

Pay-for-performance?

An Empirical Investigation of the Relationship between Executive Compensation and Firm Performance in the Netherlands

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Executive Summary

This paper investigates the relationship between CEO compensation and company performance for Dutch listed companies for the period 2002-2007. The study examines if absolute or relative changes in CEO pay are related to changes in company performance. Furthermore, the study investigates if the pay-performance relationship has strengthened after the introduction of the Dutch corporate governance code in 2004. The results suggest that the Dutch corporate governance code had a positive effect on the pay-performance relationship. This effect is mainly driven by the increased use of equity-based compensation. Compared internationally, the pay-performance relationship in the Netherlands remains relatively low.

For the full text of this master thesis refer to the following webpage:
<http://hdl.handle.net/2105/6150>.

1. Introduction

Executive compensation has been a topic of much discussion for a long period of time. Continuous debates among employers, employees, regulators and the press about the level, structure and role of CEO compensation take place in most industrialized countries (Duffhues and Kabir 2008). This political, social as well as academic debate also takes place in the Netherlands. It is said that CEO compensation is not sufficiently connected to performance: pay-for-failure instead of pay-for-performance (e.g. Couwenbergh 2007).

The main purpose of this study is to examine empirically if there is a relationship between CEO compensation and firm performance of Dutch companies listed at Euronext Amsterdam during the period 2002-2007.

In the master thesis three research questions have been formulated:

¹ This paper is based on my master thesis, which is supervised by Dr. J. Noeverman, Department of Accounting, Auditing & Control, Erasmus School of Economics, Erasmus University Rotterdam. Bart Bootsma has graduated from Economics & Business (Accounting & Finance) at the Erasmus School of Economics. He is currently finishing the master's program *Bedrijfsrecht* (Commercial Law) at the Erasmus School of Law.

1. What are the determinants of the level and structure of CEO compensation?
2. How strong is the relationship between top executive compensation and company performance?
3. Has the pay-performance relationship strengthened during the period 2002-2007?

In this paper I will mainly focus on the second and third research question, the strength of the pay-performance relationship and its development during the period 2002-2007. The results of the first research question will not be presented in this paper.

The research is relevant for several reasons. Previous studies do not show unequivocal results. Some studies found a strong positive relationship between CEO compensation and company performance (e.g. Hall and Liebman 1998), other research found a weak positive relationship (e.g. Jensen and Murphy 1990). There are even a few studies that report a negative relationship (e.g. Duffhues and Kabir 2008).

Few research about this topic has been done conducted on Dutch data. A few notable exceptions are the research of Duffhues et al. (2002), Cornelisse et al. (2005), Mertens et al. (2007) and Duffhues and Kabir (2008). I hope this study can make a contribution to the existing literature, by exploring the topic for Dutch listed companies, an area that has not been investigated to its full extent previously.

It is also of practical relevance to conduct the research for the Netherlands. Since 2004 the Dutch Corporate Governance Code (*Staatscourant* 2004, 250) is effective. This code advises a strong connection between compensation and performance of top executives (paragraph II.2 of the code). Investigating how strong the relationship is between remuneration of top executives and the performance of the company, is useful to monitor this aspect of the code (Van Praag 2005).

The remainder of this paper is structured as follows. Section 2 will provide an overview of prior literature. Hypothesis development, research design and the sample will be outlined in section 3. Section 4 presents the empirical results. These results will be analyzed in section 5. Finally, section 6 summarizes the main conclusions of this paper.

2. Prior literature

In order to provide a structured overview of the empirical studies it is necessary to make choices in which studies are discussed and which not. I use several criteria to delimitate the overview. First, studies should refer to Europe or the United States. Furthermore, the studies should be based on listed companies in a cross-section of industries. Moreover, performance of the company should be measured in current financial performance measures. The sample should include CEOs. Another criterion is that the empirical studies should explain (components of) compensation with performance. Moreover, studies should be recent. Literature published before 1998 will not be discussed. An exception is the influential study of Jensen and Murphy (1990).

The papers are used to find out what is best practice in conducting empirical research of the pay-performance relationship. The papers show that the relationship differs in the selected countries. The results of selected papers are compared with the results of the conducted research in section 5. The selected papers and their main findings are presented in table 1 on the next page.

