INCENTIVES – EFFECTIVENESS AND EFFICIENCY

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Abstract

This paper covers the question if and how incentive schemes work evaluated by their impact on company performance (market capitalization and profit before tax). Based on a unique data set for German executive directors of DAX companies it can be proved that neither short (STI) nor long term incentives (LTI) plans necessarily support the company success. It rather depends on the efficiency of each plan, i. e. on its design. Special attention has to be paid on target setting. Short term focused objectives often miss their targets, whereas long term ori-ented objectives significantly support the company success. To solve the prisoner's dilemma between employers and employees by a quasi-endless game, additional measures may be helpful, such as share ownership guidelines.

Keywords: Incentives, Efficiency, Effectiveness, Directors

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1. Introduction

That "people respond to incentives" (Levitt and Dubner, 2009b, p. XIV) is a common belief. This became even stronger with a negative association during the course of the financial crisis since 2008/09 as incentive schemes of banks are broadly considered as main reason for the crisis[1]. It is assumed that they incentivized risky and shorthand behavior. Was compensation, especially executive compensation, intensively discussed before it is now in the center of public and research interest (Larcker and Tavan, 2011).

As a reaction on the crisis, numerous countries introduced new laws or regulations for executive pay and incentives, such as the five guiding principles for executive pay in 2009 or some parts of the Dodd-Frank Act of the US government in 2010 (N. U., 2009, and N. U., 2010).

The German government reacted with the introduction of the Gesetz zur Angemessenheit der Vorstandsvergütung (VorstAG) (Law on the Appropriateness of Executive Compensation) for listed companies in 2009. One of the main intentions of the VorstAG is a sustainable incentivation of executive directors. The VorstAG requires – amongst others – that more than 50 % of the variable remuneration has to be based on a performance period of more than one year.

Generally, incentive plans can be distinguished in two types, short (STI) and long term incentives (LTI), with vesting periods of one (short) or more (long) years respectively as well various subtypes and potential plan parameters, especially for long term incentives. There exists already a great literature on incentive schemes, but there is no evidence how the different short and long term incentive plan types are composed and how their plan parameters exactly work. This is even more remarkable as such an analysis would be essential to derive both efficient incentive schemes and legal initiatives regulating incentives.

Referring to this research gap, this paper covers the question if and how incentive plans exactly work evaluated by their impact on company performance. It is split into five sections. Following this introduction, part two provides an overview on different incentive types and their parameters as well as a summary of the literature to this topic. Section three covers the theoretical background. The empirical analysis is shown under four. It is based on a unique data set for German executive directors of DAX companies (30 largest listed companies in Germany) with much information not shown in annual reports. Being Europe's largest economy, Germany is a good reference country as its developed compensation schemes have been affected by comprehensive regulatory changes in recent years. The conclusions of the evaluations are derived in section five.

[1] As beginning of the last financial crisis is often the bankruptcy of investment bank Lehman Brothers in September 2008 mentioned. Bhagat and Bolton (2010) consider the incentives of Fannie Mae and Freddie Mac that encouraged individuals to purchase residential real estate as the most important cause of the crisis.

2. Incentive Types

2.1. Incentives in the Context of Total Remuneration

Studies on compensation and incentives have a long history. Being one of the first, Masson already proved in 1971 a positive effect of US executive compensation on share performance. These results have been confirmed in many analyses (see Jensen and Zimmermann, 1985, for an empirical overview) and for many countries besides the USA, e. g. for China (Firth et al., 2010) and Australia (Evans and Evans, 2002).

But to understand incentive plans correctly their role in a total remuneration context has to be considered. Core and Guay (2010) argue that contracts incorporating too much incentives and too little pay will lead to the effect that executives will either quit or will act conservatively in order to avoid firm risk. If the contract includes too much pay and too little incentives, the executives and the shareholders interests will not sufficiently be aligned.

Remuneration covers different components. As shown in table 1 it can be distinguished in base salary, incentives and benefits:

Table 1. Remuneration Elements

Benefits	• Various remuneration components, such as pensions, company cars, insurances, etc..
Incen-tives	• Short Term Incentives: Annual incentives depending on the company and/or individual performance. • Long Term Incentives: Incentives with a vesting period of two or more years depending on the company and/or individual performance , e.g. stock options and performance share plans.
Base Salary	• Fix cash pay component.

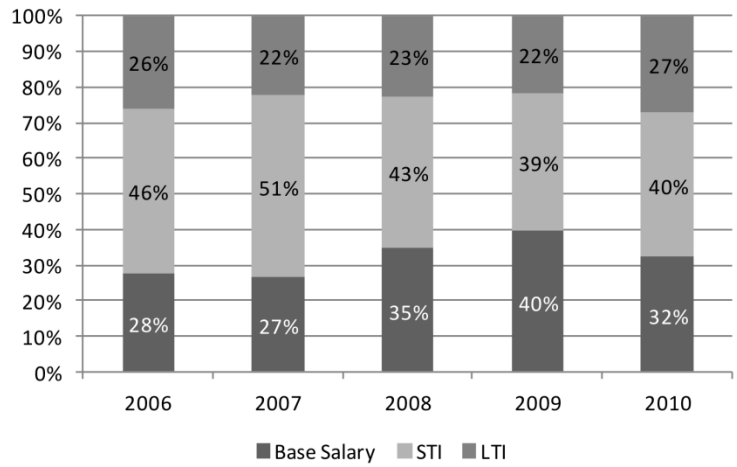
Focus of this document.

Base salary is the fixed cash pay component. Incentives are variable compensation elements whose pay out depends on company as well as individual performances. They can generally be differentiated in STI and LTI. STI generally have a vesting period of one and LTI of two or more years (There also exists great evidence for piece rates, a different short term incentive type that is not relevant in this context of executive compensation (e. g. Lazear, 1998 and 2000, Irlenbusch and Ruchala, 2006, and Irlenbusch and Sliwka, 2005)). Benefits cover various remuneration components, such as pensions, company cars and insurances.

Whereas base salary ensures an appropriate standard of living, serve benefits as supplemental pay elements often with a provision character. Incentives have a variable and performance orientated character. Their objective is to canalize employees' behaviors.

Figure 1 shows the portion of base salary, STI, and LTI of total direct compensation (sum of base salary, STI, and LTI) in DAX companies from 2006 to 2010.

Figure 1. Portion of Pay Elements of Total Direct Compensation



Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations)

There is a trend from STI to base salary, with the portion of base pay increasing from 28 % to 32 % between 2006 and 2010 as well as the STI simultaneously decreasing from 46 % to 40 %. The LTI portion remains stable with 26 % in 2006 and 27 % in 2010.

2.2. Short Term Incentives

Looking at European and US blue chip companies, there are actually no companies that do not apply STI plans. But they differ in terms of their parameters. Table 2 shows the different STI plan targets of DAX companies in 2010.

Table 2. STI Plan Target Categories in DAX Companies 2010

Company	Number of STI Plan Targets	STI Plan Target Categories								
		Cash Flow	Dividend	Individual	Profit	Sales	Share Price	Return	Value Added	Other
Adidas	3			x	x	x				
Allianz	3				x					x
BASF	2							x		x
Bayer	4			x	x					x
Beiersdorf	2			x				x		
BMW	4		x	x	x			x		
Commerzbank	2			x					x	
Daimler	3			x	x					x
Deutsche Bank	2			x				x		
Deutsche Boerse	2			x				x		
Deutsche Lufthansa	2				x					
Deutsche Post	4			x	x					x
Deutsche Telekom	4	x		x	x	x				
EON	3			x	x			x		
Fresenius	4			x	x					
Fresenius Medical Care	4	x		x	x					
HeidelbergCement	1				x					
Henkel	6			x	x			x		x
Infineon	2			x				x		
K+S	2			x				x		
Linde	4		x	x	x			x		
MAN	3							x	x	
Merck	2				x					x
Metro	2				x			x		
Muenchener Rueck	4			x	x			x		
RWE	2			x					x	
SAP	5			x	x	x		x		x
Siemens	3	x				x		x		
ThyssenKrupp	4			x	x			x		
Volkswagen	2				x					x
Sum	**90**	**3**	**2**	**22**	**27**	**4**	**0**	**18**	**3**	**11**

Source: DAX 30 companies 2010; DAX constituents as at December 31, 2010; own evaluations

Profit related targets are the most prevalent and used for 27 times followed by individual (22) and return (18) targets. Therefore, return and, especially, profit are in the strategical focus of companies.

