

# **Is there a link between the implementation of the fair value accounting approach for ESOs and their use?**

Economic consequences of IFRS 2 in The Netherlands

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## Preface

I am proud of presenting my master's thesis that was, after I had passed all my exams, the last thing to complete, to receive my master's degree and to become Master of Science in Accounting Auditing and Control.

Choosing a subject for my master's thesis that I thought was interesting, was not that difficult as I always found it remarkable that changes in accounting standards can have economic consequences. In proof of this, my bachelor's thesis discussed the implementation of new accounting rules for leases. Thus, when I became aware of the fact that the implementation of new standards for Employee Stock Options caused a lot of resistance the choice to pick and to examine this subject was easily made.

However, as I completed all my exams without many difficulties and with excellent notes, it soon became clear to me that writing a master's thesis was something completely different. While during the process of reading-in and designing the research methodology I was really enthusiastic and motivated to get the best out of myself, during the data gathering process my enthusiasm became less as this was a time-consuming, non informative job. Nevertheless, after this 'necessary evil' was completed, while I was working out the data and after it became gradually more clear that my expectations were fulfilled, I was again inspired to make this a contributive and interesting thesis. In the end, I think that this thesis is relevant as it is shown that the new rules on Employee Stock Options indeed have had a negative impact on their use and as a consequence that it is reconfirmed that accounting standards can have economic consequences.

Now, after I have completed my master's thesis I am looking forward to start as an associate at PwC and to become part of the working society.

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At the end, I wish to thank all those who helped me completing my master's thesis.

At first, I would like to thank dr. C.D. Knoops, who was my thesis supervisor. It was great having dr. C.D. Knoops as supervisor as he was always available for comments and as his comments and suggestions always were useful and let me see things from another perceptive.

Besides, I would like to thank my future employer PricewaterhouseCoopers (or: PwC) for providing all resources necessary to complete my thesis on time. In particular, special thanks goes to my coach at PwC, Rose Bandola, who supported me during the whole process and kept me motivated to finish my thesis before my commencement of employment at PwC in September 2010.

At last, thanks to my parents and best friends, who were always there for me on moments I found it difficult to stay motivated and for the necessary pleasant distractions.

Linda Brigitta Kraakman

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## Abstract

It was until February 2004 in Europe that Employee Stock Options (also: ESOs) were processed using an intrinsic value approach. Under the intrinsic value approach, ESOs were only required to be recorded as a compensation expense when the market value of the shares on the grant date was higher than the exercise price of the ESO. In other words, an ESO was only expensed when it had an intrinsic value. Since in practice most firms set a fixed exercise price equal or higher than the market value of the shares, an ESO did not have an intrinsic value and as a result no compensation expenses were recorded on the income statement. However, in February 2004 the IASB issued IFRS 2 *Share-Based Payment*. This standard made it, in contrast to the standard at that time, mandatory to expense ESOs by using their fair value. In this thesis it is examined whether the implementation of IFRS 2 has had a negative impact on the use of ESOs as equity-based compensation for Dutch listed firms. Thereby both the amount and value of ESOs granted to CEOs and total employees are examined. By separating changes in ESOs for CEOs and total employees it is possible to study whether not only investor sentiments, but also the impact of expensing on firms' financial statements has affected ESO use. However, when analyzing the results the focus in this thesis lies on CEO compensation. In the end, decisive evidence was found to conclude that IFRS 2 indeed has had a negative impact on ESOs granted to both CEOs and total employees in The Netherlands. Supplementary to this, for CEO compensation it was also shown that a decline in the use of ESOs and an increase in other types of long-term equity-based compensation took place simultaneously.

**Keywords:** IFRS 2, ESOs, CEO compensation, economic consequences

## Abbreviations

AEX	Amsterdam Exchange Index
AMX	Amsterdam Midcap Index
APB	Accounting Principles Board
AScX	Amsterdam Smallcap Index
CEO	Chief Executive Officer
DASB	Dutch Accounting Standards Board
EPS	Earnings per Share
ESO	Employee Stock Option
FASB	Financial Accounting Standards Board
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
ISO	Incentive Stock Option
NSO	Nonstatutory Stock Option
RJ	Dutch Foundation of Annual Reporting
ROA	Return on Assets
ROE	Return on Equity
SFAS	Statement of Financial Accounting Standards
TSR	Total Shareholder Return
US	United States
UK	United Kingdom

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# 1. Introduction

## 1.1 Background

The traditional way for firms to compensate their employees is by paying them in cash. However, nowadays a lot of firms also use stock options to compensate their employees. Allee et al. (2008) identified two primary reasons for the use of stock options to compensate employees. First, it is assumed that stock options align the interests of employees and shareholders. Second, an outlay of cash is not required when using stock options, which is attractive for start-up companies.

It was until February 2004 in Europe and until December 2004 in the US that Employee Stock Options (hereafter: ESOs) were processed using an intrinsic value approach. However, in February 2004 and December 2004 the IASB and the FASB respectively implemented new rules which made it mandatory for ESOs to be fully recognized on the income statement. Thus, from then on listed firms were required to record their stock options as a compensation expense using a fair value approach rather than using an intrinsic value approach. Before, under the intrinsic value approach, ESOs were only required to be recorded as a compensation expense when the market value of the shares on the grant date was higher than the exercise price of the option. In other words, an ESO was only expensed when it had an intrinsic value. However, since in practice most firms set the exercise price equal or higher than the market value of the shares an ESO did not have an intrinsic value and as a result no compensation expenses were recorded on the income statement.

The implementation of the new rules, which require the use of the fair value approach, caused a lot of opposition. An exposure draft issued by FASB in 1993 on expensing ESOs received over 1700 comment letters, mostly contesting the draft (Dechow et al., 1996, p.4). Opponents were concerned with the impact of expensing ESOs and the related lower reported earnings on the share price, costs of capital and the motivation of employees. Indeed, a study of Standards&Poor's in 2005 showed that expensing of ESOs led to a decline in reported earnings for the S&P 500 by 4.2 percent. Also, a study of Botosan & Plumlee (2001) finds a 14 percent median reduction in firms' earnings per share and a 13.6 percent median reduction in firms' return on assets for US listed firms when stock options are required to be expensed. In addition, Chalmers and Godfrey (2005) approximated a significant negative effect of 20% on firms' financial performance ratios for Australian firms when the fair value of ESOs is required to be recognized with the implementation of IFRS 2 in Australia in 2005. Therefore, expensing of ESOs has a material effect on firm

performance. Consequently, it was assumed that the new accounting treatment will lead to a reduction in the use of ESOs as a way to compensate employees.

