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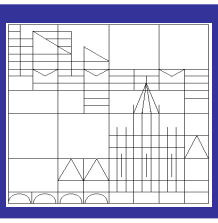

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Which Pay for what Performance? Evidence from Executive Compensation in Germany and the United States

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Abstract

This paper analyzes executive compensation in German and U.S. corporations for the period 2005-2009 including the financial crisis. We analyze the impact of stock market performance and accounting-based measures of firm performance on different compensation components. We find that only firm earnings explain total executive compensation in both samples while stock market performance does not. Cash bonus payments of German executives are explained by firm earnings and not by stock returns while U.S. bonuses are also determined by stock returns. Moreover, the sensitivity of cash bonuses to firm performance depends on firm risk and firm size. We also provide evidence that firms choose performance measures with low volatility. Finally, we find that pay-performance sensitivities are higher in the U.S. than in Germany, but have no robust explanation how long-term compensation such as company stock and options is granted in either country.

JEL Classification: G30, J33, M12

Keywords: Pay for Performance, Executive Compensation, Incentives

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1 Introduction

Since the onset of the financial crisis in 2007/08 executive compensation has been on the political agenda in both the United States and Germany. Although shareholder value of many companies fell substantially during the crisis, many executives in these companies received pay packages with large bonuses. The media and politicians in both countries started questioning for what performance these executives were actually paid, and whether executive pay was linked to firm performance at all. In the U.S. and in Germany, public objections against excessive bonus payments became visible in bonus restrictions for companies that received government support during the crisis.

Surprisingly little evidence has been added from academic studies about executive pay during this recent time period. A notable exception is Fahlenbrach & Stulz (2011) who analyze the association between CEO compensation and bank performance during the financial crisis. However, their research is limited to U.S. banks and they only look at the CEO's share of outstanding stocks as a measure of incentives in CEO compensation. Instead we analyze total annual compensation of CEOs and other executives and we look separately at individual compensation components such as bonuses and their sensitivity to firm performance during 2005-2009. Moreover, we do not limit our search for a link between compensation and performance to shareholder value (market-based performance), but also look at various accounting-based measures. We further contribute to the literature by relating pay-performance sensitivities to firm characteristics, and by comparing the pay-performance relation of executive compensation in the U.S. and Germany, two jurisdictions with very different forms of corporate control.

Our analysis is related to two major strands of the executive compensation literature. As Murphy (1999) describes in a survey, both financial economists and accountants have studied executive compensation. Whereas financial economists have mainly focused on the link between compensation and performance, accountants have studied the use of accounting-based versus stock market-based performance measures. Surprisingly, however, the two disciplines remain fairly separated. Our study combines elements from both research areas. Related to earlier studies by financial economists such as Jensen & Murphy (1990) or Aggarwal & Samwick (1999), we investigate the association between executive compensation and firm performance and calculate pay-performance sensitivities. Related to earlier accounting studies such as Lambert & Larcker (1987) or Sloan (1993), we analyze the use of accounting-based versus market-based performance

measures. Moreover, we look separately at different compensation components such as bonus payments[3]. This detailed analysis allows us to shed light on the question whether executives received large bonuses despite bad performance during the financial crisis. Finally, our work contributes to the small literature that compares executive compensation across countries. Corporate control is organized differently in the U.S. and Germany and we provide evidence for differences in the choice of performance measures and in pay-performance sensitivities between the two countries.

In this study we analyze annual executive compensation by explicitly excluding changes in executive wealth. In many other studies executive compensation includes gains from exercising options, the change in value of company stock holdings or other measures of changes in (firm-related) executive wealth[4]. However, the public discussion in the press and among politicians and regulators has focused on the link between direct annual compensation and firm performance, not on changes in executive wealth. Moreover, the link between annual compensation and firm performance is of political interest because regulation can target this annual flow of compensation. As Kaplan (2012) notes, annual compensation, but not changes in executive wealth, is directly influenced by the board of directors or the firm's compensation committee[5]. Since our study is motivated by the public doubting of any link between executive compensation and corporate performance during the financial crisis, we focus on annual compensation under the board's control.

Our findings are as follows. First, total compensation of both German and U.S. executives is stronger related to firm earnings than to stock market performance. Other measures of firm performance such as sales growth play a minor role for total compensation. Second, firm earnings explain cash bonuses in both countries, also during the financial crisis, but only cash bonuses of U.S. executives are also determined by stock market returns. We also find that the sensitivity of cash bonuses to firm performance decreases with higher firm risk and that pay-performance sensitivities differ with firm size. Moreover, we find evidence for firms choosing performance measures for cash bonus compensation that are less volatile than alternative measures. Third, our results show that

[3]Most executives receive compensation packages including fixed salaries, cash bonuses, and components providing future incentives such as company stock and options. All compensation components will be defined and discussed in detail in the data section 3.1.

[4]Notable exceptions are Perry & Zenner (2001), Aggarwal & Samwick (1999) and Kaplan (2012). Perry & Zenner (2001) analyze the impact of new tax legislation limiting the deductibility of fixed compensation items (Section 162(m) of the Internal Revenue Code, introduced in 1993) on CEO compensation. Since the regulatory change was targeting annual "flow compensation", they separate between "flow compensation" and executive wealth. Also Aggarwal & Samwick (1999) exclude wealth changes in their measure of "flow compensation", as defined on p. 71. However, their measure is still broader than ours. For example, their measure includes severance payments which we exclude explicitly whenever such payments are identified, or implicitly by dropping compensation data of executives who join or leave the company during the fiscal year for which compensation is published.

[5]See also the discussion in Perry & Zenner (2001).

pay-performance sensitivities are higher in the U.S. than in Germany. Finally, there is no robust explanation for what determines long-term variable compensation. In both countries there is only weak evidence for a correlation between long-term compensation and firm performance in prior fiscal years.

Hence, contrary to the perception in much of the public debate, we find a positive link between executive compensation and firm performance. In Germany, cash bonuses during the financial crisis were based on positive accounting performance rather than on stock market performance. In the U.S., cash bonuses can be explained with both stock market and accounting performance.

We explain differences in executive compensation between the U.S. and Germany with differences in corporate control. U.S. companies operate under a single-tier board system where the CEO can also be the chairman of the board, whereas German companies are governed by a two-tier system with a supervisory body separated from the executive board. We argue that German executives are monitored by an institutionalized supervisory body, whereas U.S. executives do not face institutionalized control, but are implicitly controlled through financial incentives. This can explain the higher pay-performance sensitivities of U.S. executives compared to their German peers[6]. Furthermore, U.S. corporate governance grants shareholders the right to elect the complete board of directors, whereas the German supervisory body is composed of both shareholder and employee representatives[7]. Employee representatives are most probably less concerned about creating shareholder value than shareholder representatives. This may explain why shareholder returns influence executive compensation in the U.S. more than in Germany.

Our study does not provide a robust explanation for what determines long-term oriented compensation such as company stock and options. This not only sets an agenda for future research, it also shows where firms and regulators can help to improve transparency and thus our understanding of executive compensation.

The paper is organized as follows. In section 2 we present findings from related studies on executive compensation. In sections 3 and 4, respectively, we describe our data and the analytical approach of our empirical study. Section 5 presents the regression results. After some robustness checks in section 6, we conclude in section 7.

[6]This argument is closely related to the 'substitution hypothesis' by Fahlenbrach (2009).

[7]In listed corporations with more than 2,000 employees, one half of the supervisory board members represent shareholders and the other half are elected employee representatives. For corporations with less than 2,000, but more than 500 employees, German codetermination law prescribes one third employee representation on the supervisory board.

2 Related Literature

This study is connected to the existing compensation literature along different dimensions. First, our work is related to previous work by financial economists and accountants. We investigate the association between executive compensation and performance and calculate pay-performance sensitivities similar to other studies in financial economics. We measure firm performance by various market- and accounting-based figures as did other accounting studies.

Second, our work can be classified within the existing compensation literature along the geographical dimension. Most of the empirical literature is based on U.S. data. Few studies investigate executive compensation outside the U.S.. Even fewer studies compare compensation practices between countries. This lack of evidence is due to the limited availability of non-U.S. compensation data. Studies on executive pay in countries other than the U.S. are usually based on hand-collected data from annual reports and filings with national authorities, or data from compensation consultancies.

In this short literature review we first present related literature on the pay-performance link and the choice of performance measures which is based on U.S. data. We then discuss the relevant literature on executive compensation in Germany[8]. Only few studies compare executive compensation in two or more countries. Since we contribute to this small literature, we conclude this literature review with some comparative studies in which one country is either the U.S. or Germany.

2.1 Evidence from the U.S.

Discussing the whole literature on executive compensation in the U.S. would go beyond the scope of this paper. For a more detailed overview we refer to extensive surveys by Murphy (1999), Frydman & Jenter (2010), Kaplan (2012) or Murphy (2012). Our study is related to studies that analyze the sensitivity of executive compensation to firm performance (pay-performance sensitivity) in U.S. firms. A first notable study is Jensen & Murphy (1990). They find a significant but surprisingly low sensitivity of CEO compensation to a firm's stock market returns for the period 1974-1986. Hall & Liebman (1998) estimate the sensitivity of CEO compensation to stock market returns for the period 1980-1994 by including in their compensation measure the annual change

[8]We present the few available studies on German executive compensation to compare our evidence with earlier findings from German data. We do not cover the entire and much broader literature on executive compensation in the U.S. because this would go beyond the scope of this comparative study. For a recent overview we refer to Frydman & Jenter (2010).

in value of stock and stock option holdings. Unlike Jensen & Murphy (1990), they find a strong relationship between CEO compensation and firm performance which comes mostly from CEO holdings of stock and stock options[9]. Unlike previous studies on CEO compensation, Aggarwal & Samwick (1999) have data on individual compensation of the top five executives in large U.S. firms for the period 1993-1996. They find for both CEOs and other executives that the sensitivity of compensation to stock market returns decreases with the variance of returns[10].

The focus of Bebchuk & Grinstein (2005) is the growth in CEO pay levels during 1993-2003 after controlling for firm size and firm performance. They measure firm performance by stock return and return on assets and find that stock return is a significant control for CEO compensation levels, whereas the effect of accounting performance on compensation is less pronounced. However, the authors do not calculate and interpret any pay-performance sensitivities since they are only interested in the growing level of compensation.

A recent U.S. study is Fahlenbrach & Stulz (2011) who investigate the impact of CEO incentives on the performance of U.S. banks during the financial crisis. They find that CEOs whose incentives are better aligned[11] with the interests of the shareholders did not outperform their peers with poorer incentives. They test this for different choices of market- and accounting-based performance measures and find that stronger incentives do not lead to better firm performance.

The second major type of studies related to our work is accounting literature about the use of different performance measures in executive compensation. In an early study, Lambert & Larcker (1987) model the use of accounting and market measures of performance in executive compensation. They hypothesize that the relative weight placed on a performance measure should be related to the noisiness of the measure. They empirically examine this hypothesis in a sample of U.S. firms during the period 1970-1984 and confirm that firms place relatively more weight on market performance if the variance of the accounting measure[12] is high relative to the market measure variance. They also find that firms with high growth rates place more weight on market performance than on accounting performance.

[9]Hall & Liebman (1998) note that executive stock options became very popular only at the end or shortly after the period covered by Jensen & Murphy (1990).

[10]This holds true whether or not they include the change in value of stock and stock option holdings in their compensation measure.

[11]They assume that CEOs who own a higher percentage share of outstanding stocks have better aligned incentives.

[12]Their market measure is the security market return defined as the sum of capital gains and dividends divided by the stock price at the beginning of the year. Their accounting measure is the return on equity defined as firm earnings before extraordinary items and discontinued operations divided by the average common shareholders' equity.

Similarly, Sloan (1993) finds in a U.S. sample for the period 1970-1988 that CEO compensation is more sensitive to firm earnings relative to stock returns if the stock price is a relatively noisy measure of executive performance, where noise in stock returns is defined as movements in stock returns related to market-wide changes in equity values. He concludes that earnings-based performance measures are used to shield executives from fluctuations in firm value that are beyond their control[13].