2.3. Long Term Incentives

Contrary to STI plans, LTI schemes are not applied by all companies and can be differentiated in various plan types. Figure 2 shows the different LTI plan types of DAX companies.

Figure 2. LTI Plan Categories/Types in DAX Companies

LTI Category	LTI Type	Explanation
Options	Stock Options	• The incumbent has the right to purchase a share to a defined exercise price after a vesting period. • The exercise right is restricted to a limited period. • The exercise may be due to performance targets.
	Stock Appreciation Rights	• Stock Appreciation Rights are equal to virtual options. • After a vesting period, the incumbent receives a cash payment that is linked to the share price. • The payment may be due to further performance targets.
Performance Cash		• The incumbent receives a cash grant based on the target achievement in a performance period. • Performance targets can refer to internal or share related measures.
(Performance) Deferred Bonus		• The deferred bonus is the portion of the variable pay that is deferred into the following periods. • The pay out can depend on performance targets (performance deferred bonus).
Perfor-mance Shares	Performance Shares	• The incumbent receives shares based on the target achievement in a performance period. • Performance targets can refer to internal or share related measures.
	Performance Share Units	• Like performance shares, but pay out can be in shares or cash.
Restricted Shares	Restricted Stocks	• The incumbent receives shares after a vesting period.
	Restricted Stock Units	• Like restricted stocks, but pay out can be in shares or cash.
Share Ownership Guidelines		• Company requirements for incumbents to hold company shares.

Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations

The LTI category 'options' covers stock options as well as stock appreciation rights, 'performance cash' includes performance cash plans, 'performance shares' comprise performance shares (units), and 'restricted shares' cover restricted stocks (units). (Performance) Deferred STI plans could be allocated to options, performance cash, performance shares or restricted shares depending on their plan parameters. Therefore, they are mentioned as own category.

LTI are often share based with an unclear impact on company performance. Frye (2001) shows a positive link between equity-based compensation and company performance. This is contradicted by Morck et al. (1988) who argue that stock based incentives are too low to have an effect on executives and subsequently companies' performance. Bannier and Feess (2010) conclude that high-powered incentives reduce performance rather than improve it.

Especially, share options are discussed very controversially. Whereas Sesil et al. (2000) as well as Ittner et al. (2001) come to mixed conclusions regarding the impact of share options on company performance (see also Kole, 1996), consider Hall and Murphy (2000a and 2000b) stock options generally as inefficient remuneration vehicle.

Share ownership guidelines (SOG) are a special kind of LTI and considered separately. They define to which extent employees have to hold shares of their employer. Referring to many authors, company ownership (guidelines) by employees has a positive impact on firm performance (Benson et al., 2011). For instance, Morck et al. (1988) show that management ownership of 0 % to 5 % or above 25 %, increases the company value due to stronger incentives and decreases it at an ownership of 5 % to 25 % related to managerial entrenchment. McConnell and Servaes (1990) come to slightly different conclusion, saying that the company value increases until an equity ownership by managers of 40 % to 50 %.

Figure 3 shows the different LTI plan categories and types per DAX company in 2010. Today, performance cash and restricted shares are dominating.

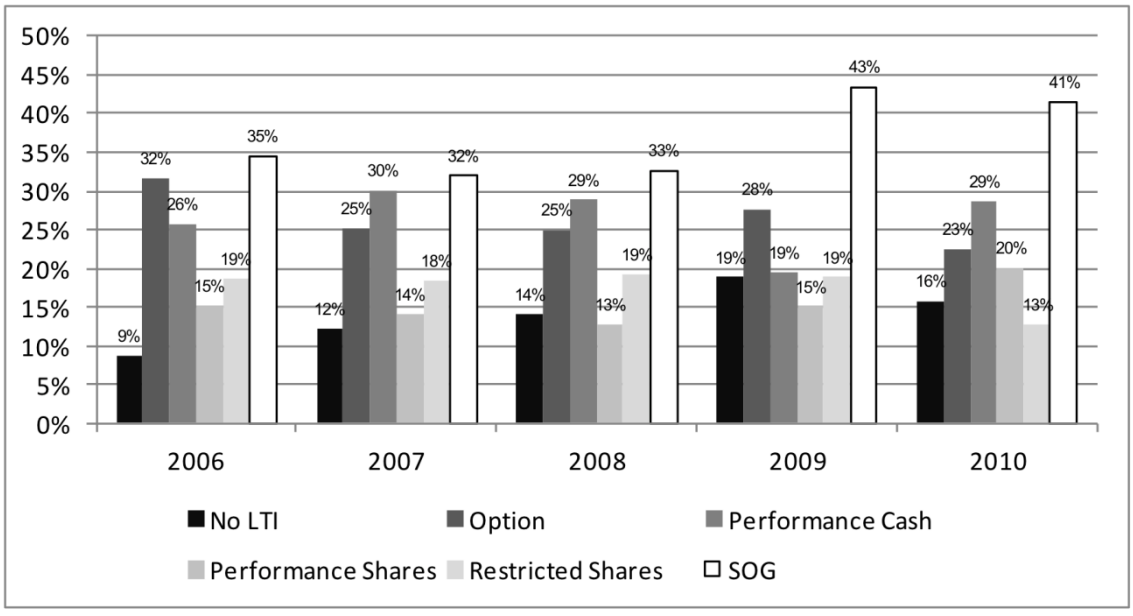
Figure 3. LTI Plan Categories/Types per DAX Company in 2010

	4	3	9	6	0	8	9	4	4	9
DAX Companies			Volkswagen			Thyssen Krupp	Siemens			Siemens
			SAP			Siemens	Siemens			RWE
			Muenchener Rueck			RWE	Muenchener Rueck			Metro
			K+S	RWE		Metro	Muenchener Rueck			Linde
			Henkel	Fresenius		EON	MAN			Deutsche Post
	Linde		Deutsche Telekom	Deutsche Telekom		Deutsche Boerse	MAN	Thyssen Krupp	Merck	Daimler
	Infineon	SAP	Deutsche Lufthansa	Deutsche Post		Deutsche Bank	Henkel	Fresenius Medical Care	Heidelberg Cement	Commerzbank
	Fresenius Medical Care	Deutsche Post	Allianz	Deutsche Bank		Daimler	Deutsche Bank	Bayer	Commerz-bank	Bayer
	Fresenius	BASF	Adidas	Beiersdorf		Bayer	Deutsche Bank	Allianz	BMW	BASF
LTI Category/ Type	Stock Options	Stock Appreciation Rights	Performance Cash	(Performance) Deferred Bonus.	Performance Shares	Performance Share Units	Restricted Stocks	Restricted Stock Units	No LTI	SOG
	Options				Performance Shares		Restricted Shares			

Source: DAX 30 companies 2010, DAX constituents as at December 31, 2010; own evaluations

As shown in figure 4, option plans were the most prevalent LTI vehicles until a few years ago (The results of figure 3 and 4 slightly differ, as in figure 3 the considered sample consists of all LTI plans of the DAX constituents as at December 31, 2010. The sample of figure 4 consists of the main LTI plans of the DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement). Share ownership guidelines have become quite common in recent years, with a prevalence of 41 % in 2010.

Figure 4. LTI Main Plan Type Portion and SOG in DAX Companies 2006 – 2010



Source: DAX 30 companies 2006 – 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations

Table 3 shows the LTI plan targets of DAX companies in 2010. Share price related targets – used for 22 times – are the most prevalent and another strategical company focus.