Yet, in an ideal world with perfect, efficient markets a change in accounting standards should not influence management decision-making concerning ESOs, since the efficient-market hypothesis assumes that investors are perfectly able to calculate the true economic profit (Sacho and Wingard, 2004). Though this only holds when changes in accounting standards do not cause a cashflow effect. While changes in accounting standards for ESOs do not lead to a cashflow effect, following the efficient-market hypothesis the new standards should not influence decision-making concerning ESOs. However, because we do not live in a perfect world a change in accounting treatment of ESOs could indeed influence the attitude towards ESOs. This is because markets are inefficient and investors fixate on reported earnings and thus do not take ESOs compensation expenses into account when these costs are not explicitly recognized, but only disclosed. Therefore, the accounting treatment of ESOs can have economic consequences. Accounting standards have economic consequences when “accounting reports influence the decision-making behavior of business, government, unions, investors, and creditors” (Zeff, 1978, p. 56). Thus, when the implementation of the fair value approach for ESOs influences firms' decision-making processes concerning the issuance of ESOs, it can be stated that the implementation of the fair value approach has economic consequences. While for the US there already exists some evidence from studies that show option use indeed declined, for Europe and implicitly The Netherlands such studies are not yet performed.

## 1.2 Purpose and research question

This thesis examines whether there is a link between the implementation of the fair value accounting approach for ESOs and their use. More precisely, it is examined whether expensing has had a negative impact on the use of stock options as equity-based compensation in The Netherlands thereby focusing on CEO compensation. As a consequence, the research question that stands central in this thesis is as follows:

Has the adoption of the fair value accounting approach for ESOs had a negative impact on the use of ESOs as equity-based compensation for both CEOs and total employees in The Netherlands?

As is already mentioned for answering the research question the focus in this thesis lies on CEO compensation, since ESOs are mostly used as a way to compensate CEOs rather than

lower-level employees. This has to do with the fact that ESOs are used to align CEOs' incentives with those of the shareholders. Therefore, CEOs are expected to be compensated with high levels of ESOs relative to firms' total ESO use. Besides, another reason why CEO compensation is the main focus of this thesis is that mandatory expensing of ESOs for CEOs not only influences ESO use by the net impact recognition of costs has on firms' financial statements, but also by the outrage recognition of CEO compensation can cause. Namely, recognition of ESOs granted to CEOs makes CEO compensation more transparent and, due to reluctance of the public, can impact ESOs granted to CEOs. Thus, since both investor sentiments and the impact of expensing on financial statements can lead to changes in ESOs granted to CEOs, the impact IFRS 2 has on CEO compensation stands central. However, to examine whether a reduction in ESOs is not only caused by investor sentiments, but also by the impact expensing has on firms' financial statements, changes in ESOs will also be determined for total employees. Arguments for using total employee compensation besides CEO compensation and arguments for using CEO compensation rather than total board compensation will be elaborated more deeply in chapter four and five.

Both a literature study and empirical research will be conducted to answer the research question. First, the literature study discusses economic theories concerning equity-based compensation, determinants of ESO use, and prior research that has already studied the impact of expensing on ESO compensation. Subsequently to the literature study empirical research will be performed. Research models together with additional analyses examine changes in ESO use for Dutch listed firms as a consequence of the implementation of IFRS 2 on 1 January 2005.

### **1.3 Relevance and contribution**

This thesis contributes to the existing state of research for several reasons.

First, academic research is still inconclusive about the role of accounting as a determinant of ESO use. While there is indeed American evidence that ESO use declined after expensing ESO costs, this relation is not yet examined for Dutch firms. Therefore, to extend the existing body of research it will be examined if a negative relation between fair value accounting for ESOs and their use also exists for Dutch listed firms. However, during the research period other business and time-related issues, besides the implementation of IFRS 2, also influence the issuance of ESOs. To isolate the impact of IFRS 2 and to mitigate heterogeneity

problems this study takes these factors into account by developing control variables or by performing additional analyses.

Second, in this thesis both investor sentiments and the impact expensing of ESOs has on firms' financial statements are examined as possible reasons why ESO use changed after the implementation of IFRS 2. Since both explanations can reflect the economic consequences of the fair value accounting approach it is necessary that both explanations are taking into account. Thus, by separating changes in ESOs for CEOs and total employees it is possible to study whether not only investor sentiments have impacted ESO use.

Thirdly, this study has the ability to contribute to the debate concerning the economic consequences of accounting standards and the role of accounting. While some people argue that accounting does not influence the behavior of people and that accounting is neutral, practice proves that accounting standards indeed can influence decision-making behavior of business, government, unions, investors and creditors (Zeff, 1978, p. 56). Lease accounting, pension accounting and simply the fact that the implementation of new accounting standards sometimes leads to heated discussions and lobbying behavior of third parties all show this. Since the purpose of this thesis is to examine whether IFRS 2 influenced the use of ESOs this thesis contributes to this debate, because it implicitly examines if decision-making behavior about employee compensation is influenced.

#### **1.4 Structure**

To come to a conclusion on the impact of the fair value accounting approach the remainder of this thesis proceeds as follows. Chapter two provides an overview of accounting standard setting for ESOs and describes accounting methods for ESOs. Chapter three continues with a literature review concerning equity-based compensation, determinants of ESO use, and prior empirical research. In chapter four hypotheses regarding the relation between accounting treatment and the use of ESOs are developed. Thereafter, chapter five outlines the research design and the methodology used to test the hypotheses. Chapter six presents the sample and data sources and chapter seven provides the results. Subsequently in chapter eight robustness checks and additional analyses are performed. Then in chapter nine the limitations of the study are discussed. Finally, chapter ten concludes with a summary and recommendations for further research.

## 2. Institutional background and accounting for ESOs

### 2.1 Introduction

The purpose of this chapter is to obtain a clear understanding of accounting issues surrounding ESOs. A clear understanding is reached by providing an overview of the institutional background of accounting standard setting for ESOs in both the US and The Netherlands. While in the end the economic consequences are examined for Dutch firms it is useful to also be familiar with the institutional background of ESO accounting in the US. Firstly, since the research model is based on studies that are conducted in the US it is critical that differences between the two areas are known before an adjusted model for Dutch firms can be developed. Secondly, for analyzing the outcomes of the research model and for making comparisons with the US it is also critical to know the institutional background in the US. Besides examining the institutional background, the two primary accounting approaches for ESOs are described. Knowing how the two methods of accounting for ESOs differ is crucial for examining the economic consequences of the implementation of the fair value accounting approach.

### 2.2 Institutional background

#### 2.2.1 US

In June 1993 the FASB issued the Exposure Draft *Accounting for Stock Compensation* surrounding the requirement to make ESO expensing mandatory. This proposed method contradicted the standard at that time, namely the Accounting Principles Board Opinion No. 25: *Accounting for Stock Issued to Employees* (hereafter: APB No. 25).

APB No. 25 was implemented in 1972 and was based on the intrinsic value approach. Under this approach ESO expenses only need to be recognized if an ESO has an intrinsic value. However, ESOs only have an intrinsic value if the market value of the shares on the grant date is higher than the exercise price of the option. Therefore, under APB No. 25 most firms were granting ESOs with a fixed exercise price at or above the current market value and thus did not recognize any ESO expenses (Ratcliff, 2005). To be complete, ESOs with a variable exercise price should be periodically expensed for increases in their value. For example, an ESO for which the exercise price is linked to the market has to be expensed, because the exercise price is not immediately fixed (Hall and Murphy, 2003).