More recently, De Angelis & Grinstein (2010) investigate the association between firm characteristics and firm performance measures. Based on S&P 500 companies in 2007, they identify firm characteristics that determine the choice of performance measures in CEO compensation. They find, for example, that smaller firms reward performance in terms of sales growth whereas larger firms use earnings-based performance measures.

Our study is related to these studies on U.S. executive compensation. First, we estimate pay-performance sensitivities similar to Jensen & Murphy (1990), Hall & Liebman (1998) and Aggarwal & Samwick (1999), and we provide new evidence for a link between compensation and performance for a time period with financial crisis. Second, our compensation measure is similar to "flow compensation" in Aggarwal & Samwick (1999) or "grant-date" compensation as discussed in Kaplan (2012) and Murphy (2012), in that it excludes changes in executive wealth from stock and option holdings. Finally, similar to Lambert & Larcker (1987), Sloan (1993) and De Angelis & Grinstein (2010) we analyze the use of different firm performance measures and firm characteristics, but we go beyond their analysis in that we estimate pay-performance sensitivities and relate these to firm characteristics.

2.2 Evidence from Germany

Elston & Goldberg (2003) investigate executive compensation in Germany for the period 1970-1986. Controlling for firm fixed effects, they find that the average pay level of a member of the management board is mainly determined by firm size (measured by sales), but also by firm performance measured by book return on equity[14]. They also look at ownership structures and find that both concentrated ownership of large stockholders and bank influence (more than 50 percent

[13]Bushman & Indjejikian (1993) provide a theoretical model with a wage contract containing both stock price and earnings as performance measures and show that the role of earnings is to filter non-output related noise. The information content of earnings drives the relative weights put on the two performance measures in the wage contract.

[14]The latter result is not very robust though. When they split their sample by industries and run the same analysis with firm fixed effects, firm size survives the robustness check but return on equity cannot explain executive compensation in any of the six analyzed industries.

ownership of financial institutions) have a negative influence on compensation levels.

Another early study on executive compensation in German firms is Kraft & Niederprüm (1999) for the period 1987-1996. They find that firm profitability measured by book return on equity has a positive and significant impact on compensation of management board members. In their analysis, they control for firm risk[15], firm size and ownership structure of the firm. For given profits firm risk has a negative impact on compensation. Moreover, in firms that are dominated by a large shareholder compensation is lower and the sensitivity to firm profitability is smaller.

Schwalbach & Graßhoff (1997) analyze the relationship between firm performance and compensation of German CEOs using several model specifications and alternative measures of firm performance. Throughout their analysis they find a significantly positive impact of earnings per share on CEO compensation for the period 1968-1990 and a significantly positive impact of return on sales for the years 1988-1992.

Haid & Yurtoglu (2006) investigate executive compensation and ownership structures of German firms for the period 1987-2003. They also identify firm size as the most important determinant of total compensation but firm performance (measured by return on assets) also explains a large part of compensation. They further control for firm ownership structures and find that in firms with more concentrated ownership the relationship between pay and performance is weaker and the overall level of compensation is significantly lower. Moreover, executives in bank-owned companies (companies with more than 50 percent bank ownership) earn less than executives in family-owned companies (more than 50 percent ownership of a family or an individual). The authors also estimate the sensitivity of executive pay to firm performance measured by shareholder returns. They find that pay-performance sensitivity is very small, with managers receiving on average an additional $0.005 for every $1,000 increase in shareholder value.

A recent study about determinants of executive compensation in German firms is Rapp & Wolff (2010) for the period 2005-2007. They find that firm size, industry and time effects are important explanatory variables but firm performance does not add much to explaining executive compensation in German firms. In particular, they find a positive but economically very small effect of total shareholder return on executive compensation, and no significant (in some specifications weakly significant but surprisingly negative) effect of a firm's operating performance[16] on executive compensation.

[15] Firm risk is measured by the variance of book return on equity.

[16] They measure operating performance as operating income after depreciation divided by total assets.

For the time period 2005-2009, we discuss German executive compensation in a companion paper, Heimes & Seemann (2011), in which we analyze the relationship between pay-performance sensitivity, firm risk and German codetermination with employee representation on the supervisory board.

We note that most studies on executive compensation in German firms have related compensation to accounting performance rather than stock market returns. This is different from much of the U.S. literature and may be attributable to a less pronounced stock market orientation in the German economy. Our study adds new evidence for this by explicitly comparing accounting- and market-oriented performance measures.

2.3 Comparative Studies

Finally, our study is related to cross-country studies which compare executive compensation in different jurisdictions. Results from such studies are important contributions to the literature because of the difficulty to assess and compare results from single-country studies which are not based on the same compensation measures, performance measures, time periods, or estimation methodology. One example of a cross-country study is Kaplan (1994) who analyzes differences in the sensitivity of compensation to firm performance of U.S. and Japanese executives in the 1980s. He investigates the impact of firm performance on executive pay in a sample of 119 Japanese firms[17] and compares his findings to the largest 150 U.S. industrial companies[18]. He measures firm performance by accounting figures (earnings, sales growth) and by stock market performance and finds that executive compensation in Japan is most sensitive to earnings whereas U.S. executive pay is more tied to stock market performance. The author argues that this finding arises from institutional differences between the "bank and relationship oriented" Japanese system and the "(stock) market oriented" U.S. system (p. 511). He also finds that U.S. executives own significantly more shares of the firms they manage and, thus, he concludes that they have stronger incentives to increase stock returns.

Conyon & Schwalbach (1999) analyze executive pay in Europe. Their sample consists of more than 30,000 individuals in 2,800 European companies in 1996. They use information about job

[17] Taken from the *Fortune* magazine list of the 500 largest foreign industrials in 1980 measured by sales.

[18] From *Fortune*'s list of the largest U.S. industrials in 1980 by sales. The two samples differ substantially in that the median U.S. firm is much larger (measured by sales), has a higher equity market value and an income-to-asset ratio which is about twice as high as the one for Japanese firms.

positions[19] and company size measured by number of employees. They find that much of the variation in European executive compensation is explained by job level and company size. However, country effects remain significant throughout their analysis. They conclude that country-specific differences prevail and factor price equalization has not yet led to similar executive pay across Europe[20]. They also find some differences in compensation structure between countries. For example, in the UK the ratio of long-term compensation (e.g. executive stock and options) to cash compensation is 25 percent whereas this ratio is close to 0 percent in Germany.

In another study, Conyon & Schwalbach (2000) compare executive compensation in the UK and Germany during the period 1969-1995. They find that the average pay in UK firms is much higher than in German firms[21]. Also the compensation structure differs. Since the mid 1980s, UK firms use much more long-term compensation provided through long-term incentive plans than German firms. Although the authors find that firm size rather than stock returns explain executive compensation to a large part, they still identify for both German and UK firms a significantly positive link between cash compensation and firm performance. For German firms the pay-performance sensitivity of cash compensation is slightly lower than for UK firms.

Conyon, Core & Guay (2011) compare the compensation packages of U.S. and UK CEOs. Their dataset consists of 391 CEO-year observations for UK firms in the years 1997 and 2003. To make findings comparable, they use a propensity-score-matching procedure to obtain two samples that are similar in terms of firm structure[22]. Their main finding is that U.S. CEOs are paid more, but also face more compensation uncertainty as their pay packages contain more stocks and options. They conclude that risk-adjusted CEO compensation is not significantly higher in the U.S. than in the UK.

In a recent study, Fernandes, Ferreira, Matos & Murphy (2012) compare compensation levels of U.S. CEOs in the year 2006 with the level of CEO compensation in 13 other countries. They find that U.S. CEOs do not earn significantly more than CEOs in other Anglo-Saxon countries[23] once

[19] They classify executives on five job levels from "most senior full time executive" to "middle manager" (p. 20).

[20] The ten countries they consider are Austria, Belgium, Denmark, Germany, Ireland, Italy, Netherlands, Spain, Switzerland and the UK.

[21] More precisely, the authors find that average pay in UK firms is about twice as high as in German firms. However, at least part of the pay gap is probably due to differences in data availability. For UK firms the authors have information about the compensation of the "highest paid director" whereas for German firms they calculate the *average* "per capita income of the management board"(see data description in Appendix B of their paper).

[22] We use a similar matching approach to confirm our findings in a robustness check.

[23] They find effective parity in CEO pay levels among the U.S., U.K., Ireland, Australia, Canada and, as an exception, Italy.

they control for country differences in ownership structure[24] and board characteristics[25]. However, the authors still find a significant pay gap between U.S. CEOs and CEOs in continental European countries like Germany and France.

3 Data Description

We combine data from several sources. Firms in Germany and the U.S. have to publish compensation data in their annual reports. U.S. firms also report compensation data in filings with the Securities and Exchange Commission (SEC). We collected the compensation data and combine them with firm performance data from Thomson Reuters' Datastream database. In the following we provide details on the data collection process and some descriptive statistics.

3.1 Compensation Data

We have two comparable sets of compensation data. For U.S. executives, compensation data is readily available in S&P's Execucomp database and in the SEC EDGAR database for the five highest paid executive board members[26]. Since there is no similar platform for German compensation data, we hand-picked compensation data for German executive board members ("Vorstand") from annual reports on company websites.

Our German sample contains listed firms that are currently part of the Prime Standard market segment of the Frankfurt Stock Exchange[27]. Our sample includes 209 firms for which we have individualized compensation data and sufficient performance data[28]. The U.S. sample consists of 1,141 firms from the S&P 1500 Composite Index. Both datasets cover the years 2005 to 2009[29]. We have information on individual compensation of the executive board members for a wide cross section of firms of different size and industries.

[24] In particular, they control for institutional ownership and ownership by insiders such as officers, directors and related individuals or corporations.

[25] Such as board size, the fraction of independent directors, and duality of CEO and board chairman.

[26] The respective SEC filing is form "DEF 14A" ("definite proxy statement") in which listed U.S. companies have to disclose the compensation of their CEO and the next four highest paid executive board members.

[27] To be part of the Prime Standard segment, firms have to fulfill certain obligations concerning publication of quarterly reports, ad-hoc disclosure rules and accounting standards.

[28] In both samples we exclude firms in the financial industry (banking, insurance, real estate) because some of the firm performance measures we use in our regression analysis are not comparable between financial and non-financial firms (e.g earnings, growth in sales). Moreover, we exclude those firms from our analysis for which (some) firm performance measures are not available.

[29] The time period is determined by the availability of compensation data for German executives. German law requires corporations listed in Germany to provide information on the compensation structure of their executive board members for fiscal years starting after August 15, 2005.

We try to exclude executives who are not with the same company for the whole fiscal year. For such observations compensation data may contain payments that are associated with the job change (e.g. severance payments). Often these payments cannot be identified and separated from other compensation in the data and thus we try to remove such observations. In our hand-collected German sample we can identify executives who are not with the company for the whole fiscal year because this information is given in annual reports. For U.S. executives we do not have this information. We use the following proxy to identify U.S. executives joining or leaving the company. For each executive we exclude the first (last) available year of observation if her base salary in that year is only 75 percent or less of her base salary in the following (previous) year[30].

Moreover, in both samples we exclude the top and bottom 0.5 percent of observations in the compensation and performance data to make sure our regression results are not driven by extreme outliers. We are left with a German sample of 2,404 observations for a total of 896 individual executives in 209 corporations. The U.S. sample is much larger and contains 25,515 observations for a total of 9,297 individuals in 1,141 corporations. Table 1 in the appendix shows the compensation structure of executives in German (left panel) and U.S. firms (right panel) for the whole sample period 2005-2009. Total compensation is the sum of all compensation components an executive receives in a given year. We distinguish three different components of total compensation: (1) Compensation that is not performance related such as base salary, the value of company cars and insurance payments, (2) short-term compensation which is paid out as cash bonuses at the end of the fiscal year, and (3) long-term compensation which comprises the value of granted shares, stock options and company-specific long-term incentive plans. The variety of such incentive plans is quite large across firms and may include non-standard payout structures with grants in cash, deferred cash, equity, phantom stock, restricted or time vesting stock, stock appreciation rights or similar types of awards.