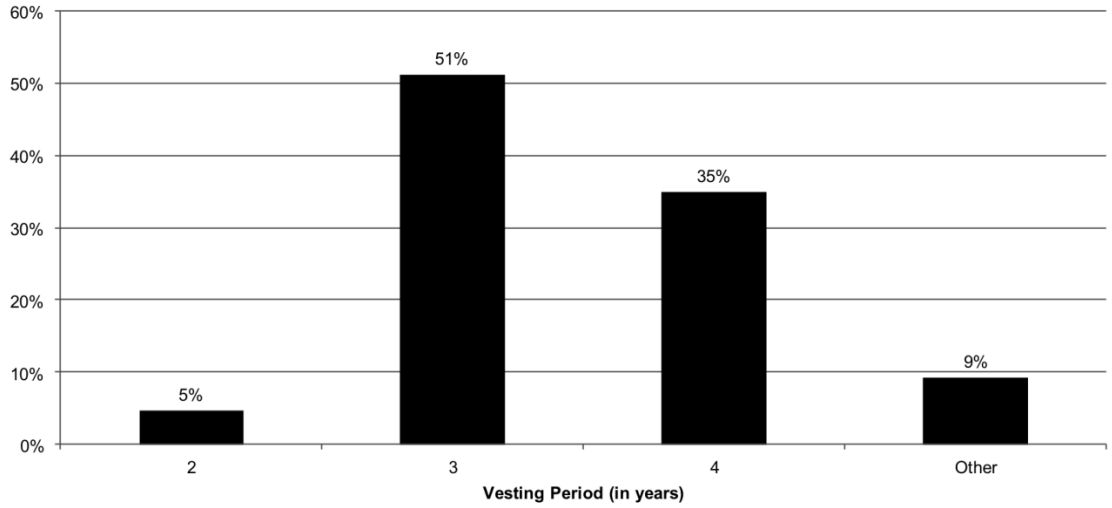
Table 3. LTI Plan Target Categories in DAX Companies 2010

Company	Plan Type	Vesting Period (in years)	Number of LTI Plan Targets	LTI Plan Target Categories						
				Individual	Profit	Sales	Share Price	Return	Value Added	Other
Adidas	Performance Cash	3	3		x	x				x
Allianz	Performance Cash	3	3					x	x	x
	Restricted Stock Units	4	1				x			
BASF	Stock Appreciation Rights	4	2				x			
Bayer	Performance Share Units	4	2				x			
	Restricted Stock Units	3	0							
Beiersdorf	(Performance) Deferred Bonus	1, 2, 3, and 4 (each 1/4)	1							x
BMW	No LTI Plan.									
Commerzbank	No LTI Plan.									
Daimler	Performance Share Units	4	2					x		
Deutsche Bank	Performance Share Units	3	1				x			
	(Performance) Deferred Bonus	1.5/2.5/3.5/4.5 (each 1/4)	2	x	x					
	Restricted Stocks	4.5/5.5	0							
	Restricted Stocks	3	0							
Deutsche Boerse	Performance Share Units	3	2				x			
Deutsche Lufthansa	Performance Cash	3	2				x			
Deutsche Post	(Performance) Deferred Bonus	3	1							x
	Stock Appreciation Rights	4	2				x			
Deutsche Telekom	(Performance) Deferred Bonus	4	0							
	Performance Cash	4	4		x			x		x
EON	Performance Share Units	4	2				x			
Fresenius	(Performance) Deferred Bonus	2	0							
	Stock Options	3	1		x					
Fresenius Medical Care	Restricted Stock Units	3	1				x			
	Stock Options	3	1		x					
HeidelbergCement	No LTI Plan.									
Henkel	Restricted Stocks	3	0							
	Performance Cash	3	1		x					
Infineon	Stock Options	3	2				x			
K+S	Performance Cash	4	1						x	
Linde	Stock Options	3	3		x		x			
MAN	Restricted Stocks	4	0							
	Restricted Stocks	4	0							
Merck	No LTI Plan.									
Metro	Performance Share Units	3 - 4.25	1				x			
Muenchener Rueck	Restricted Stocks	4	0							
	Performance Cash	3	1		x					
	Restricted Stocks	2	0							
RWE	(Performance) Deferred Bonus	3	3						x	x
	Performance Share Units	4	1				x			
SAP	Performance Cash	3	4	x	x	x				x
	Stock Appreciation Rights	4	1				x			
Siemens	Restricted Stocks	3	0							
	Restricted Stocks	3	0							
ThyssenKrupp	Performance Share Units	3	1						x	
	Restricted Stocks Units	3	0							
Volkswagen	Performance Cash	4	4			x		x		x
Sum			**56**	**2**	**9**	**3**	**22**	**6**	**4**	**10**

Source: DAX 30 companies 2010; DAX constituents as at December 31, 2010; own evaluations

Table 3 and figure 5 provide an overview for 2010 on the prevalence of LTI vesting periods in DAX companies. With a portion of 51 % three years is the predominant vesting period followed by four years with 35 %.

Figure 5. LTI Plan Vesting Periods in DAX Companies 2010



Source: DAX 30 companies 2010; DAX constituents as at December 31, 2010; own evaluations

3. Theoretical Approach

Following the optimal contracting theory, pay levels (For an evaluation of remuneration level determinants see Hinderlich (2012)) and structures, like incentive schemes, are optimally contracted due to legal and economical constraints (Fama and Jensen, 1983, Frydman and Jenter, 2010, as well as Thomas and Wells, 2010). Therefore, an optimal contract should appropriately reflect the factors, such as incentive schemes, that have a positive impact on the company performance. But this assumption is contradicted by various theories.

3.1. Company Owner and Employee in a Prisoner's Dilemma

The fact that pay arrangements are not always optimal and may include ineffective components is reflected in the assumption that the relationship between company owner and employee is a prisoner's dilemma with two players – owner and employee – possessing complete and imperfect information (Güth, 1999, and Sieg, 2005) (see figure 6).

Figure 6. Company Owner's and Employee's Prisoner's Dilemma

		Company Owner	
		Cooperation	Non-Cooperation
Employee	Cooperation	A/a	B/b
	Non-Cooperation	C/c	D/d

The common wealth will be maximized by cooperation of both parties, i.e. that the employee fulfils the interests of the company owner and gets an appropriate compensation for his cooperation. But both sides can increase their own wealth by non cooperation if the other side cooperates. Thus, the management might introduce measures with a positive short term but a negative long term impact on the company success. Based on this short term success, the management will realize a high compensation and the long term consequences may be suffered by the succeeding management and the shareholders (Bebchuk and Fried, 2003). The company owner may try to increase his own rent by

paying the employee less than the agreed compensation.

Thus, the pay-out matrix is based on the following assumptions:

1. Company Owner: B > A > D > C.
2. Employee pay-out: c > a > d > b.
3. Overall pay-out: Aa > Bb = Cc > Dd.

Independent of the strategy of the other side, both owner and employee realize a higher pay-out if they do not cooperate. These dominant strategies lead to a Nash equilibrium with the least preferable pay-out combination D/d (Gabisch, 2000).

This prisoner's dilemma may be solved in an endless game if owner and employee can react with cooperation on cooperation and non cooperation on non cooperation of the other side. Due to the fact that employees will leave the company sooner or later, the contract between owner and employer has to end at a certain point. Thus, both sides will have an incentive not to cooperate in the last contract period and, in anticipation of this behavior, not to cooperate in the periods before (Demers and Wang, 2010).

3.1.1. Bargaining/Rent Seeking Power

These general assumptions may be diluted in dependence of the employee's (Bebchuk and Fried, 2003, as well as Bebchuk et al., 2002) or company's bargaining and rent seeking power. For instance, CEO's in Anglo-American one tier boards are often claimed for overruling the remaining Executive and non executive directors of the board. They can use this power in their own interest without any potential sanctions of the company, e.g. by introducing ineffective remuneration schemes for the company performance simultaneously fostering their own wealth.[2]

Pointing into a similar direction as the bargaining power approach is Rosen's (1981) theory of superstars. Referring to Rosen, high remuneration does not necessarily compensate superior functions or a high marginal work product, i.e. for performance. It can rather be considered as tournament prize for the employee winning against internal and external competitors.

Depending on the company's or employee's power, the Nash Equilibrium is in these specific cases not at D/d and rather at B/b or C/c respectively. But it is very likely that neither a company nor an employee would stay long in a situation that is linked to an own disadvantage. Therefore, a deviation from the general Nash equilibrium D/d should only occur for a limited number of companies/employees in a restricted period of time.