While other types of employee compensation had to be recognized in the financial statement most ESO compensation expenses were not. Since APB No. 25 led to inconsistency in accounting between 1) both other forms of compensation and ESOs and 2) variable and fixed ESOs, the FASB issued an Exposure Draft in which it was proposed to recognize ESOs on the basis of a fair value model. However, this led to enormous resistance from company owners and employees, and even politics intervened. Opponents claimed that the negative impact on the reported earnings will weaken the competitiveness and as a consequence threaten the existence of some firms.

As a result of the enormous opposition SFAS No. 123: *Accounting for Stock-Based Compensation* was not implemented until October 1995. Despite the delayed implementation under political pressure the new standard still allowed firms to use the old intrinsic value approach on the condition that they disclose the compensation expenses estimated with a fair value model in their financial statement footnotes. In the end, most firms continued the use of the intrinsic value approach.

Yet, during time opposition against expensing ESOs somewhat reduced and more firms began to recognize ESO expenses. Ratcliff (2005) identified one major cause for this trend. Scandals with for example Enron and WorldCom where managers awarded themselves with enormous amounts of stock options focused the attention of financial statement users on stock-based compensation. Firms reacted by recognizing ESO expenses voluntary.

Since opposition got smaller the FASB was able to finally implement a standard that only allowed for expensing of ESOs using a fair value approach. In December 2004 SFAS No. 123 (Revised): *Share-Based Payment* (hereafter: SFAS No. 123(R)) was issued, which became effective on June 2005. The FASB identified four primary reasons for the issuance of the new standard (SFAS No. 123(R), p. 2):

- The old standard did not faithfully represent economic costs, which can distort the decision making of financial statement users.
- The standard improves comparability by eliminating alternative accounting methods.
- The new standard simplifies U.S. GAAP relative to APB. No. 25.
- The standard converts with international accounting standards.

<b>Overview of accounting rules</b>		
<b>Date</b>	<b>Accounting standard</b>	<b>Accounting approach</b>
1972 - October 1995	APB No. 25	Intrinsic value approach
October 1995 - December 2004	SFAS No. 123	1) Intrinsic value approach with fair value disclosure in footnotes, 2) Fair value approach
December 2004* - at present	SFAS No. 123(R)	Fair value approach
*: <i>Effective date June 2005</i>		

### **2.2.2 The Netherlands and IFRS 2**

In July 2001 the IASB started developing an accounting standard for share-based payments. After the exposure draft *Share-based Payment* was published on November 2002, in February 2004 the IASB issued the definite standard IFRS 2 *Share-based Payment*. The effective date of IFRS 2 was 1 January 2005. IFRS 2 made it mandatory for European listed firms to recognize option expenses. Recognizing of expenses was required for equity-settled share-based payments that were granted after November 2002, but that were not yet vested on January 2005.

Before the issuance of IFRS 2 there was no comprehensive accounting standard by the IASB for the recognition and measurement of ESOs. Since there was no comprehensive framework every European country individually has its own accounting rules for ESOs prior to IFRS 2. However, no country in Europe made the fair value accounting approach for ESOs mandatory before the issuance of IFRS 2 and therefore all European listed firms were affected by the adoption of IFRS 2. A press release of the European Commission on 20 December 2004 stated that 8000 listed firms in the European Union were affected by the implementation of IFRS 2. Since, IFRS 2 also became mandatory in The Netherlands Dutch listed firms were also affected by the implementation of IFRS 2. On the other hand, since the IASB encouraged the use of the fair value accounting approach before the effective date some firms already voluntarily adopted this method and as a consequence these firms were not impacted by the implementation of IFRS 2. This is since these firms are expected to already have adapted their use of ESOs when they began to expense ESOs voluntarily.

Whether this is relevant for any Dutch firms is not yet known. Until IFRS 2 was implemented it was common practice across Europe and also in The Netherlands that ESO expenses were not recognized, but that information on ESOs was only disclosed. Thus, just like the US in The Netherlands the intrinsic value approach was used to account for ESOs prior to the fair value accounting approach. Therefore, it is expected that the implementation of the fair value accounting approach also led to a decline in the use of ESOs in The Netherlands.

A major difference between Europe and the US is that in the US prior to the implementation of SFAS No. 123(R) two accounting approaches for ESOs were allowed. The fair value of ESOs needed to be either disclosed or recognized. In Europe and thus in The Netherlands however, firms were not required to report the fair value of ESOs either by recognition or disclosure. Instead across Europe before the implementation of IFRS 2 every country has its own disclosure requirements on ESOs. In some European countries strict disclosures on ESOs were required and in other European countries this was not the case. In The Netherlands, prior to IFRS 2, article 383c of book 2 of the Dutch civil code (hereafter: art. 2:383d BW), which was implemented in September 2002, required Dutch listed firms to report remuneration information for both executives individually and all employees together. In fact, the first Committee on Corporate Governance in the Netherlands the 'Commissie Peters' already recommended disclosure of this information in their report 'Corporate Governance in Nederland: De veertig aanbevelingen', which was published in 1997. However, since the Commission pleaded for self-regulation and because of lack of clear guidance, in practice the recommendations of the Peters Report were hardly complied (Commissie Corporate Governance, 2003). As a result, subsequent to the recommendations made by the 'Commissie Peters' the Corporate Governance Code published a new corporate governance code 'Tabaksblat 2003'. Tabaksblat 2003 contained 'best practice' recommendations on, among other things, remuneration requirements for executive compensation. The code took effect on January 2004 and applied to all listed firms with a statutory seat or headquarter vested in The Netherlands. Nevertheless, in contrast to art. 2:383d BW, it was not mandatory to comply with Tabaksblat 2003. Instead, there was of so-called 'comply or explain' approach in which firms either had to comply with the Code or had to explain why they did not follow a specific recommendation. In appendix I part of the Corporate Governance Code of 2003 that relates to ESOs is provided.

At last to be complete, based on art. 2:383d BW, the Dutch Accounting Standards Board (also: DASB) also provided guidelines that recommended firms to disclose, among other things, the following remuneration information (RJ 271.713):

- number of options granted in specific year with inclusion of the main options terms (e.g. strike price, price underlying shares, lifetime);
- number of options exercised during a specific year with inclusion of the number of stocks and the exercise price;
- the number of unexercised options at the beginning and end of the year;
- information that is of importance with respect to measuring the value of ESOs that aren't exercised yet (e.g. exercise price, remaining life, price of underlying stock);
- the firms ESO granting policy.

While it can be argued that the US setting was not optimal with regard to comparability of company statements a major advantage of the US institutional setting is that the fair values of ESOs were already available before recognition of ESO expenses became mandatory. In contrast, in Europe there was no comprehensive standard that required extensive disclosure on ESOs. Therefore, it might be hard to examine changes in the use of ESOs, because Dutch firms were only required to report limited information on ESOs. However, as was mentioned above Dutch firms were at least to some extent required to report information on ESOs. Based on the Dutch reporting requirements prior to IFRS 2 it can be concluded that it is attainable to examine changes in ESO use for Dutch firms. This conclusion is supported by the study of Blij and Mertens (2000) in which they examine ESO use and disclosure for 42 Dutch firms. Blij and Mertens (2000) present their findings concerning financial reporting for ESOs in a table that is translated to English and showed below.