Table 1: Brief overview of the main findings in the pay-for-performance literature

Authors and year	Country	Period	Board position	Main findings
Jensen and Murphy (1990)	US	1974-1986	CEOs	The relationship between total pay and performance, the PPS, is small, but positive and significant.
Hall and Liebman (1998)	US	1980-1994	CEOs	A strong pay-performance relationship is found based on four different methods.
Conyon and Murphy (2000)	US / UK	1997	CEOs	The PPS in the US is much larger than in the UK, mostly because in the US more stock-based pay is granted.
McKnight and Tomkins (1999)	UK	1992-1995	Highest paid executive board members	There is a pronounced link between pay and performance for both the short and long term.
Girma et al. (2007)	UK	1981-1996	CEOs	The effects of the 'Cadbury' reforms on CEO compensation are disappointing.
Conyon and Schwalbach (2000)	UK / Germany	1969-1994	CEOs	The relationship between CEO compensation and firm size and the relation between cash compensation and company performance is similar in the UK and Germany.
Kaserer and Wagner (2004)	Germany	1990-2002	All executive board members	No stronger pay-performance relationship due to corporate governance changes.
Yurtoglu and Haid (2006)	Germany	1987-2003	All executive board members together	Company size is much more important in comparison to performance to determine the level of executive pay. Moreover, a small positive PPS is reported.
Duffhues et al. (2002)	NL	1996-1998	All management board members together	Positive relationship between fraction of management options and accounting performance measures.
Cornelisse et al. (2005)	NL	2002-2003	CEOs separately and all executive board members together	No relationship between cash compensation and company performance.
Duffhues and Kabir (2008)	NL	1998-2001	All executive board members together	Compensation is negatively related to both accounting- and market-based performance measures.
Mertens et al. (2007)	NL	2002-2006	CEOs, CFOs and other board members separately	Small positive relationship between short-term bonus and performance.

3. Hypothesis development and research design

This section is structured as follows. First the theoretical background is described in paragraph 3.1. The hypotheses are formulated in paragraph 3.2. The research design is described in paragraph 3.3. Finally, paragraph 3.4 is dedicated to the sample.

3.1 Theoretical background

Executive compensation is part of corporate governance. To gain more insight in what corporate governance is, a distinction can be made between a business administrative, legal, economical and management control view (Strikwerda 2002). Corporate governance will be approached in this paper primarily from the economic point of view. Corporate governance is from an economic point of view about “(...) the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment” (Shleifer and Vishny 1997, p.737).

Agency theory

If ownership and control are separated in a company, this can lead to conflicts of interest. Adam Smith already noticed this in 1776 in *The Wealth of Nations* (pp.669-700 in Cannan, ed. (1937)). The principle of separation of ownership and control has been further elaborated by Berle and Means (1932) and has since then played an important role in the agency theory. Jensen and Meckling (1976) define an agency relationship as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf. This involves for the principal delegating of decision-making authority to the agent.

Agency theory is based on a number of assumptions: a conflict of interest, information asymmetry and different risk characteristics between the principal and agent (Eisenhardt 1989). The relationship between stockholders and the management of a company is a prominent example of an agency relationship. The separation of ownership and control of the company with the stockholders as principals and the management as agents gives rise to the principal-agent problem. Stockholders have delegated decision-making authority of the company to the management. But management has not the same interests as stockholders. Stockholders maximize the return on their investment in the company and strive to long-term stockholder value creation. For a part management has other interests: their own career and welfare. Managers prefer to run large businesses rather than small ones, other things equal. This may not be in the best interest of the stockholders, as this ‘empire building’ may not result in investing in positive net present value projects (Brealy et al. 2006). Another problem is managerial entrenchment (Shleifer and Vishny 1989). Managers will invest in projects that fit with their personal skills, to improve their value for the company. This temptation to overinvest, apparent in empire building and managerial entrenchment, is called the free-cash-flow problem by Jensen (1986). Information asymmetry is also apparent. Management has more information than the stockholders. Moreover, management and stockholders have different risk characteristics. In general, stockholders hold a diversified portfolio of stocks and are risk-neutral. Managers are for their career and human capital dependent on one specific company and are for that reason risk-averse (Mehran 1995).