For the valuation of long-term compensation of German executives we rely on the numbers given in the annual reports. German law requires firms to publish the value of long-term incentives at the time they are granted. We have to rely on the values at grant date as stated in the annual reports because we do not have further information about the details of these incentive programs. Also U.S. companies publish the grant-date value of long-term incentives in SEC filings.

[30]We use the base salary as a signal for joining or leaving the company because we expect (and have anecdotal evidence that this is indeed the case) an executive to receive a monthly paid salary only for the months she is actually with the company.

Total executive compensation is thus the sum of salary and cash bonus plus the grant-date value of any long-term compensation components. We interpret this measure as the total value of "direct" compensation that shareholders grant executives for serving as firm managers for a given year. This measure is similar to "flow compensation" in Aggarwal & Samwick (1999) or "grant-date" compensation as discussed in Kaplan (2012) and Murphy (2012), because it excludes changes in executive wealth from stock and option holdings. Moreover, we explicitly exclude any gains from exercising managerial stock options or selling company stock.

Table 1 shows that during the sample period 2005-2009 the mean (median) of total compensation for German executives was 1.0 (0.6) million Euro whereas U.S. executives earned on average 2.2 (1.3) million U.S. Dollar[31]. There are substantial differences in compensation structure between the two samples. Whereas German executives received on average 53 percent of total compensation as fixed compensation, this share was only 33 percent for U.S. executives[32]. The yearly cash bonus accounted for 35 percent of German executive pay, but only 24 percent of U.S. executive pay. Conversely, the share of long-term components was much higher in U.S. executive compensation with an average of 43 percent. German executives received only 12 percent of total compensation as long-term components (and for many German executives this share was zero or negligibly small as can be seen in the median share of 0 percent)[33]. Hence the fraction of long-term components in total compensation is much larger for U.S. executives than for the German peer group. This finding confirms earlier studies such as Conyon & Schwalbach (1999) or Abowd & Bognanno (1995) who find that U.S. executives receive substantially more long-term oriented pay (both in level and as a fraction of total pay) than executives in 11 other OECD countries[34] including Germany.

Table 2 shows the development of executive compensation over time. The left part shows that average total compensation of German executives was around 1.1 million Euro during the years 2005-2007 but slightly below 1.0 million Euro in 2008 and 2009. From these summary statistics,

[31] The average (median) values are adjusted for inflation with 2005 serving as the base year.

[32] Since 1993, U.S. tax legislation limits the deductibility of fixed (i.e. non-performance related) compensation to a maximum of 1 million U.S. Dollar (Internal Revenue Code Section 162(m)), whereas any performance-based compensation is deductible regardless of the amount. Perry & Zenner (2001) find that firms reduced salaries in response to this legislation but increased performance-related pay instead. From Table 1 we see that on average U.S. executives receive fixed compensation well below 1 million U.S. Dollar, which accounts for a much lower share in total compensation than for German executives.

[33] These numbers are very similar to the numbers presented for Germany and the U.S. in Fernandes et al. (2012) for the year 2006.

[34] Abowd & Bognanno (1995) do not have an explanation for this finding. For long-term compensation components such as stock options tax treatment and disclosure rules differ between countries. However, tax treatment cannot explain why non-U.S. executives receive much less of this type of compensation and disclosure rules are generally more restrictive in the U.S. than in other OECD countries (p. 90).

however, it is not obvious whether there was truly a reduction in compensation levels during the years 2008 and 2009. From the bottom of Table 2 we see that there is a change in the sample composition over time. In 2005 and 2006 we cover fewer executive observations in fewer firms than in 2007-2009 because fewer firms published individual compensation data. Those firms publishing compensation data already in 2005 and 2006 were large firms as is evident in larger average and median firm size in those years. Since we know from earlier studies that large firms tend to pay more, the decline in compensation levels over time may be due to an increasing proportion of smaller firms in our sample. For U.S. executives we observe only a minor reduction in average compensation levels from around 2.2 million U.S. Dollar in 2005 to 2.1 million U.S. Dollar in 2009. The sample size of U.S. executives and the average U.S. firm size does not change as much over time as in the German sample. We also observe that in every year of our sample period, except for 2009, the average firm in the German sample is larger than the average U.S. firm, while the median firm size is substantially larger in the U.S. sample throughout the sample period.

Table 2 also presents the composition of total compensation over time. In both samples the shares of fixed (not performance-related) compensation, short-term cash bonuses and long-term incentive pay are fairly stable from 2005 to 2009. However, we note that in 2009 for German executives the share of fixed compensation was a few percentage points higher than in previous years (58 percent) while the share of cash bonuses was somewhat lower (32 percent). We do not observe such a change for U.S. executives.

3.2 Performance Data

To measure firm performance we start like previous studies with stock returns[35], but also extend the analysis to the accounting-based measures earnings before interest and taxes (EBIT), net income (EBIT reduced by interest and tax expenses), and sales growth. We extract all performance data from Thomson Reuters' Datastream database. Table 3 shows the distribution of these firm performance measures over the period 2005-2009 for which we have 791 German and 5,103 U.S. firm-year observations[36]. With an average annual stock return of 12.4 percent (median 5.0 percent), stock market performance of German firms was better than average stock market performance of

[35]Calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. Our results do not change when we calculate stock returns based on stock prices instead of market values.

[36]Table 3 contains the final sample of firm-year observations we use in our empirical analysis. For each performance measure we excluded the top and bottom 0.5 percent of the original distribution to account for outliers.

U.S. firms was with 7.1 percent (median 0.6 percent). There is not much difference between sales growth in the two samples. However, in terms of firm size (measured by total assets), firm earnings (EBIT) and net income (i.e. performance measures related to firm size) the two samples differ widely. With 282 million Euro the median firm size in the German sample is much smaller than the 1,810 million U.S. Dollar median firm size in the U.S. sample, whereas the average German firm is of similar size as the average U.S. firm in the sample (7,732 million Euro and 6,714 million U.S. Dollar, respectively).

4 Research Design

Principal-agent theory suggests that shareholders (acting as principals) link the compensation of the employed managers (the agents) to some measure of success which is linked to the managers' effort. It is, however, not obvious what this measure is. We have no precise information on what performance measures determine executive compensation because executive compensation contracts are generally not observable[37]. Shareholders probably care most about shareholder return and thus measure success by stock market performance. This may explain why most empirical studies in the financial economics literature investigate the link between executive compensation and firm performance by measuring the latter through stock returns.

However, as research in the accounting literature suggests, accounting measures are also used to evaluate executives. In addition, we have anecdotal evidence from German companies which in some cases explicitly explain in their annual report what determines the variable part of compensation. Much of this evidence suggests that variable compensation is not only based on stock market performance but also - and sometimes exclusively - on accounting-based performance measures such as firm earnings, income or sales growth. In fact, as Murphy (2012) argues, executives may prefer accounting-based measures because they understand their impact on accounting figures but they understand less how to influence stock prices[38].

We want to investigate this further by estimating pay-performance sensitivities based on several performance measures for both U.S. and German executives. The starting point of our analysis

[37] As De Angelis & Grinstein (2010) point out, in the U.S. disclosure is required only for some contractual terms regarding equity awards and no specific disclosure is required for what determines cash bonuses. Both U.S. firms and German firms (the latter only since 2005) have to disclose the total amount and the structure of the annual executive compensation package.

[38] This gives rise to the problem of earnings management (manipulation), which is discussed in the accounting literature but goes beyond the scope of this paper.

is the sensitivity of total compensation to performance. This will provide first insights whether executive pay is actually tied to some measure of firm performance or not. Then we continue the analysis with the variable components of total compensation, cash bonuses and long-term compensation. Analyzing compensation components individually is important because the link between firm performance and granting these different components may not be the same. Whereas cash bonuses are designed to reward performance ex post, stock price-oriented long-term compensation may also be granted ex ante to provide a link between executive compensation and shareholder value. Thus we expect a strong pay-performance link for cash bonuses, but there is no clear expectation for long-term compensation. Moreover, analyzing compensation components individually is interesting because the incentives arising from cash bonuses and long-term compensation may differ. Many studies argue that the dominant incentives for executives come from company stock and options, i.e. long-term compensation, because these ownership-providing instruments align the interest of shareholders (owners) and managers. However, cash bonuses may also provide strong incentives because risk-averse, undiversified executives are likely to favor cash payments over company stock and options with restrictions such as vesting periods. While we expect executives and companies to attach the same value to cash payments, risk-averse and undiversified executives are likely to value restricted company stock and options lower than book values[39]. This may shift the focus of executives toward maximizing cash bonuses and away from maximizing the value of stock and option holdings. Finally, we analyze pay-performance sensitivities for compensation components individually to investigate whether executives receive bonuses despite poor performance as was suggested by the public debate in the financial crisis.

We further investigate a potential association between pay-performance sensitivities and several firm characteristics. Empirical evidence, e.g. Aggarwal & Samwick (1999) and Cichello (2005), suggests that the sensitivity of total CEO wealth to shareholder value depends on firm characteristics such as firm risk. We investigate if this is also true for the sensitivity of cash bonuses to firm performance.

After running separate regressions for German and U.S. executives, we also construct two matched samples to test the significance of differences between the two countries. Institutional differences in corporate control between the German two-tier board system and the one-tier board system in the U.S. may imply differences in pay-performance sensitivities. German corporate governance is based on institutionalized control by a supervisory board separated from the executive board,

[39] See the discussion in Murphy (2012).

whereas Anglo-Saxon corporate governance with a one-tier board structure does not require this separation and CEOs often serve as chairman of the board. Hence U.S. corporate governance relies less on institutionalized control mechanisms but more on market forces to discipline executives (Conyon & Schwalbach 2000). Moreover, employee representatives on German supervisory boards[40] may be less interested in aligning management objectives with those of shareholders. This also calls for executive compensation in Germany to be less tied to stock-market performance. Due to these differences we expect more highly-powered incentives in U.S. executive compensation with a stronger focus on stock market performance than in Germany.

Evidence from other studies also calls for lower pay-performance sensitivities in Germany than in the U.S. Fahlenbrach (2009) argues that pay-performance sensitivities function as a substitute for weak corporate governance. He finds that U.S. firms in which the CEO is also the chairman of the board (one of the author's measures for weak corporate governance) implement higher pay-performance sensitivities in compensation contracts. By German law, CEO and chairman (of the supervisory board) cannot be the same person and which calls for pay-performance sensitivities in German firms to be lower than in U.S. firms.

Finally, Hüttenbrink, Rapp & Wolff (2011) identify high ownership concentration as a substitute for pay-performance sensitivity to align executive decisions with shareholder interests. Since ownership concentration has traditionally been higher in Germany than in the U.S., this again calls for lower pay-performance sensitivities in German firms. The same authors argue that transparency in executive compensation is important for shareholders to assess compensation incentives and detect malfunctions faster. Higher disclosure requirements would thus make pay-performance contracts more effective which should empirically become visible in higher pay-performance sensitivities. Indeed, they find that higher disclosure requirements defined by national corporate law are complementary to higher pay-performance sensitivities. This again calls for higher pay-performance sensitivities in U.S. firms because disclosure requirements in the U.S. have traditionally been much higher than in Germany [41].

We calculate pay-performance sensitivities from the coefficient estimates in a regression of annual executive compensation on firm performance. Since it is well documented that larger firms pay their managers more, we control for firm size. We also include executive fixed effects to control

[40] German codetermination law requires one third (half) of the supervisory board members to be employee representatives for firms with more than 500 (2,000) employees.

[41] For example, German law had not required disclosure of individual compensation per executive board member before 2005.

for executive-specific characteristics which we do not observe although they may have explanatory power for compensation, e.g. biographical variables (age, tenure, education) or a manager's bargaining power. Finally, we include year dummies to account for time effects in executive compensation during our sample period.

Note that in our basic specification with executive fixed effects we do not include other control variables such as board size, ownership structure or industry. During our relatively short sample period such variables change little over time (or not at all). Since only few executives move from one firm to another within our sample period, time-invariant differences in the cross section are captured by executive fixed effects[42]. We are interested in pay-performance sensitivities and thus estimate the impact of firm performance on compensation but we are not interested in the impact of, e.g., board size or education on compensation. Hence we choose executive fixed effects to cover as much unobserved cross-sectional variation as possible to estimate the explanatory power that is left for firm performance measures[43].