<b>ESOs reporting for 42 Dutch selected firms</b>	<b>n</b>	<b>%</b>
Firms that grant ESOs	41	98
Firms that do not grant ESOs	1	2
Total	42	100
<i>Firms that grant ESOs</i>		
Options for executives	2	5
Options for other employees	2	5
Options for executives and other employees	36	88
No reporting	1	2
Total	41	100
<i>Other information with respect to ESOs</i>		
Disclosure of maturity granted ESOs	40	98
Information about granted ESOs in a year	38	95
Information on changes in ESOs	40	98
Total firms that grant ESOs	41	100
<b>Source:</b> Blij, J.H.C., and G.M.H. Mertens. (2000), <i>Bestuurdersbezoldiging en aandelenoptieregelingen, Het jaar 2000 verslagen, Nivra geschriften 71, p. 77.</i>		

All in all, before IFRS 2 became mandatory disclosure requirements concerning ESOs were extensive in The Netherlands. As a consequence of this transparency, it is expected that the impact of IFRS 2 on ESOs granted can be measured since remuneration data is available.

## 2.3 Accounting for ESOs

Hall and Murphy (2003, p. 50) define ESOs as follows:

“Employee stock options are contracts that give the employee the right to buy a share of stock at a pre-specified ‘exercise’ price for a pre-specified term.”

Thus, employees or grantees, who are awarded with ESOs, are not obtaining shares of stock.

ESOs can only be exercised when they are vested. For most ESOs the exercise period does not start immediately, but lies in the future. The period in which the ESO is not yet vested is called the vesting period. For example, an employee is granted with an ESO that can be exercised after an employment period of three years.

Among other things the value of an ESO depends on the price of the underlying stock during the exercise period. An ESO gives the grantee the right to obtain a stock at a pre-specified strike price. The strike price, or the exercise price, is the pre-determined price for which the grantee can exercise the option. Therefore, the higher the stock price the bigger the compensation the grantee receives. This results from the fact that the grantee can sell the stocks at a price higher than for which the stocks are purchased. The difference between the market value, for ESOs the stock price, and the exercise price is called the intrinsic value and thus the higher the intrinsic value, the higher the value of an ESO *ceteris paribus*.

However, the difference between the underlying stock price and the exercise or strike price is not the only variable that determines the value of an ESO. Besides an intrinsic value ESOs namely also have time value. Option valuation models that take all different kind of variables into account, like Black-Scholes and the binominal model, are used to estimate the fair value of an ESO. For example, the Black-Scholes model involves the following variables: the exercise price, the expected life of the ESO, the stock price at grant date, the expected volatility of the stock, the expected dividend yield of the stock, and the risk-free interest rate (Ernst&Young, 2008, p. 948).

Besides vesting periods granting of ESOs can be restricted to other types of vesting conditions. Vesting conditions can be divided into market conditions and non-market conditions. An example of market condition is a targeted share price, and an example of a non-market condition is required tenure time. Non-market conditions should not be taken into account when the fair value of an ESO is determined. On the other hand, market conditions do need to be taken into account.

### **2.3.1 Intrinsic value approach**

In general, the intrinsic value approach only recognizes compensation expenses for an ESO, when the ESO has an intrinsic value. As mentioned before the intrinsic value is the difference between the market value of the shares on the grant date and the exercise price of the option.

As a consequence, for fixed ESOs with an exercise price at or above the market value no expenses need to be recognized, since they do not have an intrinsic value. Also, on the exercise date, the issuance of stock is not recognized on the income statement, but is recognized as a change of equity. Contradictory, for variable ESOs changes in the market values need to be recognized. However, this is only the case as far as there is an intrinsic value. Variable ESOs agreements are contracts in which the amount of stock or exercise price of the options are uncertain and thus not immediately fixed. For example, when the exercise price depends on the market value or when exercising depends on certain performance measures.

In the end, as a result of the accounting inconsistency between variable and fixed ESOs under the intrinsic approach mostly fixed ESOs were issued to avoid expensing.

### **2.3.2 Fair value approach**

The fair value approach requires expensing for ESOs at an amount estimated by an option valuation model. Since ESOs will always have a value under the fair value approach, compensation expenses for ESOs will always be recognized. This is the case because even when the intrinsic value of an ESO is zero an ESO will always have time value as otherwise an employee does not receive any compensation. Firms are required to expense ESOs when they receive the employee services and they have to amortize these costs over the years

they receive the employee services. In general, this period includes the time from the day the options are granted to the day the options are vested and can be exercised.

Thus, in contrast to the intrinsic value approach the income statement is affected with the use of the fair value approach. As was already mentioned in the introduction a study of Botosan and Plumlee (2005) finds that firm performance is materially negatively affected by the fair value approach. This is a result of the fact that reported earnings decline and hence the Earnings per Share (EPS) and the Return on Assets (ROA) decline. While investors fixate on reported earnings, choice of accounting treatment can have economic consequences and therefore the fair value approach for ESOs is considered an unfavorable accounting approach relative to the intrinsic value approach (Guay et al., 2003).

Example 1 shows the main differences in accounting under both models without taking taxes into account.

<b>Example 1</b>			
<b>Expensing for <u>fixed</u> ESOs</b>			
Number of ESO	100	Fair value (e.g. with Black-Scholes)	20 dollar
Vesting period	3 years	Market price (at grant date)	50 dollar
Exercise price	50 dollar	Market price (after 3 years)	75 dollar
<b>Intrinsic approach</b>		<b>Fair value approach</b>	
<i>Period 1</i>		<i>Period 1</i>	
No recognition of expenses (no intrinsic value)		Compensation costs (100 x \$20 x (1/3))	\$666.67
		A  Additional paid-in capital options	\$666.67
<i>Period 2</i>		<i>Period 2</i>	
No recognition of expenses (no intrinsic value)		Compensation costs (100 x \$20 x (1/3))	\$666.67
		A  Additional paid-in capital options	\$666.67
<i>Period 3</i>		<i>Period 3</i>	
No recognition of expenses (no intrinsic value)		Compensation costs (100 x \$20 x (1/3))	\$666.67
		A  Additional paid-in capital options	\$ 666.67

<i>Journal when ESO are exercised after 3 year:</i>			
Cash (100 x \$ 50)	\$5000	Cash (100 x \$50)	\$5000
A  Capital Stock (100 x \$25)	\$2500	Additional paid- in capital options (3 x \$666,67)	\$2000
A  Additional paid-in capital stock	\$2500	A  Capital stock (100 x \$25)	\$2500
		A  Additional paid-in capital stock	\$4500

## 2.4 Summary and conclusions

This chapter showed the institutional background of option expensing in both the US and Europe with The Netherlands in specific. In Europe and thus The Netherlands IFRS 2 was implemented in February 2004 with an effective date of 1 January 2005. From then on it was required for listed firms to recognize ESO expenses by using a fair value model instead of using the intrinsic value approach. Besides the implementation of IFRS 2 in The Netherlands additional reporting requirements which made employee remuneration and specifically executive remuneration more transparent were also implemented. It was shown that in September 2002 art. 2:383d BW was adopted that required Dutch stock listed firms to report remuneration information for both executives individually and all employees together. Subsequent to art. 2:383d BW the corporate governance code (Tabaksblat 2003) was published. This code made remuneration reporting requirements for executive compensation even more strict.