Different solutions are possible to solve the principal-agent problem. Examples are an internal control system (e.g. Fama and Jensen 1983), the labor market for managers (e.g. Fama 1980; Jensen and Murphy 1990), the market for corporate control (e.g. McColgan 2001; Jensen and Ruback 1983), the financial structure of the company (e.g. Easterbrook 1984; Jensen 1986) and executive compensation (e.g. Jensen and Murphy 1990; Jensen et al. 2004). This paper focuses on executive compensation as solution to the agency problem. The application of performance pay can diminish value destruction (agency costs). If executive compensation is based on performance measures that align their interest with the interests of the stockholders, the conflict of interest between them can be diminished.

Managerial power theory

The managerial power theory dates back to the work of the famous economist Galbraith. Galbraith coined the term “managerial capitalism” in the book *The New Industrial State* (1967). This term refers to the view that managers detain more power and influence than the stockholders on the decisional and directional process. Recently there is renewed interest in this theory (e.g. Bebchuk and Fried 2004; 2006; Bebchuk et al. 2002; Jensen and Murphy 2004).

Bebchuk and Fried (2004) state that there is “pay-without-performance”. The authors explain this with their managerial approach to executive compensation. From this point of view, the remuneration of top executives is not an instrument to reduce the agency problem, but it can be seen as part of the agency problem. Managers of companies with dispersed stock ownership have themselves a substantial influence on their own compensation. Due to the dispersed ownership, managers can use their influence to get high compensation which is in booming times strongly connected to stock prices and in bad economic times not (Bebchuk and Fried 2003). So executive compensation should in this theory not be seen as a tool to align the interests between stockholders and managers. To understand the processes of setting pay the actual conditions under which pay is set should be taken into account. In the agency theory optimal contracting is assumed. Executive compensation can only take place at arm’s length contracting, which means careful processes and procedures in which the contract consists of incentives to maximize stockholder value (Jensen and Meckling 1976).

The managerial power approach results in sub-optimal incentives and the associated act of rent extraction plays a role. Managers with power are able to extract rents and managers with more power can extract more rents. Rents are defined as value in excess of what managers would receive under optimal contracting (Bebchuk et al. 2002). The amount of compensation that is paid to managers is camouflaged from the eyes of stockholders and other stakeholders, so that it is no more related to company performance.

Although the managerial power approach is from a conceptual point of view quite different from the optimal contracting approach, Bebchuk and Fried (2003) note that the former cannot replace the latter. Compensation packages will be influenced by both market influences, which push toward value maximizing contracts and by managerial influences, which push toward directions favorable for managers.

3.2 Hypothesis development

As outlined before, agency theory sees performance-related top-executive compensation as a solution to the conflict of interest between stockholders and management. The compensation aligns the interest of the management with the objectives of the stockholders. So the agency theory is in support of the following hypothesis:

A positive relationship exists between CEO compensation and company performance (H1)

CEO compensation usually exists of the following elements: base salary, bonus, other compensation, pensions, stock options and stocks. The sum of base salary and bonus is called cash compensation and the aggregate of all compensation elements is called total compensation. The hypothesized positive relationship between CEO compensation and company performance is based on the performance-related elements bonus, options and stocks. No relationship is hypothesized between base salary, other compensation, pensions and company performance.

During the sample period 2002-2007 several changes have been made to the Dutch corporate governance system, which may have influenced top-executive pay arrangements. Transparency with respect to CEO compensation has increased during these years. Until September 2002 the regulation for the disclosure of the remuneration of the Board of Directors was very limited. Only the total amount of remuneration to all current and former executive and supervisory board members should be reported (Article 383 of Book 2 of the Dutch Civil Code). The 'Disclosure on Remuneration and Stock Ownership of Executive and Supervisory Directors Act' took effect on 1st of September, 2002 (*Staatsblad* 2002, 225). The Foundation for Annual Reporting (RJ) published guidelines based on this act and on IAS 19 Employee benefits, which prescribe that companies provide information in the annual report on granted rights and exercised and expired rights during the financial year. The RJ (240.111) requires further that Dutch listed companies provide in the annual report information on an individual basis of cash compensation, stock option plans, granted options and stock-based compensation.