We denote annual compensation of executive i at firm j in year t by w_{ijt} and estimate the following linear fixed effects model:

$$w_{ijt} = \boldsymbol{p}'_{jt}\boldsymbol{\beta} + \gamma s_{jt} + \lambda_i + \mu_t + \epsilon_{ijt}, \tag{1}$$

where $\boldsymbol{p}'_{jt} = (p_{1jt}...p_{kjt})'$ is a vector of k performance measures for firm j in year t, s_{jt} is a measure for firm size (total assets), λ_i is an executive fixed effect, μ_t is a year dummy, and ϵ_{ijt} is the error term.

[42]We are confident that our coefficient estimates of firm performance (which we use to calculate pay-performance sensitivities) would not differ much with additional ownership and board-level variables instead of executive fixed effects. We lack the data but the results in Fernandes et al. (2012) show that additional variables controlling for ownership and board structure are significant in a regression of compensation on firm performance and industry-level fixed effects, but hardly change the coefficient estimates of the performance measures.

[43]In the literature, we are no exception in following this approach. For example, Bebchuk & Grinstein (2005) are interested in the growth of CEO pay levels that is not explained by growth in firm size and firm performance. Hence they explicitly control for firm size and performance, and add firm-level fixed effects (which corresponds to executive effects in a regression with CEOs alone) to account for remaining cross-sectional variation. On the other hand, Fernandes et al. (2012) are interested in the explanatory power of ownership and board structure on executive compensation. Of course, they do not add executive or firm-level fixed effects because such time-invariant dummies would capture their variables of interest that are also mostly time-invariant. Instead they add industry dummies to control for industry effects on compensation.

5 Results

5.1 Results for Total Compensation

We first estimate equation (1) with total annual compensation including salary, cash bonus and long-term compensation on the left and one performance measure on the right. Then we combine all performance measures in one regression to see which measures have most explanatory power for total executive compensation in our two samples. Table 4 shows the results for the German sample. The first regression results show a (weakly) significant and *negative* relationship between a firm's stock return in year t and the total amount of compensation a firm manager receives at the end of year t. The next two regressions show that firm earnings (EBIT) and net income (EBIT reduced by interest and tax expenses), respectively, have a highly significant *positive* impact on total compensation. Sales growth turns out to be no significant determinant of total compensation in German firms.

The combined regression with stock returns, EBIT and sales growth as explanatory performance measures[44] in the last column of Table 4 confirms these results. However, whereas the estimated coefficient of EBIT is about the same size as in the regression with EBIT as the only performance measure, the coefficient of stock returns is almost twice as large in absolute terms (more negative) as before. Sales growth is again insignificant. The positive and significant coefficient of the CEO dummy shows that CEOs earn significantly more than other executive board members. All specifications in Table 4 include year dummies for the years 2006-2009 to account for time effects (with 2005 serving as the base year). The coefficients are significant and positive throughout the years. This means that with respect to the reference year 2005, average compensation was significantly higher in each of the following years. Moreover, the coefficient size of the year dummies shows a peak in 2007 and lower levels for 2008 and 2009. This suggests that total compensation in the crisis years 2008 and 2009 was significantly higher than in 2005 but lower than it was during the peak in 2007.

Note that although the correlation between the performance measures in the last column of Table 4 is small, there may still be some degree of multicollinearity in our specification. EBIT and net income are correlated with firm size measured by total assets (the correlation is around 0.7), because in the cross section larger firms generate higher earnings and income than smaller

[44]The results do not change when we replace EBIT with net income. We do not combine EBIT and net income in one regression because these two variables are highly correlated (correlation of 0.9). Correlation between the other performance measures is very small.

firms. Multicollinearity inflates the standard errors of the regression coefficients and thus causes downward-biased t-statistics. In our specification, however, multicollinearity is not the reason why total assets is mostly insignificant in Table 4. There is not much variation in total assets over time during the five-year sample period and variation in the cross section is taken by the fixed effects[45]. A straight-forward approach to avoid multicollinearity would be to drop firm size from the regression. However, this changes the specification and may cause an omitted-variable problem which is not preferable over some degree of multicollinearity. Another approach in the literature is orthogonalization of correlated variables. Specifically, this would imply to first regress EBIT or net income, respectively, on total assets and then use the residual of this regression as a performance measure in equation (1) instead. However, as Kennedy (1982) and Pearce & Reiter (1985) show, the estimated coefficient of the residual would be the same as the coefficient of EBIT or net income in the original specification without orthogonalization (also the standard error of the coefficient would not change). Thus the interpretation of the effect of EBIT or net income on compensation would not change. Only the estimated coefficient of total assets would change such that this coefficient shows the effect of total assets on compensation as if there was no EBIT or net income in the regression[46] and thus from a different specification without firm performance[47]. Since we do not interpret the effect of firm size on compensation because it is largely captured by the fixed effects, we prefer to keep our original specification with EBIT or net income, respectively, and total assets as a control variable[48].

Table 5 shows the corresponding results for the U.S. dataset. Unlike for the German data, we find no relationship between stock returns and total executive compensation. EBIT, net income and also sales growth are highly significant when taken separately as performance measures. When we combine stock returns, EBIT and sales growth in one regression (last column of Table 5) we find that both EBIT and sales growth remain significant. The CEO dummy is highly significant and

[45]It is a well established result that in the cross section firm size is a strong predictor for executive compensation. Larger firms pay higher compensation also in Germany; see for example Haid & Yurtoglu (2006). However, executive fixed effects capture this firm size effect. The variation in total assets for a given firm during our five-year sample period is not a strong predictor for changes in compensation in that firm. When we estimate the specifications in Table 4 without executive fixed effects, our results remain qualitatively the same but total assets have significant explanatory power for executive compensation.

[46]See the critique on this issue in Clarke & Stone (2008).

[47]The coefficient would be estimated from a misspecified model, because we do not believe that executives are paid according to firm size alone and not for performance at all.

[48]Yet another alternative would be to use as a regressor in equation (1) the ratio of EBIT divided by total assets. In a robustness test we find that this ratio is positive and significant and all other results remain qualitatively unchanged. However, anecdotal evidence from German annual reports suggests that executive compensation is rather based on EBIT than on return on assets measured by EBIT over total assets. Hence we prefer to use EBIT as a performance measure and control for firm size by including total assets as a separate control variable.

much larger than in the German sample, which indicates that the difference in total compensation between CEOs and other executive board members is even more pronounced in the U.S. than in Germany. As noted before, we do not interpret the coefficient of total assets although it is significant in some specifications in Table 5[49]. The time dummy variables show a similar pattern as in the German regression set, but the coefficients indicate that U.S. executives reached the peak in average total compensation levels in 2008 and not already in 2007 as their German peers did.

Note that the coefficients in Tables 4 and 5 are not only statistically significant, but also economically meaningful. The dependent variable, total compensation, is denoted in thousands of Euros (U.S. Dollar) in the German (U.S.) sample, whereas EBIT is measured in millions of Euros (U.S. Dollar). Hence, for generating 1 million Euro (U.S. Dollar) in EBIT, the average German (U.S.) executive in our sample receives 164 Euro (223 U.S. Dollar) in total compensation. The significant coefficient of sales growth in the U.S. sample suggests that the average U.S. executive receives 454,000 U.S. Dollar for a 1 percent increase in sales[50]. The interpretation of the significant but negative stock return coefficient in the German sample is less intuitive. It suggests that on average a German executive in our sample receives 52,950 Euro after a negative 1 percent stock return.

This unexpected result calls for further investigation of the relationship between stock market performance and executive compensation. We split the sample period in pre-crisis and crisis years to analyze whether there are differences between these sub-periods. Matolcsy (2000), for example, identifies an impact of economic growth on the pay-performance relation of executive compensation. He finds a positive relation between executive cash compensation in Australian firms and accounting performance in periods of economic growth, but no significant relation during economic downturn.

In particular, we analyze executive compensation in two sub-periods, 2005-2007 as a pre-crisis period, and 2007-2009 as the period containing the financial crisis. We include the year 2007 in both sub-periods because, first, it is not clear whether to call 2007 already a crisis year or not, and, second, to have enough years in both regressions for our fixed-effects specification to be meaningful[51].

[49]Once again, when we estimate the specifications in Table 5 without executive fixed effects, all results remain qualitatively the same but total assets are highly significant in all regressions.

[50]This number seems high at first sight. However, the average (median) sales in the U.S. sample are 5,906 million (1,679 million) U.S. Dollar. Thus a 1 percent increase in sales means additional 59.1 (16.8) million U.S. Dollar in revenues for the average (median) firm in our sample.

[51]Our main results do not change qualitatively though when we look at the two-year period 2008-2009 separately in a specification without individual but industry fixed effects.

Table 6 shows that the negative stock return coefficient in the Germans sample is no longer significant in the two sub-periods and thus does not survive this first robustness check. The EBIT coefficient is significant in both sub-periods and of similar size as in the full sample. With coefficients of 0.1841 in 2005-2007 and 0.1317 in 2007-2009, the pay-performance sensitivity based on EBIT is somewhat larger during the pre-crisis period. Sales growth is again not significant for total compensation of German executives. For U.S. executives, we find more pronounced differences between the sub-period results in Table 6. Whereas there was no significant impact of stock returns on U.S. compensation in the full sample period, stock returns have a *positive* impact on total compensation in the pre-crisis period 2005-2007, but a *negative* impact during 2007-2009. The EBIT coefficient is positive and significant in both sub-periods, and with 0.4144 in 2005-2007 twice as large as the 0.1963 in 2007-2009. Sales growth was significant in the full sample period, but is only significant during sub-period 2007-2009.

To sum up, for both German and U.S. firms we find that firm earnings measured by EBIT and, in the case of U.S. executives, also sales growth have a significantly positive impact on total compensation. This holds for the full sample but also in each sub-period in which pay-performance sensitivities based on EBIT are lower during the crisis period in both samples. The latter result is not as strong as Matolcsy's (2000) finding of no pay-performance link during years of economic downturn, but it goes into the same direction. Moreover, with respect to EBIT we find somewhat higher pay-performance sensitivities in the U.S. than in German firms.

The sub-period analysis confirms to some extent our expectation that stock market performance is a more important determinant in the U.S. than in Germany, because it has a significant (and positive) impact on total compensation of U.S. executives during 2005-2007. However, it seems to be negatively related to total U.S. compensation during the 2007-2009 period. In the following sections we identify which component of total compensation is negatively related to stock market performance in the U.S. More broadly, we now analyze whether the results for total compensation hold true for individual compensation components such as cash bonuses and long-term oriented compensation.

5.2 Results for Cash Bonuses

In this section we replace total compensation, w_{ijt}, in equation (1) with short-term variable compensation (cash bonuses). Again we analyze the full sample and the two sub-periods 2005-2007 and 2007-2009, separately. Matolcsy's (2000) finding of a significant pay-performance link in

Australian firms only during periods of economic growth was based on cash compensation alone and explained with lower performance targets for cash bonuses in times of recession. If his finding also holds for the U.S. or Germany, it should be identified in this section based on cash bonus compensation.

Table 7 summarizes the results. The coefficient estimates in the first column show that, based on the full sample 2005-2009, cash bonuses of German executives are determined by EBIT and sales growth, but not by stock market performance. During the pre-crisis period 2005-2007, stock returns, and also EBIT, have positive explanatory power for German cash bonuses (column 3). This does not hold for the crisis period 2007-2009, in which once again only EBIT and sales growth are significant (column 5). Thus we find that only EBIT is a consistently significant determinant of cash bonuses in German firms. Based on the whole sample period, the estimated coefficients imply that German executives receive on average 162 Euro in cash bonuses for generating 1 million Euro in EBIT. This estimate is almost as large as the 164 Euro from the specification with total compensation in Table 4. Hence, for German executives the pay-performance sensitivity of total compensation to EBIT comes mainly from cash bonuses. With 185 and 126 Euro, respectively, EBIT sensitivity of cash bonuses is somewhat higher in the pre-crisis period but lower during the crisis. For the sub-periods these numbers are also similar to the pay-performance sensitivities of total compensation in Table 6.