In the end, a possible consequence of the increased transparency of total employee and executive remuneration before the implementation of IFRS 2 is that it might reduced the impact of IFRS 2. This is because higher remuneration transparency made financial statement users better able to incorporate the effect of ESOs on firms' financial statements. However, on the other hand while financial statement users often fixate on reported earnings and/or often do not have the capacities to incorporate the effect of ESOs on firms' financial statements IFRS 2 might still have a significant impact on the use of ESOs.

## 3. Literature review

### 3.1 Introduction

This chapter provides an overview of the academic literature concerning equity-based compensation with ESOs in particular. This chapter starts with section 3.2 that provides a brief overview of equity-based compensation. Thereafter, section 3.3 discusses the main determinants that influence the use of ESOs as equity-based compensation following the current literature. A list of the literature discussed is provided in appendix II. At last, in section 3.4 some models developed in previous studies used to determine the link between accounting and ESOs are examined. To integrate the models discussed in section 3.4 appendix III is included.

### 3.2 Equity-based compensation and ESOs

#### 3.2.1 *Two theories concerning equity-based compensation*

In literature there are two contradictory approaches that try to explain the use of equity-based compensation for executives. Both approaches are based on the agency theory and relating problems concerning differences in interests and information asymmetry. However, as will be shown the relation between the agency theory and executive compensation varies for the two approaches (Bebchuk and Fried, 2003).

The first approach that tries to explain the use of equity-based compensation is the optimal contracting theory. This approach captures the problems arising from the difference in interests between owners of a firm, e.g. the shareholders, and the managers of that firm. Since under the agency theory everybody is expected to maximize their own wealth and since managers are assumed to have better information than shareholders, managers are expected to make decisions that maximize their own wealth at the expense of shareholders. To mitigate this agency problem caused by the differences in interests and the information asymmetry, managers are awarded with equity-based compensation to align their incentives with those of the shareholders. Thus, the use of ESOs can, at least to some extent, be explained by the incentives they provide.

The second approach is the managerial power theory. Under this approach it is assumed that managers have the power to influence their own remuneration schemes. As a result they choose schemes that maximize their own value instead of the firm value. Since managers try

to extract as much rent as possible this is also called managers' rent seeking behavior. There are two important building blocks on which the managerial power theory is built, namely outrage costs and camouflage. Outrage costs represent the costs that directors and executives face when executives are compensated in certain ways. The amount of outrage costs that proposed compensation schemes cause, depends on how these schemes are perceived by outsiders and thus on how much outrage they generate with outsiders (e.g. shareholders). The more outrage certain compensation cause, the smaller the likelihood executives will indeed receive it. The second building block 'camouflage' relates to outrage costs. Because compensation can lead to outrage costs, executives have the tendency to hide their compensation schemes to avoid outrage costs. While the tendency of executives to camouflage their compensation can be really strong this might even lead to the adoption of inefficient compensation schemes (Bebchuk and Fried, 2003, p. 4-5).

Thus, where the optimal contracting theory views equity-based compensation as a way to mitigate agency problems, the managerial power theory views equity-based compensation as part of the agency problem itself. In literature for both theoretical approaches there are studies available that evidence their existence. For example, Core and Guay (1999) find that firms set compensation schemes in accordance with the optimal contracting theory while Bebchuk and Fried (2003) have the perspective that equity-based compensation schemes are a result of the managerial power theory.

Taken the managerial power approach into account a clear link with accounting for options and their use can be drawn. Before the implementation of IFRS 2 and SFAS No. 123 in Europe and the US respectively there were no extensive financial reporting requirements for ESOs. Options as a way to compensate executives were thus easier to camouflage. As a result of this camouflage possibility the attractiveness of options increased. However, the implementation of the fair value accounting approach for ESOs, which removed the possibility to camouflage option use by making option use more transparent, could have contributed to the decline in option use after the implementation of the fair value accounting approach. Indeed a study of Dechow et al. (1996) shows that those, who had submitted a comment letter against FASB's Exposure draft that was published in 1993 were mainly concerned with the negative reaction from the public when ESOs have to be expensed, since expensing revealed the height of executive compensation.

### **3.2.2 Other explanations for equity-based compensation**

Besides the two abovementioned theories for ESOs as a way to compensate executives, other studies also tried to explain the use of options for employees. For example, Ittner et al. (2003, p. 91-92) mentioned three reasons why equity-based compensation is used by firms. These three reasons are: (1) incentive effects, (2) tax considerations, and (3) cash flow considerations.

First, the incentive effect reflects the optimal contracting theory. The incentive effect is better applicable as explanation for ESO use for executive compensation than for lower-level employee compensation. This is because lower-level employees have less influence on firm performance and thus stock prices. Therefore, in general they will be compensated with a higher proportion of fixed salary relative to executives. However, Bebchuk and Fried (2003, p. 14) doubt that ESOs link compensation to managerial performance and thus provide a so-called incentive effect. This results from the fact that stock prices vary heavily with, for managers, uncontrollable variables like industry and general market trends. If managers cannot influence their compensation, managers' incentives to perform well, and thus benefit shareholders, might reduce. Or in other words, when performance and compensation are not linked for managers, because stock prices do not perfectly reflect managers' performances, the positive incentive-effect of market-based compensation schemes might be distorted.

Second, tax considerations are mentioned by Ittner et al. (2003) as a factor that influences the use of equity-based compensation. However, it is important to notice that this argument applies to the US tax setting and that tax considerations as explanation for equity-based compensation do not have the same implication for The Netherlands as for the US.

In the US ESOs do not lead to any reduction or a deferred tax reduction of the spread between the stock and the exercise price. This is, since in the US, for tax considerations, ESOs can be classified as either incentive stock options (ISOs) or nonstatutory stock options (NSOs). They differ in a way that for ISOs a firm is not allowed to deduct the compensation expenses, while NSOs lead to a deferred tax reduction until the moment the option is exercised. Since cash compensation, like salary and bonuses, does lead to an immediate tax reduction, the use of ESOs is more attractive if the marginal tax rate for a firm is relative low. Otherwise, when marginal tax rates are high, the costs of ESOs relative to cash compensation rise, since cash compensation is fully deductible.

In contrast, in The Netherlands no such distinction between ESOs is made. In The Netherlands, firms that grant ESOs are exposed to the Employer Insurance contributions,

which have to be paid, since 1 January 2005, on the moment an ESO is exercised (Commission of the European Communities, 2002). Prior to 1 January 2005, Employer Insurance contributions had to be paid on the moment an ESO was granted or vested, depending on whether an ESO was unconditional or conditional. Taxing an ESO on the granting or vesting date, instead of the exercise date, meant that the taxable amount was not precisely known, but based on expectations of the future value of the ESO.<sup>1</sup> As a consequence, when stock prices increased more than expected on the exercise date, the old system provided a benefit relative to the new system, as firms only had to pay Employer Insurance contributions over the expected value of an ESO. However, as this argument also works the other way around, taking the risk that too much tax was paid together with the downturn of the stock market into account, it is unlikely that the change in tax regime in 2005 has impacted firms' incentives to grant ESOs significantly and correspondingly has affected the outcomes of this study in the opposite direction.