Since January 1, 2004 the Dutch corporate governance code (*Tabaskblat* 2003) came in place. This code requires additional information in the annual report about the remuneration of management board members. Paragraph II.2 of the code is dedicated to remuneration of members of the management board. The amount and composition of the remuneration packages as well as the transparency of the compensation are discussed in this paragraph of the code. Furthermore, the code advises a strong connection between CEO compensation and company performance. Based on the aforementioned changes in the Dutch corporate governance system it is hypothesized that:

The relationship between CEO compensation and company performance has strengthened in the Netherlands during the period 2002-2007 (H2)

3.3 Research design

In order to calculate the strength of the pay-performance relationship two models are used: the pay-performance sensitivity (PPS) model of Jensen and Murphy (1990) and the pay-performance elasticity (PPE) model of Hall and Liebman (1998).

Pay-performance sensitivity

PPS is an absolute measure. It measures with which amount CEO compensation increases if company performance increases with €1.000. The PPS ordinary least squares regression model is specified as follows:

$$\Delta (\text{Pay})_{it} = \alpha + \beta \Delta (\text{Perf})_{it} + \varepsilon_{it} \quad (1)$$

The dependent variable $\Delta (\text{Pay})_{it}$ represents the change in CEO compensation of company i in period t compared to period $t-1$. In section 4 the PPS of cash compensation (sum of base salary and bonus) and total compensation (sum of all compensation elements) are reported. Delta stock options is computed with the Black-Scholes (1973) European call option valuation model, which is modified for dividends by Merton (1973). The change in the value of options is taken into account by comparing the value of the options at the beginning of the year with the value at the end of the year after Hall and Liebman (1998). Delta stocks is also calculated as the difference in value at time t and time $t-1$. Delta stocks is also based on total compensation (i.e. the change in the value of stocks held by the CEO is taken into account).

The absolute change in firm performance is measured in four different ways: delta shareholder wealth, delta sales, delta net income and delta operating income. In accordance with earlier empirical literature $\Delta (\text{Shareholder wealth})_{it}$ is calculated as market capitalization at period $t-1$ multiplied with total stockholder return (TSR) at period t (e.g. Jensen and Murphy 1990, Murphy 1999, Mertens et al. 2007). Besides TSR three accounting-based measures for performance are used in this equation. After Jensen and Murphy (1990) profit and sales are used. Profit is operationalized as operating income and net income (Mertens et al. 2007). The research of Mertens et al. (2007) points out that these variables are often used by Dutch listed firms as financial performance measures in the period 2002-2006. These three accounting-based measures are calculated as the value at period t minus the value at period $t-1$.

Pay-performance elasticity

The PPE model is expressed in relative terms. It measures the increase in CEO pay in percentages, if firm performance rises with 1%. The PPE model is among others used by Hall and Liebman (1998), McKnight and Tomkins (1999) and Conyon and Murphy (2000). This model can be specified as follows:

$$\Delta \text{LN} (\text{Pay})_{it} = \alpha + \beta \Delta \text{LN} (\text{Perf})_{it} + \varepsilon_{it} \quad (2)$$

$\Delta \text{LN} (\text{Pay})_{it}$ is the natural logarithm of CEO pay of company i at moment t minus the natural logarithm of CEO compensation of firm i in the former period $t-1$. The compensation elements are computed in the same way as in the previous pay-performance

sensitivity equation. The difference with the PPS model is that the equation is now in relative terms by using the natural logarithm.

The change in performance is measured as the change in shareholder value. The change in shareholder value ignores share issues or repurchases and therefore equals the continuously accrued rate of return on common stock (e.g. Murphy 1999, Conyon and Murphy 2000). $\Delta \text{LN}(\text{Shareholder value})_{it}$ is calculated as the natural logarithm of $(1+\text{TSR})$ at moment t for company i . This computation is also used by Murphy (1999), Conyon and Murphy (2000) and Mertens et al (2007). Again, several accounting-based measures are also used as a proxy for company performance: Return on assets (ROA), Return on equity (ROE) and sales growth. Sales growth is defined as LN sales at moment t minus LN sales at moment $t-1$. This definition is also used by McKnight and Tomkins (1999). Delta ROA is computed as ROA at period t minus ROA at period $t-1$. The same computation holds for ROE. This computation is also used by Kato and Kubo (2006) and Mertens et al. (2007). This way of calculating, implies that the changes in ROA and ROE are semi-elasticities.