Estimates for U.S. executives, shown in columns two, four and six of Table 7, are more consistent across different time periods. Cash bonuses are significantly and positively related to stock returns, EBIT and sales growth in all regressions. Thus the negative relation between stock returns and total compensation in 2007-2009 (last column of Table 6) is not driven by cash bonuses. Based on the full sample period, the coefficient of stock return implies that U.S. executives receive on average a cash bonus of 135,000 U.S. Dollar for a 1 percent stock return. This estimate is somewhat higher for 2005-2007 and lower for 2007-2009. The EBIT coefficient based on 2005-2009 implies a 191 U.S. Dollar cash bonus for generating 1 million U.S. Dollar in EBIT. Again, this estimate is higher for the pre-crisis period and lower during the crisis period. It also shows that cash bonuses account for a large part of the estimated 223 U.S. Dollar EBIT sensitivity of total compensation in Table 5, but less so than for German executives. The coefficient of sales growth from the regression for 2005-2009 implies that U.S. executives receive on average a cash bonus of 373,000 U.S. Dollar for a 1 percent increase in sales. This estimate is lower in the pre-crisis period and higher in the crisis period.

The results in this section show that EBIT is an important determinant for cash bonuses of German and U.S. executives in both sub-periods. Stock returns are significant for cash bonuses throughout the sample period only for U.S. executives, but not for German executives during the crisis period. Our results explain why German and U.S. executives received bonuses during the crisis. As long as firms generate positive EBIT, managers may receive a bonus even though the stock return was negative. Although the estimated pay-performance sensitivities based on EBIT and stock returns are consistently smaller during the crisis period, our results differ from Matolcsy's (2000) finding of no pay-performance relation in crisis years for Australian firms. However, our findings for cash bonuses are in line with other results in the literature. The focus on earnings rather than stock return in German executive compensation was also identified by Schwalbach & Graßhoff (1997) and Haid & Yurtoglu (2006). Stock returns have always been identified as relevant for U.S. executive compensation, for example in Jensen & Murphy (1990), Hall & Liebman (1998) or Aggarwal & Samwick (1999).

Our results are supportive to the hypothesis that the institutional background has an impact on the compensation structure. On U.S. boards shareholders have more influence than shareholders on German supervisory boards. This may explain why in U.S. firms stock performance is a significant determinant for cash bonuses throughout the sample period, whereas in German firms only accounting measures are consistently significant for cash bonuses. We may also interpret this finding in the spirit of Kaplan (1994) who argues that executive compensation in the U.S. is more related to stock returns than in Japan because of the market-oriented U.S. economy. In Japan, earnings determine executive compensation because, similar to Germany, the Japanese economy is rather bank-oriented than stock-market oriented. We also find that pay-performance sensitivities are higher in the U.S. than in Germany in all regressions. This gives support to our hypothesis that monitoring in the German two-tier board structure serves as a substitute for more incentivized executive compensation in the U.S.

5.2.1 Cash Bonuses and Firm Risk

It is known from previous studies that some firm characteristics have an impact on the link between firm performance and executive compensation. For example, Aggarwal & Samwick (1999) present empirical evidence that executive compensation is less related to firm performance in riskier firms. The intuition behind this result is that performance-related compensation involves a risk transfer for which executives need to be compensated. Thus performance-related compensation is more

costly for riskier firms. We expect a negative relation between risk and pay-performance sensitivity, although there are conflicting findings in the literature. Prendergast (2002) argues in favor of a *positive* relation between risk and performance-related compensation, because firms in risky environments are more likely to delegate decision responsibility to executives and link compensation to observed performance.

Our measure of firm risk is the variance of firm performance prior to the compensation event in year t. For monthly stock returns we calculate the variance over the three years preceding the beginning of fiscal year t[52]. Because EBIT and sales growth is annual data we use a time horizon of 10 years to calculate the variance prior to fiscal year t. For each measure we normalize the variance between zero and one by dividing its rank within the sample by the number of observations[53]. We add a risk measure for each performance measure that we identified as significant for cash bonuses in Table 7, and also interaction terms between performance and risk measures. If pay-performance sensitivity is decreasing in firm risk, these interaction terms should have negative coefficients.

The results are shown in the first two columns of Table 8. One problem of our risk measures is that they require a data history of up to 10 years prior to the compensation event. This requirement substantially reduces the sample size. The German sample is reduced by almost 40 percent, whereas the U.S. sample loses only 16 percent of its observations. In the reduced German sample (column 1 of Table 8), we find the expected negative relation between risk and pay-performance sensitivity of cash bonuses only for EBIT. The negative interaction term suggests that for given EBIT, executive compensation in riskier firms is less sensitive to EBIT than in less risky firms. In this specification the pay-performance sensitivity can be calculated by adding the rank of the risk measure times the coefficient of the interaction term to the coefficient of EBIT. The pay-performance sensitivity at the firm with median risk in our German sample is $0.8700 - 0.5 * 0.7844 = 0.4778$, whereas this sensitivity is 0.8700 and 0.0856, respectively, at the firms with minimum and maximum risk in our sample. This means that for 1 million Euro firm EBIT a manager at the firm with median (minimum) [maximum] risk in our sample receives 478 (870) [86] Euro.

In this specification, the coefficient of sales growth is negative when we control for risk and the interaction term. This is contrary to what we expected. However, when we exclude the risk term from the regression, sales growth is, unlike in the full German sample before, not significant in

[52] If compensation is paid for fiscal year 2008, beginning at 01/01/2008, the variance is calculated based on monthly returns from the period 01/01/2005 to 12/31/2007.

[53] This risk measure has thus a value of one (zero) for the most (least) risky firm in the sample.

this reduced sample. Since sales growth does not survive this critical robustness test, we do not interpret its negative coefficient in Table 8.

Column 2 of Table 8 shows the results with firm risk for the U.S. sample. In the base specification in Table 7 we found significant explanatory power of EBIT, sales growth and stock returns. When we add a risk measure for each performance measure to our base regression, we see that all performance measures remain highly significant and that the interaction terms are also significant with the expected negative coefficients. The estimates of the coefficients imply that a manager at the firm with median (minimum) [maximum] risk in the U.S. sample receives 551 (981) [121] U.S. Dollar for 1 million U.S. Dollar in firm EBIT. For a 1% stock return or sales growth the manager at the firm with median risk receives 177,000 or 270,000 U.S. Dollar, respectively.

Pay-performance sensitivities vary substantially with firm risk in the two samples. For example, compared to the estimates in our base specification in Table 7, the EBIT pay-performance sensitivity at the firm with the median (lowest) risk is about three (five) times higher in both samples. It is not straightforward to compare the pay-performance sensitivities between the two samples because risk levels of firms at a certain point of the risk distribution (e.g. at the median) differ substantially between the two countries. However, if we compare firms with a similar level of risk, pay-performance sensitivities are still higher in the U.S. sample. This gives further support to our hypothesis that incentives are lower in the German two-tier system of corporate control. Stock returns are a highly significant and positive determinant of cash bonuses only in the U.S. sample which is further evidence that the stronger shareholder focus of U.S. boards is reflected in compensation contracts.

5.2.2 Cash Bonuses and Firm Size

Next we analyze whether firm size has an impact on pay-performance sensitivities. As Cichello (2005) notes, pay-performance sensitivities may not only depend on firm risk, but also on firm size. To account for firm size we use the same strategy as for firm risk. We rank all firms with respect to total assets, divide by the number of observations and interact this rank measure with each performance measure. We expect different coefficient signs for these interaction terms. The interaction term between firm size and EBIT should be negative, while the interaction terms between firm size and stock return or sales growth, respectively, should be positive. To see why, consider one small and one large firm. Generating, say, 10 million Euro in EBIT may be a good result for the small firm, but a very poor result for the large firm. This should be reflected in cash bonuses in the two

firms. Hence in the cross section pay-performance sensitivity based on EBIT should be lower in larger firms. The expectation differs when we consider stock return and sales growth as performance measures. The reason is that these measures already indicate performance relative to firm size, and not absolute values. Generating a 1 percent stock return or a 1 percent increase in sales creates more additional value in firms with large market value and sales numbers than in smaller firms. If this is reflected in bonus payments, we should expect higher pay-performance sensitivity based on stock return and sales growth for larger firms in our sample.

The results of this specification are as expected only for the U.S. sample. The last column of Table 8 shows that pay-performance sensitivity based on EBIT decreases linearly as we move from smaller to larger firms, whereas pay-performance sensitivities based on stock return and sales growth increase. The estimated coefficients imply that the executive at the smallest (median) U.S. firm receives a cash bonus of 1,154 (631) U.S. Dollar for generating 1 million U.S. Dollar EBIT, 25,000 (145,000) U.S. Dollar for a 1 percent stock return, and 218,000 (305,000) U.S. Dollar for a 1 percent increase in sales.

For the German sample we find no significant relation between firm size and pay-performance sensitivities when we directly interact the ranked size measure with our performance measures (results not shown). To identify a potential non-linear relation between size and pay-performance sensitivity, we create a dummy variable ('LARGE') which is one if the firm belongs to the upper half of the size distribution and zero else. We interact this dummy variable with EBIT and sales growth which were significant for German cash bonuses in Table 7. The coefficient of the interaction term with EBIT is negative and significant, but the interaction term with sales growth is not significant (column 3 of Table 8). The estimated coefficients imply that an executive of a firm that belongs to the lower (upper) half of the size distribution receives 3,436 (165) Euro for generating 1 million Euro EBIT.

The results for both samples confirm the hypothesis that pay-performances sensitivity based on EBIT is decreasing with firm size. Pay-performance sensitivities differ substantially between firms of different size. For the smallest (median size) firm in the U.S. sample, the sensitivity of cash bonus payments to EBIT is six (three) times the average cash bonus sensitivity calculated from the specification in Table 7. In the German sample the difference is even more pronounced, probably because there is much more variation in firm size within the sample (see Table 3). The average pay-performance sensitivity based on EBIT at firms in the lower half of the size distribution is more than 20 times higher than at firms in the upper half of the size distribution. Only for the

U.S. sample, we find that firm size has a strong impact on pay-performance sensitivities based on stock return and sales growth. Compared to the smallest firm in the U.S. sample, we estimate that pay-performance sensitivities based on stock returns and sales growth at the median sized firm are larger by a factor of 5.8 and 1.4, respectively.

5.2.3 Cash Bonuses, Performance Measures and Volatility

In this subsection we use a simple regression framework to test for evidence of a central result in the accounting literature. As discussed in the literature section, accounting studies such as Lambert & Larcker (1987) or Sloan (1993) analyze the choice of performance measures in executive compensation and find that firms place relatively more weight on performance measures which are less noisy or volatile. We test for this result by dividing the U.S. sample into four subsamples[54] of firms with (1) stock return volatility below the sample median and EBIT volatility below the sample median, (2) stock return volatility below but EBIT volatility above the median, (3) stock return volatility above but EBIT volatility below the median, and (4) both volatility measures above the respective median values. Volatility is measured by the 3-year stock return variance and the 10-year EBIT variance as described above.

Table 9 shows the results. The coefficient of stock return is substantially larger for firms with low stock return volatility (columns 1 and 2 of Table 9) than for firms with high stock return volatility (columns 3 and 4). Analogously the EBIT coefficient is larger for firms with lower EBIT volatility (columns 1 and 3). This is consistent with the negative relationship between volatility and pay-performance sensitivity (Table 8). Furthermore, Table 9 shows a positive impact of the volatility of one performance measure on the pay-performance sensitivity of the other performance measure. For example, firms with low stock return volatility not only have a larger EBIT pay-performance sensitivity when EBIT volatility is lower, they also have lower stock return pay-performance sensitivity (compare columns 1 and 2). This implies that firms with higher EBIT volatility substitute EBIT with stock returns as a performance measure. These results are in line with the findings from the discussed accounting studies.

[54] We cannot perform the same test for German data because the German subsamples become too small for meaningful fixed-effects regressions.