Besides the fact that firms are subjected to Employer Insurance contributions, firms could deduct ESO expenses from their taxable income until 1 January 2007. From then on, firms were no longer allowed to deduct ESO expenses from their taxable income, thereby making ESOs unattractive as a way to compensate employees. Therefore, the change in tax regime in 2007 is expected to have more likely affected firms' compensation schemes and reduced ESO use. Nevertheless as the year 2005 is the event year of this study, the implementation of this new tax regime in 2007 does not make it necessary to substantially adapt this study.

Last, cash flow considerations are related to the use of equity-based compensation and ESOs. Since equity-based compensation and thereby also ESOs do not lead to a current outflow of cash they can be attractive to start-up firms or other firms that face liquidity constraints.

Also, Oyer and Schaefer (2005) point out another reason for the use of equity-based compensation, namely that it leads to retention of good employees. This is because equity-based compensation is often designed in such a way that only employees, who perform well, receive positive payoffs and as a consequence stay with the firm. More specifically for ESOs, the fact that they often include a vesting period of several years reflects this retention explanation.

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<sup>1</sup> The taxable amount is determined by a prescribed formula that includes an ESOs' intrinsic value and expected value when determining the taxable amount. The expected value represents future expected rises in the value of an ESO.

### ***3.2.3 Trend: an increase of ESOs during the 1990s***

However, the reasons stated above are not satisfactory concerning the major increase of ESOs during the 1990s. Hall and Murphy (2003) showed an increase in the value of options from an average of \$22 million to an average of \$238 million per S&P 500 company during the period 1992-2000 in the US. Also, the use of stock options has spread to Europe for the past fifteen years and their weight since then is increasing (Butzbach and Di Carlo, 2008, p. 3). For The Netherlands in particular the report 'Personeelsopties' performed under instructions of the European Commission stated that in The Netherlands almost all big firms granted ESOs and over 80 percent of all listed firms used ESOs in 2003 (Personeelsopties, 2003, p. 27).

### ***3.2.4 ESOs compared with other equity-based compensation***

Regarding academic research the increase of ESOs instead of an increase of other types of equity-based compensation, like restricted stocks, also seems somewhat unexpected. Oyer and Schaefer (2005) for example conclude that ESOs are not efficient as a way to provide employees with incentives when stock volatility is high. A study of Dittmann and Maug (2007) supports this view by concluding that restricted stocks, rather than stock options should be used to provide employees with incentives. This has to do with the fact that ESOs with a market price well below the exercise price do not provide incentives to employees, because the employee does not believe the market value will ever become higher than the exercise price. Besides Hall and Murphy (2003) point out that ESOs for which the market price lies well below the exercise price provide managers with incentives to take more risky investments. On the other hand, when ESOs are in-the-money and the market price thus lays above the exercise price executives' incentives to take risky investments become less. So, with ESOs the undertaking of risky investments depends more on the height of the stock price, relative to for example restricted stocks. While the decision to undertake an investment should not be dependent on the stock price this could be seen as a disadvantage of the use of ESOs. Supplementary to this, ESOs result in an asymmetric payoff, since employees do not carry the burden of negative payoffs; when the stock price is below the exercise price on the exercise date of an ESO employees are only impacted by the fact that they will not exercise their ESOs. In contrast, with stock compensation employees experience both negative and positive payoffs.

At last, Hall and Murphy (2003) also conclude that restricted stocks are preferred over ESOs from a shareholders point-of-view due to the fact that restricted stocks provide better incentives to adopt an appropriate dividend policy. This can be explained by the fact that with ESOs executives do not receive dividends and consequently executives have the incentive to reduce or avoid dividend payments.

### ***3.2.5 Trend: a decrease of ESOs during the 2000s***

While there was a significant increase of ESOs in both the US and The Netherlands during the 1990s, in the 2000s a decline in the use of ESOs can be identified. For example, four studies of Carter et al. (2003, 2007), Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009), that will be discussed in section 3.4 of this chapter, all show a significant decrease of ESOs around 2002 in the US. In addition, in The Netherlands a report of Hewitt (2006) also identified that ESOs were becoming less popular as a long-term incentive instrument to remunerate CEOs. The Hewitt report appointed multiple reasons for this decrease. The first reason provided is that more strict corporate governance and the thereby accompanied disclosure rules, together with the general notion that ESOs are not optimal to remunerate CEOs caused the decline. The implementation of IFRS 2 is given as a second reason for the decline of ESOs. As the Hewitt report states that IFRS 2 had a negative impact on ESO use, this provides a foundation for the expectation that in The Netherlands ESO use indeed declined after expensing became mandatory.

### ***3.2.6 Summary***

While the optimal-contracting theory, the managerial power theory, tax considerations, cash constraints, and the retention argument, given above, to some extent explain the use of equity-based compensation and implicitly also the use of ESOs there are also other determinants that influence the use of ESOs. Section 3.3 examines these determinants in more detail and introduces the accounting method for ESOs as a possible determinant for their use.

### 3.3 Determinants of the use of ESOs

Prior research has already identified various determinants that influence the use of ESOs or the use of equity-based compensation in general. However, the influence of the accounting approach used for ESOs on their use is often not considered and the current state of research is inconclusive about whether there is a negative relation between the implementation of the fair value accounting approach for ESOs and their use. While for the US there are studies available that prove that option use indeed declined, for The Netherlands and Europe in general there are none. To contribute to the existing body of research this thesis examines whether the accounting treatment, besides various other determinants, influences firms' attitudes towards ESOs and consequently their use of ESOs in The Netherlands. With respect to problems concerning heterogeneity in the relation between accounting treatment of ESOs on their use in firms' compensation schemes it is critical to adopt control variables, which take into account other reasons and explanations for a change in the use of ESOs. An overview of the literature that identified various determinants and their expected relation with the use of ESOs or equity-based compensation in general is given below.

#### 3.3.1 Accounting treatment of ESOs

As mentioned before, the purpose of this thesis is to examine whether there is a link between the implementation of the fair value accounting approach for ESOs and their use. The importance of determining whether a relation between accounting and ESO use exists was already mentioned by Core et al. (2003). However, academic research is inconclusive about the role of accounting as a determinant of ESO use and while there is indeed American evidence that option use declined this relation is not yet examined for Dutch firms.

Chapter two showed that the old accounting approach for ESOs did not require firms to recognize their ESO expenses. When standard setters revealed their plans to shift towards the fair value approach this caused, especially in the US, a lot of resistance. Opponents of the fair value approach, which makes expensing for ESOs mandatory, were concerned with the negative economic consequences of this new rule on the share price, cost of capital and the compensation and motivation of employees. They therefore predict a decline in the use of ESOs as a result of this new accounting method for ESOs. Yet, by itself the enormous resistance already provides an indication that accounting considerations are of significance regarding the use of ESOs.