It might be useful to further elaborate on the econometric method. This can explain why no control variables are added to equation (1) and (2). Year-to-year performance related changes in CEO compensation are typically modeled as:

$$(\text{Pay})_{it} = \gamma_i + \alpha_{it} + \beta_i (\text{Perf})_{it} + \varepsilon_{it} \quad , i = 1,2,\dots,N ; t = 1,2,\dots,T \quad (3)$$

where γ_i is a CEO or firm-specific effect that varies across CEOs but does not vary over time for a given CEO, α_{it} is a CEO or firm-specific time trend (company size, CEO age and tenure, etc.), Perf is a firm performance measure, β_i is the coefficient indicating the pay-performance relationship and ε_{it} represents the equation error.

For relative small times series ($T < 10$) researchers regularly assume that time trends and pay-performance relationships are constant across executives/companies. In terms of the model this means $\alpha_i = \alpha$ and $\beta_i = \beta$. Equation (3) can then be re-estimated using fixed-effect methodologies or first differences. The result is, not surprisingly, the PPS-model presented by equation (1). See Murphy (1999, p.30-31) and Conyon and Swalbach (2000, p.521-522).

Pay-performance relationship over time

It was hypothesized (H2) that CEO compensation will show a stronger relationship with company performance during the period 2002-2007 due to corporate governance changes. An important development in that respect was the Dutch corporate governance code (code Tabaksblat) which took effect from 2004. In this study the period 2002-2003 (the pre-Tabaksblat period) is compared with the period 2004-2007 (the period after the code Tabaksblat came in place). After Girma et al. (2007) a dummy variable δ is added with value "0" in the period 2002-2003 and "1" in the period 2004-2007. This dummy variable δ measures differences in the change in CEO compensation before and after the introduction of the Dutch corporate governance code. Moreover, an interaction variable is added to the PPS and PPE model specifications. This interaction variable is computed as dummy variable δ times the performance variable. If the link between pay and performance has increased, then a statistically significant positive coefficient (i.e., $\beta_2 > 0$) will be observed on this variable.

The PPS equation is then adjusted as follows:

$$\Delta (\text{Pay})_{it} = \alpha_1 + \beta_1 \Delta (\text{Perf})_{it} + \alpha_2 \delta + \beta_2 (\delta * \Delta (\text{Perf}))_{it} + \varepsilon_{it} \quad (1')$$

The PPE equation is then reformulated as follows:

$$\Delta \text{LN} (\text{Pay})_{it} = \alpha_1 + \beta_1 \Delta \text{LN} (\text{Perf})_{it} + \alpha_2 \delta + \beta_2 (\delta * \Delta \text{LN} (\text{Perf}))_{it} + \varepsilon_{it} \quad (2')$$

I use cash compensation (after Girma et al. 2007) as well as total compensation (after Kaserer and Wagner 2004) as dependent variable in these equations. Corporate performance is measured as discussed previously for the PPS and PPE model.

3.4 Sample

The data on CEO compensation have been collected from the website <http://www.veb.net/bestuursvoorzitter/> of the Dutch Investor's Association (VEB). The crude assumptions the VEB uses for the parameters of the Black-Scholes formula (risk-free interest rate, expected dividend rate and expected volatility) are adjusted. The data to calculate the performance-related variables have been collected from the financial databases Datastream and Worldscope.