5.3 Results for Long-Term Compensation

We finally analyze long-term oriented compensation. In the German sample we face the problem that about half of the executives receive no long-term compensation components. To include all the information in the data we estimate a Tobit model for the German sample. In the U.S. sample only 4% of the observations show zero long-term compensation. Since this is a small fraction of the data, we continue to use a panel specification.

Column 1 of Table 10 shows the results for the German executives when we only include firm performance from the previous fiscal year as explanatory variables. Only stock returns have significant explanatory power for long-term compensation for the period 2005-2009. The negative sign suggests that the lower the stock return in the fiscal year, the higher was the amount of long-term compensation executives received. For U.S. executives (column 3 of Table 10) we find very similar results. Stock returns have a significantly negative impact on long-term compensation, but there is no explanatory power of other performance measures. This negative relation between stock returns and long-term compensation explains the negative stock return coefficients we found for total compensation (Tables 4, 5 and 6).

Although a negative relation between stock returns and long-term compensation seems strange at first, we explain this as follows. When the stock of a company declined during a fiscal year, companies may want to motivate executives to increase the stock price in subsequent years. Granting more long-term compensation can provide additional incentives for executives to generate positive stock returns. This may lead firms to grant more long-term compensation as an incentive to increase the stock price after a year with a declining stock price.

Whereas in most annual reports it is explicitly stated that cash bonuses are paid for performance in the preceding fiscal year, this is not true for long-term compensation. We now include lags of our performance measures to see whether long-term compensation is determined by performance over a longer time horizon.

Columns 2 and 4 of Table 10 show the results for German and U.S. executives, respectively. Stock returns in the previous fiscal year have no explanatory power for long-term compensation in both samples. Stock returns in the four preceding fiscal years have a significantly positive impact on long-term compensation for U.S. executives, whereas in the German sample this only holds for the stock return up to three years ago. EBIT is insignificant in both samples[55]. Lagged sales growth

[55]EBIT is correlated over time. Dividing EBIT by total assets decreases this correlation considerably, but does not

has a weakly significant and negative impact on long-term compensation in the U.S. sample and a weakly significant positive impact in the German sample.

We tried to confirm these results for our two sub-periods (not shown). For the German sample the negative coefficient of stock returns is significant in the 2007-2009 period, whereas it is still not significant in the 2005-2007 period. Lagged stock returns cannot explain long-term compensation in the pre-crisis period, but are significant in the crisis period for up to two years. For the U.S. sample the coefficient of stock returns in the previous fiscal year is positive and significant in the pre-crisis period and negative and significant in the crisis-period. Results for the lagged stock returns remain unchanged for the pre-crisis period. In the crisis period only stock returns from one and four years ago have significant explanatory power.

There is no consistent explanation for long-term compensation in either country. Our results suggest that long-term compensation grants are subject to discretion rather than purely performance-oriented. One possible explanation for this finding is the following. We have anecdotal evidence from German firm's annual reports that they grant a particular value of long-term compensation every year. This would also explain that there is no pay-performance relation in the crisis. Another possibility to design long-term compensation is to grant a particular number of stocks or options every year[56]. This would imply that the value of long-term compensation is positively related to prior firm performance and explain the positive pay-performance relation between long-term compensation and (lagged) stock returns in the U.S. sample before the crisis. When firms grant more long-term compensation after years with negative stock returns, as explained above, the pay-performance relation would be negative. This could explain the negative impact of stock returns on long-term compensation in both samples during the crisis.

6 Robustness

We perform several robustness checks. All results remain qualitatively the same with industry or firm-level fixed effects instead of individual fixed effects. Stock returns remain insignificant for explaining total executive compensation also when we measure stock returns relative to index returns to see whether shareholders look at relative instead of absolute stock market performance. Our risk measure was based on monthly data over a three-year horizon. Results do not change when

change our results.

[56] See the discussion in Murphy (2012).

we use weekly data or a four-year horizon. In all regressions we exclude firms from the financial industry because performance measures such as sales growth or earnings are hardly comparable between financial and non-financial firms. Other studies in the literature also exclude firms in the utilities sector because both the financial and the utilities sectors differ from other sectors in that they are highly regulated. In a robustness check we find no substantial changes in our results when we exclude utilities.

At least 10 percent of firms in both the German and the U.S. sample report a negative EBIT. We test the robustness of our results by including a dummy variable which is one for a negative EBIT and zero otherwise, and also an interaction term of this dummy with EBIT. The dummy is significantly negative but the interaction term is not significant (results not reported). Since the EBIT coefficient remains very similar to the one in our original specification without the dummy variable, we conclude that executive compensation in firms reporting a negative EBIT is generally lower but the pay-performance sensitivity is not significantly different from the average sensitivity of other firms in the sample[57].

Although we exclude the upper and lower 0.5 percent of the total compensation distribution, our results may be driven by outliers or the typical skewness of an income distribution. As a robustness test we repeat our analysis with median regression instead of fixed-effects panel regression (not reported). For the U.S. sample, all results for total compensation and cash bonuses and in all sub-periods do not change[58]. For the German sample there are two minor changes. First, based on the full sample period, total compensation is still driven by EBIT but we lose the significance of the unintuitive *negative* stock return coefficient in Table 4. Second, for cash bonuses during 2005-2009 not only EBIT but also stock returns are significant (though on a weak level), similar to what we found for the sub-period 2005-2007 in Table 7. However, since stock returns are highly significant with a larger coefficient in all sub-periods for the U.S. sample, we still argue that stock market performance plays a more pronounced role in U.S. cash compensation than in Germany.

A more general concern pertains our two very different datasets. The two samples differ not only in the total number of observations (2,404 hand-collected German observations versus 25,515 U.S. observations) but also in various characteristics such as industry composition, average firm size

[57] In a similar robustness test a dummy for negative stock returns is not significant and does not change our results for stock returns.

[58] Of course, median pay-performance sensitivities are not identical to average pay-performance sensitivities from regressions accounting for individual fixed effects, but they are of similar order of magnitude. This was also found by other authors using both median regression and OLS with executive fixed effects, e.g. Aggarwal & Samwick (1999) or Cichello (2005).

and number of observations per year (see Table 2). In our regressions we control for firm size, industry[59] and year of observation to make sure that any differences in results between the two samples are not driven by these sample differences.

As a robustness check we now create a subsample of U.S. firms that does not show these differences in firm characteristics relative to the German sample. Since we are ultimately interested in how executives are paid in German and U.S. firms we not only match the samples in terms of average firm size, industry and number of observations per year, but also with respect to our firm performance measures. We want to compare two samples of firms which differ only in their nationality. In particular, we create a U.S. subsample which is comparable to our German sample with respect to (1) number of observations per year, (2) industry composition (measured by the two-digit supersector Industry Classification Code (ICB)), (3) average firm size, and (4) firm performance. For each German firm we look in the sample of U.S. firms for the closest match in terms of these criteria.

We start the matching procedure with pooling the two samples to estimate for each year in a Logit regression the probability that a firm is German as a function of firm size, stock return, EBIT, sales growth and industry indicators[60]. Table 11 shows the results. The dependent variable in the Logit regression is a German indicator variable which equals one if the firm is German and zero otherwise. The coefficients indicate that on average German firms show significantly higher EBIT, but lower total assets than U.S. firms throughout the period 2005-2009. Stock returns were significantly higher for German firms 2005 to 2007 and significantly lower than in U.S. firms in 2008. Sales growth was significantly lower in the German sample in 2005 and 2007.

Based on the Logit regressions we calculate propensity scores, look for the best match for each German firm in 2005, and include all available observations of this match in the U.S. subsample[61]. In each of the subsequent years 2006-2009 we only search for a match for all German firms that were not matched in previous years and include all observations of the U.S. matches[62]. Our matching procedure delivers a U.S. sample that is indeed similar to the German sample with respect to

[59]This is done implicitly by including individual fixed effects because almost no executive moves firms within our short sample period. All results hold when we use industry fixed effects instead.

[60]Here we include only one observation per firm in every year. Moreover, for our matching procedure we converted all U.S. Dollar values into Euro values at historical exchange rates before combining them in the Logit regression.

[61]The results of our robustness tests with matched samples hold true when we consider only the CEOs of our matched firms.

[62]Note that we include all available observations 2005-2009 of matched U.S. firms irrespectively of the number of available observations for German firms. This explains why our matching procedure leads to a U.S. subsample which is much smaller than the full U.S. sample but still larger than the German sample.

average firm size, industry composition and firm performance. Table 12 presents summary statistics for executive compensation in the matched U.S. sample. Compared to the full U.S. sample in Table 1, total compensation of executives in the subsample is lower (1.8 million U.S. Dollar instead of 2.2 million U.S. Dollar in the full sample), and the average share of fixed compensation is slightly higher (37 instead of 33 percent) while the long-term share is lower. The structure of executive compensation in the matched U.S. subsample is still significantly different from the German sample whereas the two samples are very similar in terms of firm structure.

The first two columns of Table 13 show regression results based on the matched U.S. sample with 3,665 observations. When we compare the results for total compensation as the dependent variable (first column of Table 13) with those based on the full U.S. sample (last column of Table 5), we find again that EBIT has a significant positive impact on total compensation. The estimated coefficient is smaller though and suggests for executives in the subsample an increase in compensation of 167 U.S. Dollar for 1 million U.S. Dollar generated EBIT instead of the 223 U.S. Dollar estimated in the full U.S. sample. Hence we find a less pronounced difference in the sensitivity of compensation to firm performance measured by EBIT between U.S. and German executives when we compare the two samples of similar structure and size. Stock returns are again not significant in the subsample and sales growth is not significant either although it was significant for the full U.S. sample.

Column 2 of Table 13 shows the regression results for the matched U.S. sample with cash bonuses as the dependent variable. Stock returns, EBIT and sales growth are significant which was also found in the full U.S. sample in Table 7. The coefficient estimates for EBIT and stock returns and sales growth are again smaller than those from the regression based on the full U.S. sample. For example, we now estimate that on average U.S. executives receive a cash bonus of 179 U.S. Dollar for 1 million U.S. Dollar generated EBIT, which is slightly less than the 190 U.S. Dollar estimate based on the full U.S. sample, but still larger than the estimated 162 Euro bonus German executives receive for 1 million Euro in EBIT. This is still supportive to our hypothesis of larger incentives in U.S. firms.

As a final robustness check we investigate whether we can confirm our finding of larger incentives for U.S. executives when we estimate our basic equation (1) for pooled samples. We combine the German sample with the U.S. subsample and add to equation (1) cross terms of our performance measures and a dummy variable which is one for executives employed in U.S. firms. The last two columns of Table 13 show the results with total compensation and cash bonuses as dependent

variables[63]. We first observe that in both joint regressions only those performance measures are significant that were also significant in the separate regressions for the German and U.S. samples. Moreover, the cross terms between stock return as well as sales growth and the U.S. dummy variable are significant and positive[64]. This confirms the higher pay-performance sensitivity for U.S. executives relative to their German peers for these two performance measures. We find no significant difference in the sensitivity of compensation to EBIT. The estimated coefficients are very similar to the ones estimated from separate regressions. For example, in the joint regression the EBIT coefficient is 0.171 (last column of Table 13) which is between the 0.179 (column 2 of Table 13) for the matched U.S. sample and the 0.162 for the German sample (column 1 of Table 7). Similarly the coefficient of sales growth is 42.7 for German executives and $42.7 + 206.9 = 249.6$ for U.S. executives. These numbers are similar to the estimated 62.0 for German executives (column 1 of Table 7 and 231.3 for U.S. executives (column 2 of Table 13). Thus we find that the regression results based on the matched U.S. sample and the pooled sample analysis confirm our main previous findings.

7 Concluding Remarks

This paper provides evidence about executive compensation in Germany and the United States during the period 2005-2009 which includes the financial crisis. We find that the compensation structure of German and U.S. executives differs in that U.S. firms grant a much higher share of compensation as long-term oriented compensation (e.g. company stock and managerial stock options). For German executives short-term oriented cash bonuses account for a bigger share in compensation. We find that total compensation of both German and U.S. executives is determined by firm earnings during our sample period 2005-2009 and also in two sub-periods with and without the financial crisis. We find no robust relation between stock market performance and total executive compensation in either country. For example, stock returns and total compensation of U.S. executives are positively related in the sub-period excluding the crisis years 2008 and 2009, but negatively related in the period 2007-2009.