Supporting this statement, a study of Hall and Murphy (2003) indeed concludes that accounting considerations are relevant for the use of ESOs, because accounting rules affect managerial decisions. Subsequent this study even states that the old accounting treatment has led to excessive use of option-based compensation. As an explanation for this Hall and Murphy point out that the perceived costs of ESOs using the intrinsic value approach do not reflect the true economic costs of ESOs. After recognizing ESOs however the perceived costs reflect the actual economic costs and the understatement of ESOs costs disappear as a consequence of which the level of ESOs reduces. This explanation is supported by Bodie et al. (2003), who argued that not recognizing ESO expenses led to an accounting subsidy to ESOs which resulted in an overuse of ESOs.

Other studies that provide evidence that accounting considerations influence options are Matsunaga (1995), Core and Guay (1999), Carter et al. (2003, 2007), Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009). Carter and Lynch (2003) showed that accounting considerations do affect options by examining the link between the announcement of the FASB on 4 December 1998 about changes in accounting for ESOs and stock options repricing activities with an effective date of 15 December 1998. On 4 December 1998 the FASB announced that repricing of options had to be accounted for as variable options instead of fixed options. Since even under the intrinsic approach variable options have to be recognized by the firm, Carter and Lynch investigated if there was an increase in repricing activity between 4 and 15 December and a decrease afterwards. Indeed a significant increase in repricing activity between 4 and 15 December and a decrease of repricing activities after 15 December 1998 were found as a result of the FASB's announcement. Therefore it can be concluded that accounting considerations relate to terms of options contracts. More specific was the study of Carter et al. (2007), in which the role of accounting in CEO compensation schemes was examined. Both univariate analyses and multivariate models were used to determine whether there is a negative relation between firms that begin expensing options in 2001 and 2002 and the amount of their CEO compensation from stock options. The results show that new accounting treatment is negatively related to the use of ESOs. Just like Carter et al. (2007) Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009) developed models to determine the link between accounting and option use in detail. Consistent with Carter et al. (2007) their studies all find a significant negative relation between mandatory option expensing and option-based compensation.

Furthermore, other studies also support the view that accounting has an impact on ESO use, namely Matsunaga (1995) finds that the use of ESOs will increase when the income benefit

is high and that there is a relation between the use of income-increasing accounting methods and the use of ESOs. This is the case, because when a firm receives benefits from reporting a higher income through the accounting treatment of ESOs, the effective costs of ESOs decline which can lead to an increase of ESOs. Or in other words, because ESOs can make reported income look higher, since no expenses for employee compensation have to be recognized, ESOs are used as a way to improve reported income. Besides, Core and Guay (1999) conclude that there is a relation between reporting concerns and the use of options, because their proxy of financial reporting costs was positively related to ESO use. Thus, while both studies are not directly related to the implementation of new accounting standards for ESOs, both studies prove that accounting issues can play a role in decision-making behavior concerning ESOs. This supports the aforementioned findings of Carter et al. (2007) Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009) that the implementation of the fair value accounting approach for ESOs can influence their use.

Contradictory to these studies, some researchers find that mandatory expensing should not have an impact as long as the information on stock options was already disclosed in footnotes. These studies were conducted for US firms, because in the US prior to mandatory expensing requirement of 2004 it was the case that firms, since 1995, either had to recognize ESO expenses by using the fair value approach or disclose ESO expenses as they are under the fair value approach and recognize ESOs in the financial statement using the intrinsic approach. So, financial statement users find the fair value information of the stock-option expenses either in the balance sheet and income statement or in the footnotes. Therefore, supporters of the efficient market hypothesis believe that mandatory expensing should not make a difference. Empirical results from Aboody et al. (2004) and Dechow et al. (1996) confirm this by concluding that there is no reason for firms to change their level of option-based compensation, because financial statement users incorporate all information either disclosed or recognized. Stock markets incorporate ESOs information stated in footnotes and therefore recognizing ESO expensing would not lead to negative market reactions. In contrast to this conclusion Espahbodi et al. (2002) state that recognition and disclosures are no substitutes, because financial statement users find it too costly to adjust amounts of elements that are recognized on the balance sheet for information stated in footnotes. Therefore, accounting methods have an influence and could indeed affect the level of option-based compensation. Then again on the other hand studies of Yermack (1995) and Bryan et al. (2000) both found no association between financial reporting costs and the use of ESOs.

As shown above, there is no consensus on the exact influence of accounting on ESOs. Indeed for the US there are some studies that found a decline in the use of ESOs after the

implementation of the fair value accounting approach. For The Netherlands and the implementation of IFRS 2 such studies have not yet been conducted. Therefore, this thesis has the potential to really contribute to the existing state of research.

### **3.3.2 Investment and growth opportunities**

It is often argued that the information asymmetry of firms with high growth opportunities is high relative to firms with low or no growth. This is because it is expected that these firms have a lot of investment opportunities and it is likely for firm managers to have more and better information than shareholders concerning these opportunities. When the managers and the shareholders of a firm have the same interests this should not be a problem. However, since this is not the case shareholders try to mitigate these differences in interests by aligning the interests of managers with those of the shareholders. This is reached by using equity-based compensation like stock options. Studies that are consistent with the prior assumption are Smith and Watts (1992), Gaver and Gaver (1993) Matsungaga (1995), Ittner et al. (2003), and Chourou et al. (2008).

In contrast with this some studies identify a negative relation between growth opportunities and use of stock options. For example, Bizjak et al. (1993) conclude that high-growth firms that face high levels of asymmetry adopt compensation methods that are based on long-term stock returns rather than near-term stock returns. Hence, the use of stock options will reduce.

### **3.3.3 Firm size**

Another determinant for which some studies proved that it has an impact on the use of stock options is firm size. As monitoring of managers in large firms is assumed to be more difficult, the same information asymmetry problems as mentioned in section 3.2.1 arise. To align the interest of managers with those of the shareholders more incentive-based compensation and thus more ESOs, will be used. Core and Guay (1999) find a concave growing relation between CEO incentives and firm size. Also, Bryan et al. (2000), Carter et al. (2007), and Chourou et al. (2008) find a positive relationship.

In contrast, Matsunaga (1995) fails to find any significant relationship.

### **3.3.4 Firm performance**

Research of Murphy (1985) finds a positive relation between firm performance and equity-based compensation. Since ESO is a type of equity-based compensation this study also indicates a positive relation between firm performance and stock options.

### **3.3.5 Debt covenants and leverage**

Expensing of ESOs influences debt covenants, which are based on earnings, because reported earnings are expected to be lower when ESO compensation expenses need to be recognized. Consequently, firms with tight earnings-based debt covenants are expected to reduce their option-based compensation after expensing becomes mandatory. This is consistent with the study of Watts and Zimmerman (1990, p. 139) in which they conclude that:

“The tighter the covenant constraint, the greater the probability of a covenant violation and of incurring costs from technical default. Managers exercising discretion by choosing income increasing accounting methods relax debt constraints and reduce the costs of technical default.”