3.1.2. Principal Agent Theory

The theoretical basis of many research papers evaluating the link between company performance and executive pay is the principal agent theory covering the following assumptions (Jensen and Meckling, 1976):[3]

- Incomplete contracts: Contracts cannot cover all issues that may arise after the signature of the contract (see also Coase, 1937, and Milgrom and Roberts, 1992).
- Information asymmetries: Human beings only have incomplete information when they have to come to a decision.
- Opportunism: Human beings act in their own interests (see also Jensen and Meckling, 1994).
- Risk neutrality: Human beings possess different risk preferences.

A company owner (principal) has to act within this context and to ensure that an employee (agent) acts in the principal's and the company's best interest. To ensure a corresponding agent behavior, it is impossible for the principal to fix all duties of the agent in a contract. The principal furthermore does not have all relevant information on the agent's performance resulting in information asymmetries between both sides. This may lead to hidden action and moral hazard (Kräkel, 1999). The principal furthermore has to take into account that the agent acts in his own interest and that different agents might make have different levels of risk aversion.

The principal has some instruments to solve or at least diminish this dilemma, such as improved control/information systems and institutions, incentives, company culture, etc.. Amongst these options incentives are considered as being the most efficient. Incentive schemes honor behavior that is in line with the principal interests and sanction behavior that is against the interests of the company owner.

The importance of right target setting is proved by various analyses. Rajagoplan (1996) shows that short term incentives with accounting targets increase the performance of companies with a defensive strategy, whereas long term incentives with market related performance targets improve the performance of companies with a prospector strategy. O'Connor and Rafferty (2010) show that return incentives decrease the shareholder value, whereas risk incentives foster it.

[2] Evidence for the managerial power theory is option backdating and spring loading (Yermack, 1995).

[3] Another theoretical approach is seniority pay (Lazear, 1979, 1981, and 1988). It is not part of the analyses, as the considered data sample consists of executive directors of German blue chip DAX 30 companies with different pay structures than for other employees, often being equal amongst ordinary executive directors in one company. Furthermore, it is not obvious if the executive directors followed a seniority pay paths before becoming an executive board member.

3.1.3. Quasi-endless game

Even though the principal agent theory provides a solution how owners and employees may cooperate, it does not solve the problem of ending contracts and the accompanying constant attraction of non cooperation. This issue may be solved by contracts or laws leading to quasi-endless games. For instance, the employee could be obliged by contractual clawback clauses or by law to pay back its remuneration if misbehavior or under achievement of targets become obvious after the employee left the company.[4] The level of payback should depend on the level of misbehavior. Contracts and laws should furthermore ensure that opportunistic rent seeking of the company owner against the employee will be avoided and punished.

In Germany, only laws regulate to some extent that employees can be obliged to pay back remuneration if they act intentionally or grossly negligent against the interests of the company. Employees are to some extent protected against opportunistic rent seeking behavior of company owners by the regulations of their individual labor contracts and laws ensuring a minimum standard of compensation.

A further way of aligning the interests of company owner and employee might be to increase the investment of the employee in the company, e.g. via share ownership guidelines (Evans and Evans, 2002).[5] Obligations to hold a specific stake in the company can be extended to the time after the employment contract ceased and, thus, diminish the potential danger of finite contracts (Jensen and Murphy, 1990a and 1990b). Another option might be that the company can hold back pension or severance payments if misbehaviour or underachievement of targets becomes obvious after the executive left the company.

3.2. Hypotheses

Referring to the current literature, theories, and business developments, the following six hypotheses regarding the effectiveness and efficiency of incentive plans are evaluated in this paper.

H1: Incentive schemes support the company performance. (Effectiveness).

H2: The effect of LTI schemes on company performance differs between plan types. (Effectiveness/Efficiency).

H3: Incentive scheme targets support companies' target achievements. (Efficiency).

H4: There exist differences between the effects of LTI vesting periods on company performance. (Efficiency).

H5: Some incentives have been more efficient in the financial crisis than others. (Efficiency).

H6: Contractual and legal measures ensure quasi-endless games. (Effectiveness).

Whereas the distinction between effectiveness and efficiency can be described as follows:

1. Effectiveness: Doing the right things.
2. Efficiency: Doing things right.

Doing things in a way to achieve a target can be described as effectiveness. Doing things in an optimal output/input ratio can be considered as efficiency. Peter Drucker (1963) summarizes both terms as follows: "It is fundamentally the confusion between effectiveness and efficiency that stands between doing the right things and doing things right. There is surely nothing quite so useless as doing with great efficiency what should not be done at all."

The hypothesis above can be translated into a quantifiable model:

$$P_{it} = a_{0it} + ß_1BO_{it} + ß_2LT_{it} + ß_3SO_{it} + ß_4OP_{it} + ß_5PC_{it} + ß_6PS_{it} + ß_7RS_{it} + ß_8BP_{it}/BS_{it} + ß_9LP_{it}/LS_{it} + ß_{10}VE_{it} + ß_{11}HI_{it} + ß_{12}ED_{it} + ß_{13}JT_{it} + ß_{14}AG_{it} + ß_{15}SU_{it} + ß_{16}NC_{it} + ß_{17}CS_{it} + ß_{18}SE_{it} + ß_{19}OW_{it} + ß_{20}LO_{it} + \varepsilon_{it}$$ with

[4] In the course of today's economical crisis, clawback clauses are intensively discussed – especially for bonus payments - as instrument to ensure the sustainability of management decisions. In the USA, the Dodd-Frank Wall Street Reform and Consumer Protection Act has – amongst others – introduced requirements that companies adopt clawback policies (Larcker and Tavan, 2011).

[5] Share ownership guidelines are already prevalent amongst US and UK blue ship companies. In the course of the increased discussions on executive pay many German companies, implemented similar guidelines for their executives.

Table 4. Variables description

Dependent Variable	
Name	Description
P	Company performance (profit before tax/market capitalization) (dependent variable).

Independent Variables			
Name	Description	Name	Description
Incentives			
BO	STI portion of compensation.	LT	LTI portion of compensation.
SO	Share ownership guidelines.	OP	Options.
PC	Performance cash.	PS	Performance shares.
RS	Restricted shares.	BP	STI plan has profitability target.
BS	STI plan has share related target.	LP	LTI plan has profitability target.
LS	LTI plan has share related target.	VE	Vesting period of LTI plan.
Individual Characteristics			
HI	External/internal hiring of executive director.	ED	Education.
JT	Job Tenure.	AG	Age.
SU	Superstardom.		
Company Characteristics			
NC	New CEO.	CS	Company size.
SE	Business sector.	OW	Ownership structure.
LO	Location of company.		

Regression Coefficients, Error Term, Individual and Time Identifications			
a_0, $ß_1 - ß_{20}$	Regression Coefficients.	ε	Error Term.
i	Individual.	t	Time Period.

4. Empirical Analysis

4.1. Description of Data

The analysis is based on a unique data sample of German DAX companies between 2004 and 2010. The DAX covers the 30 largest listed companies in Germany. The data set is restricted to the period between 2006 and 2010 as at the end of 2005 the VorstOG became effective requiring all listed companies in Germany to disclose the compensation of their executive directors individually.

The sample consists of the DAX constituents as at 31 December 2010 with former DAX member Deutsche Postbank until 2009 instead of Merck that opted out from the individual disclosure requirements of the VorstOG until 2009 and Salzgitter that was replaced in the DAX in 2010 by not individually disclosing HeidelbergCement.[6] The data set incorporates individual information on the companies' executive directors such as compensation, function, age, gender, education, job experience, and membership in internal and external supervisory boards. The sample also covers comprehensive financial data of the DAX companies such as sales, profit, and personnel expenses. Furthermore, the sample includes information on the company environment, such as location, ownership structure, and industry sector. The data is collected from publicly available sources, i.e. from annual reports,

[6] Referring to the VorstOG, listed companies can opt out from their obligation to disclose the executive directors' compensations individually if at least 75 % of shareholders approve this at the annual general meeting.

financial data provider finanzen.net, as well as officially released company information.

The sample population covers 305 executive directors who served in DAX companies between 2006 and 2010 and is restricted to executive directors who served full year. The final population covers 273 executive directors consisting of 42 CEO's, ten Deputy CEO's, and 221 Ordinary executive directors with various functions.

As approximation for the company success and, thus, as dependent variables serve profit before tax (natural logarithm) and market capitalization (natural logarithm). The relevance of these two measures is supported by the fact that – as shown above – the majority of DAX STI and LTI schemes apply profit and share price targets. To analyze the sustainability of incentive schemes, profit before tax and market capitalization of the current and the following three financial years are applied as dependent variables.