[63]Note that our results do not depend on whether or not we convert Euro values into U.S. Dollar before estimating the two samples jointly because for each observation we have the same currency on both sides of equation (1). Only the coefficients for the year dummy variables change notably because over time there is a change in the exchange rate between Euro and U.S. Dollar.

[64]We do not show a coefficient estimate for the U.S. dummy itself because the dummy is captured by the executive fixed effects.

Because of such conflicting results for total compensation, we analyze the pay-performance link for individual compensation components separately. We find that yearly cash bonuses of German executives are determined by firm earnings throughout all sub-periods, whereas stock returns have some impact only in the pre-crisis period 2005-2007. Thus positive accounting performance may explain why German executives received cash bonus payments even during the recent crisis when shareholder returns were often negative. For U.S. executives we find that firm earnings, sales growth and stock returns explain cash bonuses in all periods. Our results suggest that pay-performance sensitivities are somewhat larger in the U.S. than in Germany. We also provide evidence that pay-performance sensitivities of cash bonuses differ with firm risk and firm size. Finally, in line with the accounting literature on executive compensation, we find evidence for firms choosing performance measures in cash bonus compensation that are relatively less volatile than other measures. For example, firms in the upper part of the stock return volatility distribution tend to rely more on EBIT than on stock return as a performance measure for cash bonuses, and vice versa.

Our results suggest that cash bonuses are performance oriented, also during the financial crises. However, they are based on accounting performance and not exclusively on stock market performance. This empirical result implies that shareholders do not have enough bargaining power to implement a contract solely based on shareholder return. Executives use their bargaining power to shift performance evaluation to a performance measure they can influence more directly than stock returns.

We argue that higher pay-performance sensitivities and the stronger focus on stock performance in the U.S. are due to a different model of corporate control. Whereas in Germany corporate control is organized in a two-tier board structure with an institutionalized supervisory board, U.S. corporate control relies on compensation-based incentives rather than a separate supervisory body. Moreover, half of the seats on supervisory boards of large German firms are given to employee representatives who are likely to care less about stock performance than shareholders on U.S. boards.

It is less clear what determines long-term compensation. We find weak evidence for a *negative* relation between stock returns and long-term compensation during the crisis period. An explanation for this unintuitive finding could be that long-term compensation such as company stock or options serve as discretionary grants providing extra incentives to increase firm value after years of weak performance. However, we do not find evidence for any pay-performance relation in the pre-crisis

period. There is anecdotal evidence from annual reports that many German firms grant long-term compensation independent of past firm performance. Instead they set up long-term incentive plans and grant options, company stock, phantom stock etc. over several years to provide executives with incentives to increase firm performance.

For long-term compensation of U.S. executives we find weak explanatory power of lagged stock market performance. Stock returns up to four years before the compensation year have some explanatory power in the U.S. sample, this relation is weaker in the crisis period. Thus we are not very confident that lagged stock performance is a robust explanation for long-term compensation. More research is needed to truly understand what determines long-term compensation of both German and U.S. executives.

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Appendix

Table 1: Compensation Components of German and U.S. Executives, 2005-2009

	German Executives [N=2,404]				U.S. Executives [N=25,515]			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
Total	1,026	605	55	6,681	2,197	1,300	174	22,550
Fixed	389	302	38	2,584	439	370	0	7,418
Short Term	446	210	0	4,575	551	278	0	22,415
Long Term	192	0	0	4,859	1,209	550	0	21,594
Share Fixed	0.53	0.50	0.06	1	0.33	0.29	0	1
Share Short Term	0.35	0.36	0	0.94	0.24	0.22	0	1
Share Long Term	0.12	0.00	0	0.90	0.43	0.45	0	1

All numbers in the first four lines are in thousands of 2005 Euros (U.S. Dollars) for German (U.S.) executives. Fixed compensation is not performance related, e.g. base salary, company cars, etc. Short-term compensation are annual cash bonuses. Long-term compensation is the value of shares, options and compensation based on incentive plans. The last three lines show the respective shares of total compensation.

Table 2: Development of Compensation Components 2005-2009

	German Executives					U.S. Executives				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Total Compensation	1,068	1,117	1,073	962	939	2,189	2,340	2,214	2,159	2,085
	(605)	(699)	(645)	(575)	(544)	(1,308)	(1,343)	(1,306)	(1,280)	(1,275)
Share Fixed	0.56	0.50	0.51	0.53	0.58	0.34	0.32	0.33	0.33	0.33
	(0.51)	(0.47)	(0.46)	(0.50)	(0.55)	(0.30)	(0.27)	(0.28)	(0.29)	(0.29)
Share Short Term	0.33	0.37	0.37	0.36	0.32	0.23	0.26	0.25	0.22	0.23
	(0.37)	(0.37)	(0.38)	(0.37)	(0.32)	(0.21)	(0.24)	(0.23)	(0.20)	(0.22)
Share Long Term	0.12	0.13	0.12	0.11	0.11	0.44	0.42	0.43	0.45	0.44
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.45)	(0.45)	(0.45)	(0.47)	(0.45)
Number of Executives	266	490	552	574	522	4,542	5,057	5,485	5,445	4,986
Number of Firms	86	156	182	189	178	922	1,038	1,092	1,075	976
Average Firm Size	10,120	9,719	7,423	6,689	6,260	7,384	6,740	6,160	6,269	7,160
Median Firm Size	335	323	300	247	248	1,930	1,857	1,688	1,673	1,912

The first line shows average total compensation per executive (median values in brackets) in thousands of 2005 Euros for German executives and thousands of 2005 U.S. Dollars for U.S. executives. The average shares (median shares in brackets) of fixed, short-term and long-term compensation are given with respect to total compensation. Fixed compensation is not performance related, e.g. base salary, company cars, etc. Short-term compensation are annual cash bonuses. Long-term compensation is the value of shares, options and compensation based on incentive plans. Firm size is measured by total assets in millions of 2005 Euros and millions of 2005 U.S. Dollars for German and U.S. firms, respectively.

Table 3: Distribution of Performance Measures, 2005-2009

Percentile	Stock Return	EBIT	Net Income	Sales Growth	Total Assets
German Sample [N=791]					
0	-0.7767	-651	-1,067	-0.6852	3
10	-0.5227	-6	-13	-0.1633	36
20	-0.3755	1	-1	-0.0640	54
30	-0.1990	4	2	-0.0185	90
40	-0.0479	7	4	0.0189	166
50	0.0496	17	8	0.0489	282
60	0.1504	33	17	0.0848	604
70	0.2848	88	45	0.1279	1,470
80	0.4855	196	111	0.2025	3,160
90	0.7432	1,043	524	0.3488	14,551
100	4.2877	7,406	5,022	2.2281	249,017
Mean	0.1240	378	196	0.0819	7,732
U.S. Sample [N=5,103]					
0	-0.8027	-1,781	-2,201	-0.5280	44
10	-0.4231	6	-5	-0.1318	310
20	-0.2774	35	18	-0.0329	559
30	-0.1619	64	35	0.0172	840
40	-0.0729	102	58	0.0534	1,247
50	0.0063	159	89	0.0800	1,810
60	0.0977	241	137	0.1127	2,683
70	0.2010	390	224	0.1491	4,907
80	0.3358	692	404	0.2022	7,409
90	0.6177	1,673	1,002	0.3116	18,690
100	2.5366	17,180	11,612	1.0327	264,747
Mean	0.0709	637	385	0.0899	6,714

All performance measures are taken from Thomson Reuters' Datastream database and adjusted for inflation. EBIT, Net Income and Total Assets are in millions of 2005 Euros (U.S. Dollars) for German (U.S.) firms.

Table 4: Determinants of Executive Compensation in German Corporations, 2005-2009

Dependent Variable	Total Compensation				
Stock Return	-28.62*	-	-	-	-52.95***
	(-1.96)				(-3.27)
EBIT	-	0.1564***	-	-	0.1641***
		(5.94)			(6.30)
Net Income	-	-	0.1587***	-	-
			(5.09)		
Sales Growth	-	-	-	34.36	47.02
				(0.85)	(1.13)
Total Assets	0.0013	0.0001	0.0012	0.0013	-0.0005
	(0.31)	(0.03)	(0.26)	(0.32)	(-0.01)
CEO	414.91***	399.29***	422.78***	414.09***	399.52***
	(3.26)	(3.39)	(3.45)	(3.25)	(3.40)
2006	162.29***	155.24***	138.96***	165.31***	144.79***
	(6.11)	(5.86)	(5.41)	(6.27)	(5.42)
2007	259.09***	243.49***	236.83***	266.09***	231.40***
	(8.27)	(8.00)	(7.91)	(8.56)	(7.58)
2008	195.47***	208.27***	204.00***	218.20***	167.52***
	(4.85)	(5.40)	(5.33)	(5.54)	(4.27)
2009	197.46***	219.01***	203.87***	205.12***	228.61***
	(4.69)	(5.21)	(4.89)	(4.56)	(5.10)
Individual Effects	yes	yes	yes	yes	yes
Observations	2,404	2,404	2,404	2,404	2,404

Estimates are based on a panel regression with executive fixed effects and year dummies controlling for time effects. The dependent variable is total annual compensation paid at the end of fiscal year t and measured in thousands of 2005 Euros. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in millions of 2005 Euros. Net income is EBIT subtracted by interest and tax expenses. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total firm assets in millions of 2005 Euros. CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 5: Determinants of Executive Compensation in U.S. Corporations, 2005-2009

Dependent Variable	Total Compensation				
Stock Return	4.97	-	-	-	-18.86
	(0.19)				(-0.71)
EBIT	-	0.2445***	-	-	0.2234***
		(4.49)			(5.03)
Net Income	-	-	0.2537***	-	-
			(4.99)		
Sales Growth	-	-	-	544.55***	453.59***
				(6.43)	(5.45)
Total Assets	0.0232***	0.0098	0.0137	0.0224***	0.0103
	(2.69)	(1.02)	(1.46)	(2.61)	(1.08)
CEO	1333.09***	1349.25***	1344.05***	1327.18***	1343.00***
	(9.20)	(9.31)	(9.27)	(9.15)	(9.26)
2006	241.72***	236.46***	236.46***	255.33***	248.05***
	(7.25)	(7.09)	(7.08)	(7.70)	(7.47)
2007	300.81***	285.47***	289.96***	326.06***	305.95***
	(9.05)	(8.60)	(8.75)	(9.88)	(9.17)
2008	315.94***	322.44***	324.42***	350.39***	343.35***
	(8.56)	(9.06)	(9.11)	(9.97)	(9.45)
2009	163.67***	195.31***	187.41***	301.96***	309.89***
	(4.37)	(5.29)	(5.08)	(7.70)	(7.93)
Individual Effects	yes	yes	yes	yes	yes
Observations	25,515	25,515	25,515	25,515	25,515

Estimates are based on a panel regression with executive fixed effects and year dummies controlling for time effects. The dependent variable is total annual compensation paid at the end of fiscal year t and measured in thousands of 2005 U.S. Dollars. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in millions of 2005 U.S. Dollars. Net income is EBIT subtracted by interest and tax expenses. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total firm assets in millions of 2005 U.S. Dollars. CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 6: Determinants of Executive Compensation in Sub-Periods

Dependent Variable	Total Compensation			
	2005-2007		2007-2009	
	Germany	U.S.	Germany	U.S.
Stock Return	-7.32	198.77***	-2.60	-85.40***
	(-0.28)	(3.96)	(-0.12)	(-2.97)
EBIT	0.1841***	0.4144***	0.1317***	0.1963***
	(3.97)	(5.09)	(2.94)	(5.12)
Sales Growth	54.12	120.75	5.1239	498.59***
	(1.16)	(0.87)	(0.12)	(5.02)
Total Assets	0.0139***	-0.0055	-0.0002	-0.0008
	(3.46)	(-0.35)	(-0.08)	(-0.08)
CEO	378.77**	1531.95***	244.93***	1031.01***
	(2.19)	(5.97)	(2.64)	(5.57)
Year Effects	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes
Observations	1,301	14,967	1,662	16,020