The original sample consists of 160 companies listed at Euronext Amsterdam during (some part of) the sample period 2002-2007. These funds can be listed at the AEX or AMX index or are Small Caps or local funds. The total sample consists of 685 year observations (on average 4 observations per company). Companies for which compensation or financial data were not available for one or more years are eliminated from the sample for those years. The regression results are based on CEOs that have been in function during the whole year. Comparing compensation for the whole year t with part of t-1 (because the CEO was appointed during that year) or with part of t+1 (because the CEO left the company during that year) would have a distortive effect on the results. Extrapolating compensation for a part of the year would also be arbitrary, especially for variable compensation elements. Furthermore, extreme observations are eliminated from the final sample, because they have a distortive effect on the results. Outliers are defined as cases which deviate more than three standard deviations from the median (Wiggins 2000). The influence of this elimination procedure on the number of observations is limited. In none of the models more than thirteen observations are deleted due to extreme observations.

4. Results

Table 2: Pay-performance relationship over time

The table reports the regression results of pay-performance sensitivity and elasticity for cash compensation and total compensation. An additional variable (Dummy) is added to the equation with value 0 in the period 2002-2003 and value 1 in the period 2004-2007. Moreover, an interaction variable (Dummy*Perf) is added to the model specifications. The reported coefficients of delta performance in the PPS models are reported as Euro cents per € 1.000 change in company performance. The coefficient of the constant and dummy term are reported in Euros. To allow a meaningful comparison over time all monetary amounts are expressed in constant prices of 2006, based on the Consumer Price Index of Statistics Netherlands. The unstandardized coefficients (B) and the absolute t-statistics (t) are reported in the table. Explanatory power (Adj R2), F-statistic and the number of observations (N) are reported in the lower part of each model specification. Significance at the 1%, 5% and 10% level is indicated by ***, **, * respectively.

Panel A: PPS cash compensation

	(1)		(2)		(3)		(4)	
	B	t	B	t	B	t	B	t
(Constant)	-16775,508	-0,672	6926,257	0,268	3847,348	0,151	749,906	0,03
Delta Shareholder Wealth	6,5	3,99	***					
Delta Sales			1,0	0,646				
Delta Net Income					-0,9	-0,187		
Delta Operating Income							-11,1	-2,054
Dummy	78334,202	2,793	***	57098,38	1,973	**	60597,325	2,117
Dummy*Delta Perf	-4,2	-2,456	**	0,4	0,234		10,0	1,76
							*	15,9
								2,62

Adj R2	0,085		0,034		0,029		0,025	
F-statistic	12,558		5,377		4,747		4,233	
N	372		372		373		373	

Panel B: PPE cash compensation

	(1)		(2)		(3)		(4)				
	B	t	B	t	B	t	B	t			
(Constant)	-0,018	-0,703	0,025	0,969	0,04	1,781	*	0,019	0,801		
Delta Shareholder Wealth	0,207	3,471	***								
Delta Sales			0,019	0,158							
Delta ROA					-0,002	-1,444					
Delta ROE							0,001	4,189	***		
Dummy	0,076	2,584	***	0,044	1,552	0,039	1,515	0,065	2,425	**	
Dummy*Delta Perf	-0,086	-1,223		0,129	0,997	0,006	2,848	***	0,001	1,687	*
Adj R2	0,062		0,028		0,024			0,093			
F-statistic	9,139		4,44		3,652			12,028			
N	369		365		326			325			

Panel C: PPS total compensation

	(1)		(2)		(3)		(4)					
	B	t	B	t	B	t	B	t				
(Constant)	127827,164	1,046	117576,997	0,858	159040,972	1,192	163122,443	1,222				
Delta Shareholder Wealth	11,6	1,455										
Delta Sales			-12,0		-1,469							
Delta Net Income						1,7	0,202					
Delta Operating Income								-1,7	-0,062			
Dummy	273713,473	1,993	**	351045,101	2,282	**	297875,842	1,983	**	310432,579	2,063	**
Dummy*Delta Perf	16,1	1,904	*	18,1	2,15	**	59,1	3,56	***	39,4	1,288	
Adj R2	0,22		0,031		0,052		0,029					
F-statistic	35,999		5,007		7,805		4,649					
N	373		373		374		374					