The estimates are clustered per ED to cover characteristics of the ED's who have to realize the incentive scheme targets (Several tests are applied to ensure the correctness of the empirical results (Kohler and Kreuter, 2001, Ramsey, 1969, Breusch and Pagan, 1979, and White, 1980): Model fits are controlled by (adjusted) R^2, F tests, graphical as well as regression specification error tests. Linearity is tested by component plus residual plots and augmented component plus residual plot. Important cases are controlled by graphical tests. Homoscedasticity is evaluated by Breusch/Pagan and White tests. As the Breusch/Pagan and White tests indicate heteroscedasticity for the estimates, the standards errors are robust (see also Huber, 1967). See White (1980), Huber (1967), Rogers (1993), Williams (2000), Froot (1989), and Wooldridge (2002) for an explanation how to calculate robust standard errors in cluster models. For all models, the Hausman (1978) test was applied to evaluate if random (RE) or fixed effects (FE) models are appropriate. Referring to the Hausman test, FE should be used for all models. All FE estimates suffer from time constant variables, - even if they are approximated by factors. They do not provide further insights and the restricted FE and RE estimates generally support the results below. Instruments are hardly to build as all available instruments would also be correlated with the error term. For consistency reasons, clustered OLS models are considered as they use robust variance estimates (with robust standard errors) and are robust to any correlation within panels and/or groups (Wiggins, 2009). Coles and Li (2010) suggest further methods to investigate FE, all requiring individuals who changed companies to distinguish the effect between movers/non-movers and companies with/without movers. Different R^2 can be interpreted as covering time invariant unobserved managerial and company heterogeneity included in the respective samples. As there are only a few cases of executive directors that either changed their jobs between DAX 30 companies or became newly appointed as DAX 30 executive director between 2006 and 2009, the estimates for some data cuts are not representative and include too many omitted variables.).

Tab. 4: Descriptive Statistics for Independent Variables

4.1.1. Descriptive Statistics

Table 5 shows the independent variables and their assumed impact on company performance based on the theories above (Hinderlich (2007) shows that work councils and collective bargaining support company performance. As all DAX 30 companies are covered by similar co-determination systems, their impact can hardly be differentiated.).

Table 5. Descriptive Statistics for Independent Variables

Variable	Description	Expected Prefix	Mean	Standard Deviation	N
STI Portion (ln)	STI portion of total direct compensation (base salary + STI + LTI) (natural logarithm).	+	-0.8251	0.4043	758
LTI Portion (ln)	LTI portion of total direct compensation (base salary + STI + LTI) (natural logarithm).	+	-1.4311	0.7383	671
SOG	Company has share ownership guidelines (SOG) (yes/no, i.e. 1/0-coded).	+	0.3678	0.4825	813
No LTI	Company has no LTI plan (yes/no, i.e. 1/0-coded) (reference category).	-	0.1390	0.3462	813
Option	Company has share option plan as primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.2645	0.4413	813
Performance Cash	Company has performance cash plan as primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.2657	0.4420	813
Performance Shares	Company has performance share plan as primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.1550	0.3621	813
Restricted Shares	Company has restricted share plan as primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.1759	0.3810	813
Profit Target STI	Company has profit related performance target in STI plan (yes/no, i.e. 1/0-coded).	+	0.5769	0.4944	813
Profit Target LTI	Company has profit related performance target in primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.1907	0.3931	813
Share Target STI	Company has share related performance target in STI plan (yes/no, i.e. 1/0-coded).	+	0.0258	0.1587	813
Share Target LTI	Company has share related performance target in primary LTI plan (yes/no, i.e. 1/0-coded).	+	0.5215	0.4998	813
Vesting2	Vesting period of primary LTI plan is 2 years (yes/no, i.e. 1/0-coded).	+/-	0.0800	0.2714	813
Vesting3	Vesting period of primary LTI plan is 3 years (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.5203	0.4999	813
Vesting4	Vesting period of primary LTI plan is 4 years (yes/no, i.e. 1/0-coded).	+/-	0.2091	0.4069	813
Vesting5	Vesting period of primary LTI plan is 5 years (yes/no, i.e. 1/0-coded).	+/-	0.0517	0.2215	813
External Hire	Executive Director's previos job was with an external company (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.2263	0.4187	813
Internal Hire	Executive Director's previos job was with current company (yes/no, i.e. 1/0-coded).	+/-	0.7737	0.4187	813
Apprentice	Highest educational degree is apprenticeship (yes/no, i.e. 1/0-coded) (reference category).	-	0.0701	0.2555	813
Study	Highest educational degree is university degree (yes/no, i.e. 1/0-coded).	+	0.4846	0.5001	813
PhD	Highest educational degree is phd/post doc (yes/no, i.e. 1/0-coded).	+	0.4428	0.4970	813
Tenure	Tenure in current function.	+	4.8167	3.2300	813
Qtenure	Tenure in current function (squared).	-	33.6212	46.6447	813
Age54	Executive director is younger than 55 (reference category).	+	0.5867	0.4927	813
Age55	Executive director is between 55 and 59.	+/-	0.2571	0.4373	813
Age60	Executive director is 60 years or older.	-	0.1562	0.3633	813
Superstar	Executive Director is "superstar"/has strong rent seeking power (yes/no, i.e. 1/0-coded).	+	0.0935	0.2913	813
New CEO	Company has new CEO at least half year in company (0 = no, 1 = 1st new CEO, 2 = 2nd new CEO, etc.).	+	0.4785	0.4998	813
Employees (ln)	Number of employees of company (ee) (natural logarithm).	+	11.2859	1.0998	813

Table 5. Descriptive Statistics for Independent Variables (continued)

Variable	Description	Expected Prefix	Mean	Standard Deviation	N
Non FS	Busines sector of company is not financial services (yes/no, i.e. 1/0-coded).	+/-	0.7515	0.4324	813
FS	Busines sector of company is financial services (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.2485	0.4324	813
Government	Largest owner of company is governmental with a stock portion of at least 10 % (yes/no, i.e. 1/0-coded).	-	0.1451	0.3525	813
Many	Company has many shareholders (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.4748	0.4997	813
Private	Largest company owner is non-governmental with a stock portion of at least 10 % (yes/no, i.e. 1/0-coded).	+/-	0.1562	0.3633	813
Major	Company has majority owner (stock portion >= 40 %; is in all cases non governmental) (yes/no, i.e. 1/0-coded).	+/-	0.2239	0.4171	813
Year06	Year is 2006 (yes/no, i.e. 1/0-coded).	+/-	0.2103	0.4078	813
Year07	Year is 2007 (yes/no, i.e. 1/0-coded).	+/-	0.2005	0.4006	813
Year08	Year is 2008 (yes/no, i.e. 1/0-coded).	+/-	0.1919	0.3940	813
Year09	Year is 2009 (yes/no, i.e. 1/0-coded).	+/-	0.1956	0.3969	813
Year10	Year is 2010 (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.2017	0.4015	813
BA	Company headquarter is in Bavaria (yes/no, i.e. 1/0-coded) (reference category).	+/-	0.0775	0.2675	813
BW	Company headquarter is in Baden-Wuerttemberg (yes/no, i.e. 1/0-coded).	+/-	0.0726	0.2596	813
HE	Company headquarter is in Hesse (yes/no, i.e. 1/0-coded).	+/-	0.1587	0.3656	813
HH	Company headquarter is in Hamburg (yes/no, i.e. 1/0-coded).	+/-	0.1205	0.3258	813
NI	Company headquarter is in Lower Saxony (yes/no, i.e. 1/0-coded).	+/-	0.2645	0.4413	813
NRW	Company headquarter is in North Rhine-Westphalia (yes/no, i.e. 1/0-coded).	+/-	0.2522	0.4345	813
RP	Company headquarter is in Rhineland-Palatinate (yes/no, i.e. 1/0-coded).	+/-	0.0209	0.1432	813

Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations

Both the STI (LN STI Portion) and LTI (LN LTI Portion) portion of total direct compensation are assumed to have a positive, decreasing impact on company performance.[7] Share ownership guidelines are considered to increase profit and market capitalization.