Estimates are based on a panel regression with fixed effects and year dummies controlling for time effects. The dependent variables is total executive compensation paid at the end of fiscal year t and measured in thousands of 2005 Euros (U.S. Dollars) for German (U.S.) executives. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in fiscal year t. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total firm assets in millions of 2005 Euros (U.S. Dollars). CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 7: Determinants of Cash Bonuses in German and U.S. Corporations

Dependent Variable	Cash Bonus					
	2005-2009		2005-2007		2007-2009	
	Germany	U.S.	Germany	U.S.	Germany	U.S.
Stock Return	-9.27	135.31***	20.22**	180.51***	4.17	140.38***
	(-0.90)	(12.87)	(2.06)	(10.97)	(0.25)	(11.54)
EBIT	0.1616***	0.1905***	0.1853***	0.2526***	0.1258***	0.1501***
	(8.01)	(7.75)	(4.50)	(6.05)	(3.40)	(7.65)
Sales Growth	62.04***	372.94***	-14.17	127.17***	75.65***	426.44***
	(2.93)	(11.11)	(-0.35)	(2.95)	(3.84)	(11.43)
Total Assets	0.0015	-0.0028	0.0041	-0.0036	0.0007	-0.0084
	(0.50)	(-0.50)	(1.39)	(-0.28)	(0.63)	(-1.29)
CEO	234.98**	359.07***	221.50	390.84***	151.11**	252.75***
	(2.58)	(8.56)	(1.63)	(7.13)	(2.02)	(5.28)
Year Effects	yes	yes	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes	yes	yes
Observations	2,404	25,515	1,301	14,967	1,662	16,020

Estimates are based on a panel regression with fixed effects and year dummies controlling for time effects. The dependent variables is short-term cash bonuses paid at the end of fiscal year t and measured in thousands of 2005 Euros (U.S. Dollars) for German (U.S.) executives. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in fiscal year t. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total firm assets in millions of 2005 Euros (U.S. Dollars). CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 8: Cash Bonuses and Firm Characteristics, 2005-2009

Dependent Variable	Cash Bonus			
	Firm Risk		Firm Size	
	Germany	U.S.	Germany	U.S.
Stock Return	4.26	282.15***	-12.19	25.43*
	(0.23)	(8.87)	(-1.08)	(1.85)
Stock Return x Rank(·)	-	-209.39***	-	240.01***
		(-4.86)		(6.11)
Rank(·)	-	51.66	-	-
		(1.08)		
EBIT	0.8700***	0.9806***	3.44***	1.1541***
	(3.40)	(7.26)	(3.72)	(6.83)
EBIT x Rank(·)	-0.7844***	-0.8599***	-	-1.0456***
	(-2.73)	(-5.85)		(-5.67)
Rank(·)	589.50	88.27	-	-
	(1.10)	(0.92)		
EBIT x LARGE	-	-	-3.27***	-
			(-3.54)	
Sales Growth	-519.52**	530.16***	31.73*	218.10***
	(-2.40)	(5.33)	(1.94)	(4.93)
Sales Growth x Rank(·)	728.55***	-519.55*	-	173.83*
	(2.69)	(-1.78)		(1.67)
Rank(·)	-243.19*	113.88	-	505.41***
	(-1.90)	(1.00)		(5.12)
Sales Growth x LARGE	-	-	52.70	-
			(0.99)	
LARGE	-	-	73.19	-
			(1.59)	
CEO	450.17***	420.79***	225.43**	369.92***
	(2.83)	(8.33)	(2.54)	(8.92)
Total Assets	0.0012	-0.0010	-	-
	(0.91)	(-0.18)		
Year Effects	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes
Observations	1,458	21,130	2,404	25,515

Estimates are based on a panel regression with executive fixed effects and year dummies controlling for time effects. The dependent variable is cash bonuses paid at the end of fiscal year t and measured in thousands of 2005 Euros (U.S. Dollars) for German (U.S.) firms. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in millions of 2005 Euros (U.S. Dollars). Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. In columns 1 and 2, Rank(·) is the rank of the stock return variance, EBIT variance or sales growth variance, respectively, divided by the number of observations. In column 4, Rank(·) is the rank of firm size (measured by total assets) divided by the number of observations. The variance of EBIT and sales growth is calculated based on annual data over ten years preceding the beginning of fiscal year t. The variance of stock returns is calculated based on monthly data over three years preceding the beginning of fiscal year t. LARGE is a dummy variable equal to one if a firm is in the upper half of the firm size distribution. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 9: Cash Bonuses and Performance Volatility in U.S. Corporations, 2005-2009

Dependent Variable	Cash Bonuses			
	Low Stock Volatility		High Stock Volatility	
EBIT Volatility	Low	High	Low	High
Stock Return	149.22***	338.97***	82.63***	153.26***
	(7.16)	(7.67)	(8.88)	(3.64)
EBIT	0.5060***	0.1565***	0.4029***	0.2900***
	(4.22)	(5.73)	(4.43)	(4.82)
Sales Growth	206.03***	359.32***	112.37***	801.69***
	(3.17)	(3.01)	(3.52)	(6.68)
Total Assets	0.0491***	-0.0005	0.0661***	-0.0178
	(3.87)	(-0.09)	(4.44)	(-0.91)
CEO	280.77***	593.02***	173.38***	631.69***
	(3.23)	(6.36)	(3.74)	(3.38)
Year Effects	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes
Observations	4,380	6,408	5,917	4,425

This table shows regression estimates based on four U.S. subsamples created with respect to performance volatility. Columns 1 and 2 contain U.S. firms with stock return volatility below the sample median, and EBIT volatility below and above the median, respectively. Columns 3 and 4 contain U.S. firms with stock return volatility above the sample median, and EBIT volatility below and above the median, respectively. Stock return (EBIT) volatility is measured by the Rank($\cdot$) measure as defined in Table (8). In all regressions the dependent variables is short-term cash bonuses paid at the end of fiscal year t and measured in thousands of 2005 U.S. Dollars. All regressions include individual fixed effects and year dummies controlling for time effects. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in fiscal year t. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total firm assets in millions of 2005 U.S. Dollars. CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 10: Determinants of Long-Term Compensation, 2005-2009

Dependent Variable	Long-Term Compensation			
	Germany		U.S.	
Stock Return	-101.39***	-26.18	-147.48***	-17.76
	(-4.78)	(-1.02)	(-5.87)	(-0.65)
Stock Return$_{t-1}$	-	67.13*	-	250.64***
		(1.96)		(5.61)
Stock Return$_{t-2}$	-	134.75***	-	183.81***
		(4.10)		(5.82)
Stock Return$_{t-3}$	-	39.79*	-	86.40***
		(1.78)		(2.79)
Stock Return$_{t-4}$	-	10.29	-	64.72***
		(0.50)		(2.89)
EBIT	0.0128	0.0114	0.0335	-0.0115
	(0.92)	(0.66)	(0.99)	(-0.34)
EBIT$_{t-1}$	-	-0.0825***	-	-0.0286
		(-3.31)		(-0.66)
Sales Growth	-8.8345	36.65	77.84	0.33
	(-0.21)	(0.65)	(1.07)	(0.00)
Sales Growth$_{t-1}$	-	71.47**	-	-131.92*
		(2.06)		(-1.74)
Total Assets	-0.0015**	0.0023	0.0113	0.006
	(-2.07)	(0.70)	(1.36)	(0.67)
CEO	94.10	83.79	843.97***	877.41***
	(1.26)	(1.03)	(6.51)	(6.25)
Year Effects	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes
Observations	2,404	1,940	23,515	23,188

The dependent variable is long-term variable compensation granted at the end of fiscal year t and measured in thousands of 2005 Euros (U.S. Dollars) for German (U.S.) executives. Estimates in columns 1 and 2 are based on a Tobit specification because 52 percent of German observations receive zero long-term compensation. All specifications include individual fixed effects and year dummies controlling for time effects. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT is total firm earnings before interest and taxes in fiscal year t. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. The subscript $t - i$ indicates a variable that is lagged i periods. CEO is a dummy variable to identify executives serving as CEOs during year t. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 11: Logit Model for Propensity Score Matching (Germany=1)

Year	2005	2006	2007	2008	2009
EBIT	3.61***	5.18***	4.71***	6.49***	4.19***
	(3.87)	(5.09)	(4.73)	(6.12)	(3.89)
Stock Return	1.67***	0.6072**	0.5106*	-1.26***	0.2042
	(5.66)	(2.50)	(2.24)	(-3.52)	(1.29)
Sales Growth	-3.18***	-0.6969	-1.53***	-0.0175	0.3423
	(-3.78)	(-1.28)	(-2.67)	(-0.04)	(0.66)
Total Assets	-1.24***	-1.49***	-1.31***	-1.57***	-1.22***
	(-5.46)	(-8.24)	(-7.62)	(-9.34)	(-7.64)
Industry Dummies	yes	yes	yes	yes	yes
Observations	949	1,084	1,197	1,204	1,110

The Logit regression models the probability that an executive works for a German firm as a function of earnings before interest and taxes (EBIT), stock return, sales growth, total assets of the respective firm-year and industry dummies. We only include industries for which there are firms in Germany and the U.S., since we demand the matched pairs to come from the same industry. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.

Table 12: Compensation Components in Matched U.S. Sample, 2005-2009

	Matched U.S. Sample [N=3,665]			
	Mean	Median	Minimum	Maximum
Total	1,801	936	174	22,509
Fixed	379	316	12	1,649
Short Term	463	180	0	22,415
Long Term	960	382	0	19,502
Share Fixed	0.37	0.33	0.01	1
Share Short Term	0.21	0.19	0	1
Share Long Term	0.42	0.43	0	0.98

All numbers in the first four lines are in thousands of 2005 U.S. Dollars. Fixed compensation is not performance related, e.g. base salary, company cars, etc. Short-term compensation are annual cash bonuses. Long-term compensation is the value of shares, options and compensation based on incentive plans. The last three lines show the respective shares of total compensation.

Table 13: Determinants of Executive Compensation in Matched Sample, 2005-2009

	U.S. Executives		All Executives	
Dependent Variable	Total	Cash Bonus	Total	Cash Bonus
Stock Return	17.22	109.81***	-11.83	8.74
	(0.44)	(5.59)	(-0.56)	(0.65)
Stock Return x U.S.	-	-	5.91	87.66***
		(0.16)	(4.59)	
EBIT	0.1673*	0.1790***	0.1433***	0.1713***
	(1.72)	(2.63)	(5.29)	(7.39)
EBIT x U.S.	-	-	0.0020	-0.0873
			(0.02)	(-1.56)
Sales Growth	220.82	231.28***	-23.79	42.71**
	(1.48)	(3.11)	(-0.59)	(2.01)
Sales Growth x U.S.	-	-	328.46**	206.87***
			(2.23)	(2.82)
Total Assets	-0.0073	-0.0369***	-0.0017	-0.0088*
	(-0.58)	(-3.58)	(-0.41)	(-1.83)
CEO	783.65***	233.05**	574.03***	215.74***
	(2.67)	(2.59)	(3.84)	(3.16)
Year Effects	yes	yes	yes	yes
Individual Effects	yes	yes	yes	yes
Observations	3,665	3,665	6,069	6,069

Estimates are based on a panel regression with individual and year effects. The dependent variables are total compensation or short-term cash bonuses granted at the end of fiscal year t. Stock returns are calculated as the stock market value at the end of the fiscal year divided by the stock market value at the beginning of the fiscal year. EBIT are total firm earnings before interest and taxes in fiscal year t. Sales growth is calculated as sales at the end of the fiscal year divided by sales of the preceding fiscal year. Total assets are total assets in fiscal year t. CEO is a dummy variable to identify executives serving as CEOs during year t. U.S. is a dummy variable to identify executives employed by U.S. firms. All numbers are adjusted for inflation. For each estimate t-values are given in parentheses. Standard errors are corrected for heteroscedasticity and clustering at the executive level. Significance levels of 1, 5 and 10 percent are indicated by ***, ** and *, respectively.