Panel D: PPE total compensation

	(1)		(2)		(3)		(4)	
	B	t	B	t	B	t	B	t
(Constant)	0,079	2,212 **	0,12	3,123 ***	0,12	3,605 ***	0,1	2,8 ***
Delta Shareholder Wealth	0,138	1,694 *						
Delta Sales			0,049	0,298				
Delta ROA					-0,001	-0,484		
Delta ROE							0,001	2,593 ***
Dummy	0,01	0,253	0,06	1,406	0,076	1,986 **	0,107	2,619 ***
Dummy*Delta Perf	0,434	4,547 ***	0,142	0,774	0,01	3,24 ***	0,001	0,852
Adj R2	0,272		0,017		0,051		0,041	
F-statistic	47,206		3,104		6,815		5,602	
N	372		367		328		328	

5. Analysis

The indicator variable (*Dummy*) measures changes in the level of CEO compensation before and after the introduction of the Dutch corporate governance code. This variable is statistically significant in 12 out of 16 model specifications. The interaction variable (*Dummy*DeltaPerf*) is statistically significant in 10 out of 16 model specifications. In one of these cases (for the PPS of cash compensation) a negative relationship is found. In all other statistically significant cases the interaction variable is positive. These findings indicate that the PPS and PPE have changed significantly between the period 2002-2003 and 2004-2007. The PPS and PPE have increased in the latter period compared to the former.

The results on the PPS model for cash compensation are reported in panel A. The figures should be interpreted as follows. In the pre-Tabaksblat period (2002-2003) the CEO receives 6,5 eurocents extra per €1.000 increase in shareholder wealth. In the post-Tabaksblat period (2004-2007) the CEO received 4,2 eurocents less per € 1.000 increase in shareholder wealth. So, overall the CEO received $6,5 - 4,2 = 2,3$ eurocents extra per €1.000 increase in shareholder wealth. The overall PPS of cash compensation amounts 1,4, 9,1 and 4,8 eurocents extra per €1.000 increase in sales, net income and operating income respectively. These figures are comparable with the findings of Mertens et al. (2007). These authors report a PPS for cash compensation of 2,7, 1,6 6,5 and 4,2 for each € 1.000 increase in shareholder wealth, sales, net income and operating income respectively. The results on the PPE model for cash compensation (panel B) show that the CEO receives in the pre-Tabaksblat period 0,207% extra cash compensation for a 1% increase in shareholder wealth. In the post-Tabaksblat period the CEO receives 0,086% less cash compensation for a 1% increase in shareholder wealth. However, this finding is not statistically significant. For the whole period 2002-2007 the PPE amounts then $0,2047 - 0,086 = 0,121$. For sales, ROA and ROE the PPE amounts 1,155, 0,004 en 0,002. Again, these figures are in line with the findings of Mertens et al. (2007). The PPS and PPE of cash compensation have decreased after the introduction of the code Tabaksblat for delta shareholder wealth. This finding does not hold for the accounting-based measures. The results on the PPS model for total compensation (panel C) show that CEOs received in the pre-Tabaksblat period 11,6 euro cents total compensation for a €1.000 increase in shareholder wealth. In the post-Tabaksblat period the CEO receives 16,1 euro cents extra total compensation for each €1.000 increase in shareholder wealth. So, the PPS for total compensation amounts $11,6 + 16,1 = 27,7$ euro cents for an increase in shareholder wealth of €1.000. The PPE relationship between shareholder wealth and total compensation (panel D) amounts in the pre-Tabaksblat period 0,138. The PPE has increased with 0,434 to 0,572 in the post-Tabaksblat period. The accounting-based measures do also show increases after the introduction of the Dutch corporate governance code.

Changes in the value of options and stocks contribute to a large part to the total PPS and PPE. The increase in the PPS and PPE for total compensation is mainly driven by the increased use of equity-based compensation in recent years in the Netherlands (cf. Swagerman and Terpstra 2007). For cash compensation, mainly driven by bonus, no large increases (even a decrease for delta shareholder wealth) are reported after the introduction of the code.

Although the results should be interpreted carefully due to the limited number of years that are compared, they suggest that corporate governance changes have improved the pay-performance relationship in the Netherlands. This is in contrast to the findings of Kaserer and Wagner (2004) for Germany and Girma et al. (2007) for the UK. However, the pay-performance relationship still remains weak compared to the US. Jensen and Murphy (1990) report a PPS of about 30 dollar cents for every \$1.000 increase in shareholder wealth. The overall PPE measured by Hall and Liebman (1998) for US companies is ranging from 1,2 in 1980 to 3,9 in 1994.