The existence of the different LTI types – share option (Options), performance cash (Performance Cash), performance share (Performance Shares), and restricted share plans (Restricted Shares) – is assumed to have a positive effect on the profit and market capitalization of companies (reference category: No LTI). If a company has more than one LTI plan, the primary LTI with the largest compensation portion is considered to capture the main LTI effect.

The fact that a company has share (Share Target STI and Share Target LTI) or profit (Profit Target STI and Profit Target LTI) related performance targets in its STI or (primary) LTI plan is assumed to have a positive impact on the companies profit and market capitalization.[8]

The LTI vesting period – two (Vesting2), three (Vesting3, reference category), four (Vesting4), and five (Vesting5) years – impact is not clear.[9]

[7] As shown in table 4, all independent variables have 813 observations except LN STI Portion (758) and LN LTI Portion (671). This is due to the fact that the total direct compensation portion of STI and LTI are in 55 and 142 cases respectively 0 % and not considered after logarithm them.

[8] The impact of absolute, i.e. company linked, and relative, i.e. peer related, LTI targets has been also tested without clear results, but leading to multicollinearity.

[9] If a vesting period is between two years, e.g. 3.5 years, it is rounded to the next full year. Cadman et al. (2010)

A new CEO (New CEO) is likely to provide the company with new, performance fostering impulses, whereas it is not obvious if it is an advantage to hire executive directors externally (External Hire) or internally (Internal Hire).

Education of executive directors is distinguished in three categories, with the company performance likely to be positively related to the educational level: Highest degree is apprenticeship (Apprentice) (reference category), highest degree is university degree (Study), and highest educational degree is phd/post doc (Phd).

Job tenure and age are measured by the executive director's tenure in current function (Tenure) and its square term (QTenure) as well as three age categories (Age54, Age55, and Age60), i. e. executive directors who are younger than 55 and quite far away from retirement (Age54) (reference category), the ones between 55 and 59 who are nearer to retirement (Age55), and executive directors with 60 years or more being very near to retirement (Age60). It is reasonable to assume that firm success is positively influenced by service periods and age, whereas it is also likely that these effects may change after certain periods, especially, when executive directors are getting nearer to retirement.

The superstar variable (Superstar) depends on the fact if an executive director was categorized in the 2002 or 2005 study of Manager Magazin amongst Germany's top 50 business leaders (N. U., 2002, as well as Balzer et al., 2005) and constantly confirmed this ranking between 2006 and 2010 with a top 20 place in Manager Magazin's Börsenbarometer (N. U., 2011).[10] Referring to the theories above, being a manager superstar is not necessarily linked to a superior company performance.

As variables for company size serve the natural logarithm of number of employees (LN EE) with the assumed positive decreasing effect on profit and market capitalization. Business sector is distinguished in financial services (FS) (reference category) and non-financial services (Non FS) with an unclear effect of its impact on company success.[11]

Company ownership is clustered in four categories: Many shareholders (Many) (reference category), largest owner is governmental (Government), largest owner is non-governmental (Private), and majority owner (Major). This takes the heterogeneity and nature of ownership into account,[12] with arguments for and against each ownership structure.[13]

The estimates also include time and location dummies. The time dummies cover the considered years from 2006 to 2010 (reference category). Neither profit nor market capitalization have to be higher or lower in subsequent years. The location dummies refer to the German federal states in which the companies are headquartered, i.e. Bavaria (reference category), Baden-Wuerttemberg, Hesse, Hamburg, Lower Saxony, North Rhine-Westphalia, and Rhineland-Palatinate. It seems reasonable to assume that companies in the more economically developed south of Germany are generally more successful, especially, in the reference state Bavaria. But it is likely that this trend is not consistent at the considered level of German blue chip companies.

4.2. Results

The empirical results for hypotheses one to four and six are shown in tables 6 and 7. Hypothesis five is evaluated in table 8.

show that growth companies apply longer vesting periods as they have a stronger focus on the companies' horizon. Firms grant options with shorter vesting periods to more powerful executives, and when institutional ownership is low. There is evidence that companies apply longer vesting periods to retain CEOs.

10 Monthly published Manager Magazin is one of the most influential business magazines in Germany. Manager Magazin's Börsenbarometer is a monthly survey with 500 leading managers participating. One question in this survey asks the participants in which managers they have confidence to sustainably increase the share price resulting in a top 20 manager ranking for listed companies in Germany. With a ten year Fortune 500 sample, Fanelli et al. (2004) show that charismatic CEO influence their compensation and share price, whereas their impact on other company indicators seems rather negligible.

11 The models in this paper were also calculated by using dummy variables for all business sectors of the 30 DAX companies, e.g. automotive or aviation, leading to similar results as shown below. But the differentiation between FS and Non FS proved to be the most meaningful.

12 There exist various approaches in the literature to categorize ownership. Whereas De Angelis and Grinstein (2010) argue that shareholder portions above 5 % can be considered as large, this paper refers to Voulgaris et al. (2009), categorizing large ownership as being at least 10 %. An additional cluster is applied for majority – often family – owners with a share portion of at least 40 %.

13 For instance, Bandiera et al.(2010) find empirical evidence that family owned Italian companies apply less performance sensitive contracts for their managers. This attracts less talented and risk averse managers, working and earning less than their peers. Also for Italian family owned companies, Barontini and Bozzi (2010) show that excess CEO compensation is linked to worse stock and accounting performance, but that this result is only significant at a lower degree of ownership concentration, a higher link between voting and cash flow rights and in the absence of shareholders' agreements. Thus, the conflict is rather between family and minority owners and not between shareholders and managers. The pay for performance relation in Chinese companies is significantly reduced by state ownership (Kato and Long, 2005). De Angelis and Grinstein (2010) prove that performance is better in complex companies with a concentrated shareholder ownership.

Table 6. Determination of Company Profit

Variables	Predicted Effect	Profit Before Tax (Natural Logarithm)			
		t	t+1	t+2	t+3
LN STI Portion	+	0.8003 *** (0.0888)	-0.2521 * (0.1045)	-0.2522 (0.1747)	0.0600 (0.3497)
LN LTI Portion	+	0.1101 * (0.0578)	-0.1721 *** (0.0584)	-0.1954 (0.1863)	-0.0530 (0.1252)
SOG	+	0.1624 *** (0.0479)	0.2418 *** (0.0680)	0.3630 * (0.1657)	0.4434 *** (0.1656)
Options	+	-0.4098 *** (0.0893)	0.0762 (0.1563)	0.5887 (0.4187)	-0.3931 * (0.2289)
Performance Cash	+	-0.4525 *** (0.1001)	-0.5553 *** (0.0929)	-0.3614 (0.3301)	-1.5942 *** (0.2815)
Performance Shares	+	(omitted)	0.4767 *** (0.1336)	0.8109 (0.5723)	(omitted)
Restricted Shares	+	-0.1978 * (0.1107)	(omitted)	(omitted)	-2.2694 *** (0.5705)
Share/Profit Target STI	+	-0.2423 *** (0.0625)	-0.1637 (0.1499)	-0.4893 (0.4089)	-1.7439 *** (0.3806)
Share/Profit Target LTI	+	0.2748 *** (0.0881)	0.0172 (0.1898)	0.4131 (0.3974)	1.9411 *** (0.4997)
Vesting2	+/-	0.1062 (0.115)	-0.4087 *** (0.1184)	-0.6392 *** (0.1715)	-0.7052 *** (0.1822)
Vesting4	+/-	0.0987 (0.09)	-0.3462 *** (0.097)	-0.5325 *** (0.1802)	-0.3202 (0.1955)
Vesting5	+/-	-0.4804 *** (0.0888)	-0.7119 *** (0.0987)	-0.8710 *** (0.2873)	-0.4407 (0.3294)
Internal Hire	+/-	0.0587 (0.0468)	-0.0329 (0.0461)	0.0133 (0.0536)	-0.0324 (0.0844)
Study	+	-0.0287 (0.0765)	0.0094 (0.079)	0.2179 (0.1477)	0.0208 (0.1596)
PhD	+	0.1051 (0.0718)	0.0858 (0.0699)	0.2224 (0.1597)	-0.0334 (0.1494)
Tenure	+	0.0086 (0.0144)	0.0016 (0.0145)	-0.0529 * (0.0233)	0.0094 (0.0271)
Qtenure	-	-0.0014 * (0.0008)	-0.0002 (0.001)	0.0033 * (0.0014)	-0.0008 (0.0015)
Age55	+/-	0.0019 (0.0442)	0.0034 (0.043)	-0.0455 (0.0605)	0.1899 * (0.0864)
Age60	-	0.1449 *** (0.0542)	0.0192 (0.0634)	-0.1136 (0.0955)	-0.1316 (0.1135)
Superstar	+	-0.0677 (0.0707)	0.0275 (0.0566)	0.0525 (0.0741)	0.2239 * (0.1068)
New CEO	+	0.5122 *** (0.0869)	0.4173 *** (0.111)	0.8327 *** (0.1855)	2.0518 *** (0.3101)
Employees (ln)	+	0.6026 *** (0.0337)	0.6091 *** (0.0439)	0.7202 *** (0.0638)	1.0376 *** (0.1404)
Non FS	+/-	-1.8930 *** (0.1054)	-1.8706 *** (0.1496)	-2.2573 *** (0.2239)	-3.1996 *** (0.3037)
Private	+/-	-0.3269 *** (0.0786)	0.0345 (0.1152)	0.1713 (0.2844)	0.2722 (0.2831)
Government	+/-	-0.2561 * (0.1263)	-0.2075 * (0.1153)	-0.4566 (0.3535)	-0.7079 * (0.278)
Major	+/-	-0.7602 *** (0.1285)	-0.7976 *** (0.1109)	-0.8905 *** (0.17)	-1.1613 *** (0.2014)
Year dummies	+/-	Yes **	Yes ***	Yes **	Yes ***
Location	+/-	Yes ***	Yes ***	Yes ***	Yes ***
Constant	+/-	4.1280 *** (0.3829)	2.6799 *** (0.3971)	1.4664 (1.0025)	0.0865 (1.2523)
N		642	402	257	153
F Value		174.03	375.14	160.09	127.67
R^2		0.77	0.84	0.80	0.87
Adjusted R^2		0.76	0.83	0.77	0.84

Dependent Variables: Profit before tax (natural logarithm). Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations. Pooled OLS models (cluster = executive director). Standard errors are in brackets. As the Breusch and Pagan (1979) and White (1980) tests indicate heteroscedasticity, the standards errors are robust (see also Huber, 1967). *, **, ** refer to a significance level of 10 %, 5 %, and 1 %.

Table 7. Determination of Company Market Capitalization

Variables	Predicted Effect	Market Capitalization (Natural Logarithm)			
		t	t+1	t+2	t+3
LN STI Portion	+	0.1928 *** (0.0504)	-0.0281 (0.0621)	-0.0946 (0.0835)	0.1561 (0.1978)
LN LTI Portion	+	0.0519 (0.0422)	-0.0475 (0.0469)	0.1169 * (0.0563)	0.0756 (0.0863)
SOG	+	0.0746 (0.0610)	0.1994 *** (0.0502)	0.1082 (0.1207)	0.1774 (0.3075)
Options	+	-0.2615 * (0.108)	-0.9858 *** (0.204)	-1.0086 *** (0.2231)	-0.2811 (0.1812)
Performance Cash	+	-0.1888 * (0.0928)	-1.0811 *** (0.1549)	-1.1694 *** (0.1602)	-0.2642 * (0.1455)
Performance Shares	+	(omitted)	-0.7941 *** (0.1785)	-0.8155 *** (0.202)	(omitted)
Restricted Shares	+	0.1714 (0.112)	(omitted)	(omitted)	1.3773 ** (0.5683)
Share/Profit Target STI	+	-0.7295 *** (0.1249)	-1.6360 *** (0.1417)	-1.7014 *** (0.2588)	-1.7885 * (0.7693)
Share/Profit Target LTI	+	0.3209 *** (0.0768)	0.6550 *** (0.0917)	0.7709 *** (0.1339)	0.9840 *** (0.2622)
Vesting2	+/-	0.2434 * (0.1066)	0.5295 *** (0.2019)	0.6122 *** (0.2152)	0.0899 (0.2032)
Vesting4	+/-	-0.1685 * (0.078)	-0.4814 *** (0.1269)	-0.6456 *** (0.0934)	-0.2805 * (0.161)
Vesting5	+/-	-0.2055 (0.1287)	-0.5852 *** (0.1622)	-0.6340 * (0.2705)	-0.6402 (0.8172)
Internal Hire	+/-	0.0184 (0.0569)	-0.0267 (0.0478)	-0.0028 (0.0509)	0.0165 (0.0534)
Study	+	0.1105 (0.088)	0.0546 (0.0746)	0.1555 * (0.0774)	0.0744 (0.0736)
PhD	+	0.1614 ** (0.0792)	0.0774 (0.0689)	0.0984 (0.0784)	0.0116 (0.0639)
Tenure	+	-0.0116 (0.0177)	-0.0019 (0.0183)	-0.0260 (0.0176)	-0.0217 (0.0228)
Qtenure	-	0.0003 (0.0011)	0.0005 (0.0012)	0.0021 * (0.0012)	0.0014 (0.0014)
Age55	+/-	0.0250 (0.0471)	-0.0113 (0.0428)	-0.0227 (0.0379)	-0.0083 (0.0483)
Age60	-	0.1769 *** (0.0639)	0.0962 (0.0623)	-0.1068 (0.0673)	-0.0208 (0.0566)
Superstar	+	-0.0720 (0.0815)	-0.0237 (0.0649)	0.0260 (0.0645)	-0.0301 (0.0642)
New CEO	+	0.7193 *** (0.085)	0.7722 *** (0.084)	0.6457 *** (0.0796)	0.7374 *** (0.1271)
Employees (ln)	+	0.4030 *** (0.0288)	0.4162 *** (0.0302)	0.4533 *** (0.0541)	0.2936 * (0.1137)
Non FS	+/-	-1.2364 *** (0.1547)	-1.0512 *** (0.1688)	-0.8891 *** (0.162)	-0.5914 *** (0.2052)
Private	+/-	-0.4575 *** (0.1046)	-1.0655 *** (0.1306)	-0.9722 *** (0.1461)	-0.6460 * (0.3078)
Government	+/-	-0.1145 (0.1237)	-0.3100 *** (0.1074)	-0.1715 (0.1372)	-0.5238 *** (0.1944)
Major	+/-	-0.7719 *** (0.0958)	-0.8965 *** (0.077)	-0.9052 *** (0.0794)	-0.8507 *** (0.1525)
Year dummies	+/-	Yes ***	Yes *	Yes **	Yes ***
Location	+/-	Yes ***	Yes ***	Yes ***	Yes ***
Constant	+/-	7.2433 (0.3422)	7.1773 *** (0.4187)	7.2059 *** (0.5749)	7.6476 *** (1.3458)
N		653	429	281	167
F Value		131.62	317.76	302.11	228.37
R^2		0.75	0.83	0.87	0.89
Adjusted R^2		0.74	0.82	0.86	0.87

Dependent Variables: Market capitalization (natural logarithm). Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations. Pooled OLS models (cluster = executive director). Standard errors are in brackets. As the Breusch and Pagan (1979) and White (1980) tests indicate heteroscedasticity, the standards errors are robust (see also Huber, 1967). *, **, ** refer to a significance level of 10 %, 5 %, and 1 %.