The explanatory power of the PPS and PPE models that are used to investigate the strength of the pay-performance relationship is comparable to previous research. The limited overall explanatory power (Adjusted R²) has several reasons. In the first place, only financial performance measures are analyzed. Qualitative/individual objectives are not included in the regression analyses. As pointed out by Mertens et al. (2007) the ratio quantitative/financial versus qualitative/individual measures amounts in the Netherlands around 70%/30%.

Another possible explanation is given by Perry and Zenner (2001). This explanation is especially relevant for bonuses. Bonus is measured as a linear function of performance. In reality bonus-plans are fixed-target plans in which executives do not receive any payoff until they reach a lower bound of the performance measure. Between the lower and the higher bound, the bonus increases linearly with the performance measure. Beyond the higher bound and the maximum bonus, additional performance is not reflected in the bonus. Such features can reduce the explanatory power of the models.

Hypothesis 1, assuming a positive relationship between CEO compensation and company performance, and hypothesis 2, assuming a stronger relationship after the introduction of the Dutch corporate governance code in 2004, can not be rejected based on the empirical results presented in this paper.

6. Summary and conclusions

This study contributes to the growing literature on CEO compensation by analyzing data from the Netherlands. The timeframe 2002-2007 provides an interesting scenario for the Netherlands. The Dutch corporate governance system changed significantly during this period of time. An important development with respect to CEO compensation in the period has been the introduction of the Dutch Corporate Governance Code in 2004. Since 1998-2001, the research period of Duffhues and Kabir (2008), the level of corporate governance in the Netherlands has improved.

The available theoretical framework and previous empirical studies do not provide a clear-cut picture on the pay-performance relationship. On the one hand, the agency theory assumes a positive pay-performance relationship. On the other hand, the managerial power theory will not necessarily result in a positive pay-performance relationship.

The remuneration data of CEOs of a large sample of Dutch listed firms during the period 2002-2007 is analyzed. The strength of the pay-performance relationship has been investigated based on the PPS model of Jensen and Murphy (1990) and the PPE model of Hall and Liebman (1998). The sensitivity and elasticity of cash compensation (i.e. the sum of base salary and bonus) are mainly driven by delta bonus. Changes in the value of options and stocks contribute largely to the PPS and PPE of total compensation (i.e. the aggregate of cash compensation, options and stocks).

Although the results should be interpreted carefully, the data suggest that the Dutch corporate governance code, which took effect in 2004, had a positive effect on the pay-performance relationship. Compared internationally, the pay-performance relationship in the Netherlands remains relatively low.

This study is subject to several limitations. These limitations are mentioned in such a way that they can be addressed in future research.

First of all this research is only based on CEO compensation. In reality, firms are run by teams of managers. It may be interesting to extend the research with other members of the management board (e.g. Aggarwal and Samwick 2003).

Another limitation concerning the data is the relative small size of the sample and the limited time period for which compensation data are available (since 2002). This will result in a lower quality research compared to American studies like Hall and Liebman (1998).

This study has focused solely on financial (accounting and market-based) performance measures. However, recent evidence indicates that companies make increasingly use of non-financial performance like for instance customer satisfaction and market share (e.g. Iltner et al. 1997; Banker et al. 2000). These non-financial performance measures affect CEO (cash) compensation as indicated by Davila and Venkatachalam (2004).

Endogeneity may be a problem in this study. Future research can use a simultaneous equation framework to mitigate the endogeneity problem.

Finally, stock option valuation is a major limitation of this study. Several more or less trivial assumptions had to be made in order to use the Black-Scholes formula to value stock options. The estimation of the value of stock options is not controlled for conditional compensation. Conditional compensation means that during the vesting period of the options several performance criteria have to be met and the actual number of options awarded depends on the extent to which the performance criteria are met. The conditionality can be based on the rank in a peer group, earnings per share, (relative) TSR, etcetera. Especially after the introduction of the Dutch corporate governance code (paragraph II.2.1 and II.2.3) in 2004 this conditionality is more common in compensation contracts in the Netherlands.

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