Table 8. Determination of Company Success during the Financial Crisis 2009

Variables	Predicted Effect	Market Capitalization (Natural Logarithm) in 2009	
		t+2	t+3
LN STI Portion	+	-0.1202 (0.3154)	0.4034 (0.3307)
LN LTI Portion	+	0.0677 (0.1085)	0.1599 (0.166)
SOG	+	-0.0046 (0.1979)	-0.0071 (0.2643)
Options	+	-1.5949 *** (0.3217)	-0.6557 *** (0.1029)
Performance Cash	+	-1.4101 *** (0.3093)	-0.3851 *** (0.0886)
Performance Shares	+	-0.8795 ** (0.4017)	(omitted)
Restricted Shares	+	(omitted)	0.9486 *** (0.2857)
Share Target STI	+	-1.7724 *** (0.4491)	(omitted)
Share Target LTI	+	1.0628 *** (0.1778)	1.2322 *** (0.2771)
Vesting2	+/-	1.3651 *** (0.3658)	1.0297 *** (0.2984)
Vesting4	+/-	-0.6889 *** (0.1384)	-0.2216 (0.1479)
Vesting5	+/-	-0.8724 * (0.5250)	0.2270 (0.5512)
Internal Hire	+/-	0.0671 (0.0561)	0.0164 (0.0436)
Study	+	0.1432 (0.1060)	0.0179 (0.0414)
PhD	+	0.0815 (0.1005)	-0.0055 (0.0293)
Tenure	+	-0.0417 * (0.0239)	0.0105 (0.0113)
Qtenure	-	0.0023 * (0.0014)	-0.0005 (0.0006)
Age55	+/-	0.0474 (0.0494)	-0.0551 (0.0479)
Age60	-	-0.1845 (0.1248)	0.0552 (0.0366)
Superstar	+	0.0317 (0.0725)	-0.0203 (0.0425)
New CEO	+	0.4372 *** (0.083)	0.7524 *** (0.1095)
Employees (ln)	+	0.5982 *** (0.1055)	0.1756 * (0.1039)
Non FS	+/-	-0.6820 *** (0.2270)	-1.2359 *** (0.2648)
Private	+/-	-1.0420 *** (0.2358)	-1.4628 *** (0.3417)
Government	+/-	-0.2341 (0.1803)	-0.1388 (0.1964)
Major	+/-	-0.7695 *** (0.0973)	-0.8345 *** (0.1512)
Location	+/-	Yes ***	Yes ***
Constant	+/-	5.6938 *** (1.1539)	9.8990 *** (0.8353)
N		98	82
F Value		139.57	843.54
R^2		0.94	0.98
Adjusted R^2		0.91	0.97

Dependent Variable: Market capitalization (natural logarithm) in 2009. Source: DAX 30 companies 2006 - 2010; DAX constituents as at December 31, 2010, with Deutsche Postbank instead of Merck until 2009 and Salzgitter instead of HeidelbergCement; own evaluations. OLS models. Standard errors are in brackets. As the Breusch and Pagan (1979) and White (1980) tests indicate heteroscedasticity, the standards errors are robust (see also Huber, 1967). *, **, ** refer to a significance level of 10 %, 5 %, and 1 %.

4.2.1. H1: Incentive schemes support the company performance

Neither a STI (LN STI Portion) (0.8003 to 0.0600 and 0.1928 to 0.1561) nor a LTI (LN LTI Portion) (0.1101 to -0.0530 and 0.0519 to 0.0756) plan's existence and their compensation portion have a clear impact on companies' profit or market capitalization. The prefixes change between the years (t to t+3) as the significance of the regressors (tables 6 and 7).

Therefore, hypothesis 1 can not be confirmed.

4.2.2. H2: The effect of LTI schemes on company performance differs between plan types

There is mixed evidence if the considered LTI plan types – Options (-0.4098 to -0.3931, and -0.2615 to -0.2811), Performance Cash (-0.4525 to -1.5942 and -0.1888 to -0.2642), Performance Shares (0.4767 to -0.8155), and Restricted Shares (-0.1978 to 1.3773) – support the company performance, but it seems that they rather have a negative impact compared to using no LTI, especially, in the case of options and performance cash plans (tables 5 and 6). As performance and restricted share plans are not sufficiently applied in all years, their regression factors are sometimes omitted.

This is again no evidence that LTI work.

4.2.3. H3: Incentive scheme targets support companies' target achievements

Profit (Profit Target STI) (-0.2423 to -1.7439) and share (Share Target STI) (-0.7295 to -1.7885) related STI targets rather have a negative effect on companies' profit and market capitalization. But profit (Profit Target LTI) (0.2748 to 1.9411) and share (Share Target LTI) (0.3209 to 0.9840) related LTI targets increase profit and market capitalization (tables 5 and 6).

Thus, targets seem to need a long enough incentivation period to work counterproductive otherwise.

4.2.4. H4: There exist differences between the effects of LTI vesting periods on company performance

A three year LTI vesting period (Vesting3) (reference) is performance fostering compared to a four (Vesting 4) (0.0987 to -0.3202 and -0.1685 to -0.2805) and five (Vesting 5) (-0.4804 to -0.4407 and -0.2055 to -0.6402) year period, whereas compared to – seldom – two years (Vesting 2) (0.1062 to -0.7052 and 0.2434 to 0.0899) three years are only preferable for profit (tables 5 and 6).

Therefore, the effect of vesting periods is becoming negative after some years.

4.2.5. H6: Contractual and legal measures ensure quasi-endless games

Share ownership guidelines (SOG) (0.1624 to 0.4434 and 0.0746 to 0.1774) seem to sustainably foster the company performance, at least regarding profit (tables 5 and 6).

The extension of the 'employer-employee game' is an approach to foster the company performance.

4.2.6. Further Determinants

A new CEO (NEW CEO) sustainably increases companies' profit and market capitalization, whereas the fact if an executive director is hired internally (Internal Hire), the education level (Study and Phd), job tenure (Tenure and QTenure), executive directors age (Age55 and Age60), and superstardom (Superstar) do not have a significant effect.

The company success is determined by its size (LN EE) and business sector (Non FS). Larger and financial services companies have significantly better company performance. Furthermore, many owners (Many) (reference) have a positive impact on market capitalization and profit compared to governmentally (Government) and majority owner (Major) dominated companies as well as on the market capitalization of privately (Private) owned firms.

There is a no clear time, but a significant location effect supporting the hypothesis that companies in the economically more developed south of Germany are more successful (tables 5 and 6).

4.2.7. H5: Some incentives have been more efficient in the financial crisis than others

The sample is restricted to market capitalization in 2009 as dependent variable and the two and three periods before for the independent variables. The results for profit as dependent variable and for independent regressors from 2008 and 2009 are statistically not stable and, amongst others, suffer from too many omitted variable. As performance and restricted share plans as well as share related STI targets are not sufficiently applied in all years, their regression factors are sometimes omitted in the shown analyses.

When only the market capitalization in the financial crisis of 2009 and the impact of the dependent variables two and three years before are considered, the results from above basically remain the same with some exceptions. Thus, the impact of share ownership guidelines becomes insignificant (-0.0046 and -0.0071) (see table 8).

5. Conclusions

Neither STI nor LTI plans necessarily support the company success. That incentive schemes even include some risks became obvious during the course

of the financial crisis 2008/09. As shown in various studies, compensation, especially high risk incentives, had a negative impact on bank performance finally causing the financial crisis (Suntheim, 2010, van Bekkum, 2010, as well as Bhagat and Bolton, 2010 and 2011).

Therefore, the question on the effectiveness of incentive schemes cannot be affirmed, it rather depends on the efficiency of each plan, i.e. on the way how it is designed. This is mainly due to the fact that there is no one fits all approach for incentive schemes as their impact depends on companies and employees characteristics, especially, on the level of individual risk aversion (Eaton and Rosen, 1983, Abowd and Kaplan, 1999, Core et al., 2002, as well as Grund and Sliwka, 2006). Therefore, the often raised claims for general regulations on executive pay and incentive schemes have to be treated with caution.

Special attention has to be paid on target setting. Short term focused objectives of STI plans often miss their targets, whereas long term oriented objectives of LTIs significantly support the company success. Targets of incentive schemes have to consider specific employee and company characteristics. Many companies focus too much on observable, financial performance targets at the expense of non financial targets, such as innovation as well customer and employee satisfaction (Ariely, 2010, and Larcker and Tavan, 2011).

The full process has to be accompanied by performance management. Targets do not only have to be set properly, they also have to be communicated clearly and followed up regularly by reviews (see also Grund and Sliwka, 2007). Over- and underachievement has to be honored and sanctioned (monetarily). The positive effect of appropriate incentive schemes might further increase on a mid and long term basis as they serve as signaling for high-ability workers (Lazear, 1996, Paarsch and Shearer, 2006, Ferrall and Shearer, 1999, as well as Lazear, 2003).

To foster the incentivation and to solve the prisoner's dilemma by a quasi-endless game, additional measures may be helpful (see also Bebchuk and Fried, 2009). Share ownership guidelines seem to extend the 'game' between employer and employees in a performance fostering way.

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