The contract theory and the accompanying conflict of interests between shareholders and debtholders provide another explanation for this link. When managers are compensated with equity-based compensation their interests will be aligned with those of the shareholders. As a result, it is expected that managers' decisions will maximize shareholder value rather than that their decisions serve the interests of debtholders (Feng and Tian, 2009, p. 207). To reduce debt related agency costs, firms with high earnings-based debt covenants, that are heavily leveraged, thus have an incentive to decrease stock-based compensation and implicitly also stock options (Bryan et al. 2000, p. 668).

While Feng and Tian (2009) and Bryan et al. (2000) find a negative relation between earnings-based debt covenants and ESO use, Yermack (1995) and Matsunaga (1995) did not find any significant relation.

### **3.3.6 Liquidity constraints**

Firms that have a shortage of cash and are facing liquidity constraints have more incentives to substitute cash compensation awards for stock options awards and other forms of equity-based compensation. This is because firms that are issuing stock options as a compensation award are only providing a right, which requires no cash outlay on the grant date. This explanation is in agreement with studies of Yermack (1995), Dechow et al. (1996), and Bryan et al. (2000).

However, Carter et al. (2007), Chourou et al. (2008), and Feng and Tian (2009) do not find a significant relationship.

### **3.3.7 Managerial horizon and CEO tenure**

Horizon problems are becoming more relevant close to retirement of executives. Under the horizon problem executives, who are close to retirement and receive earnings-based compensation, are likely to turn down investment projects that indeed have a positive net present value. The reason therefore lies in the fact that investment projects often require large investments in prior years thereby reducing earnings and the associated executive compensation. Thus, CEOs close to retirement do not have incentives to accept investments since only their successor will reap the fruits of these projects. Equity-based compensation can be used to counteract the horizon problem. Besides, Core and Guay (1999, p. 153) argue that over time CEOs can be awarded with a higher level of equity-based compensation, because uncertainty about their ability is reduced. Following this explanation a positive relation between CEO age and option use is found by Feng and Tian (2009). Also, Carter et al. (2007) expect and find a positive relation between CEO tenure and ESO use. They argue that CEOs, who are long in a position, are less risk averse, since the likelihood of CEO turnover declines during time, and therefore CEOs prefer variable compensation schemes rather than fixed compensation schemes.

Instead of the positive relation supported by theories concerning the horizon problems, other studies revealed a negative relation between CEO tenure or CEO age and the use of stock options. For example, Bryan et al. (2000) find a negative relation between CEO age and stock option use. They explain this by saying that there is a trend by which high levels of stock options are provided to young CEOs in high-growth firms. Last, Chourou et al. (2008) explain a negative relation by the fact that CEOs obtain more stock as their tenure increase.

Thus, CEOs need fewer options, because their interests are already aligned with the interests of shareholders.

### **3.3.8 Stock volatility**

The informativeness principle developed by Holmstrom (1979) captures the effect that firms will reduce the weight assigned to a performance measure in CEOs' compensation schemes when that measure is noisy. Thus, when accounting performance measures are noisy relative to stock-based performance measures the use of accounting-based performance awards will, in contrast with the use of stock-based performance awards, reduce. Likewise, it can be argued that the lower the level of volatility in stock returns or stock prices, the higher the use of options. This statement is supported by Oyer and Schaefer (2005) who conclude that ESOs are not efficient as a way to provide employees with incentives when stock volatility is high.

The study of Bryan et al. (2000) confirms the relation between noisiness in earnings and the use of option-based compensation awards. Results of their study indeed show a significant increase in stock options when earnings relative to stock returns are volatile. As well, Espahbodi et al. (2002) find a negative relation between noise in stock prices and the use of stock-based compensation.

On the other hand, Yermack (1995) and Chourou et al. (2008) do not reveal any significant relation.

### **3.3.9 Ownership structure**

It is unlikely for firms in which CEOs already possess a high amount of stocks to also compensate these CEOs with high amounts of stock options. The reason is that the interests of executives are already aligned with those of the shareholders.

However studies surrounding this topic are inconclusive. Chourou et al. (2008) and Bryan et al. (2000) find a negative relation, while Matsunaga (1995) and Yermack (1995) find no relation.

### 3.4 Prior models examining the impact of expensing of ESOs

This section outlines different research approaches used to investigate the relation between various determinants and the use of ESOs. While in section 3.3 the most important determinants for the use of ESOs are already revealed, this section shows how prior studies have incorporated these determinants in a model to verify the relation between the adoption of the fair value accounting approach for ESOs and their use. Section 3.4 concludes with an overview of the models discussed by providing an inscription of the determinants used in the different models to integrate the studies that have already been conducted in appendix III. All the studies mentioned below are conducted with US data only.

#### 3.4.1 Carter et al. (2007)

Carter, Lynch, and Tuna (2007) examined if there is a relation between accounting considerations and the use of stock options and restricted stocks for executive compensation. Carter et al. (2007) find that accounting considerations indeed have an impact on the use of options and restricted stocks. Their study shows that expensing of stock options is negatively related to the use of stock options and positively related to the use of restricted stocks. To come to this conclusion Carter et al. (2007) divided their paper into two parts. First, they examined and found that financial reporting concerns are positively related with the use of stock options and negatively related with the use of restricted stocks. Then subsequently they support this relation by showing that option use indeed declined when firms began to recognize stock option expenses in 2002 or 2003. Carter, Lynch, and Tuna added this part, because "it shows the relation between accounting considerations and equity compensation without having to rely on an estimated financial reporting concern proxy" (Carter et al., 2007, p. 344). For the first part, in which financial reporting concerns are examined, a sample of Execucomp firms between 1995 and 2001 is used. Respectively, the second part uses a sample of Execucomp firms that started to expense their options in 2002 or 2003 voluntarily.

First, as was already mentioned Carter et al. (2007) studied the relation between financial reporting concerns and equity compensation prior to expensing of options. To determine proxies for financial reporting concerns Carter et al. (2007) make use of existing literature. Based on existing literature they found that financial reporting concerns were related to both earnings expectations and earnings pressure and to capital-raising and contracting

circumstances. As a consequence the following proxies for financial reporting concerns were identified (Carter et al., 2007, p. 333-334):

- 1) EPS\_INCR: Proportion of quarters that the firm's EPS was equal to or greater than the prior year same quarter
- 2) BEAT\_FCST: Proportion of quarters that the firm met or beat analysts EPS forecasts
- 3) LEVERAGE: Debt-to-asset ratio
- Together FINRPT\_1 to capture financial reporting concerns with regard to capital market participation
- 4) ISSUE\_EQ: Extent to which firms access the equity markets in the upcoming year
- 5) ISSUE\_DEBT: Extent to which firms access the debt markets in the upcoming year
- Together FINRPT\_2 to capture financial reporting concerns with regard to plans to access the capital market

From the five abovementioned proxies Carter et al. (2007) developed two determinants. The purpose of using only two determinants is to mitigate problems concerning multicollinearity, since the five proxies are correlated, and to reduce the measurement error of the five proxies individually. Aggregating the five identified proxies for financial reporting concerns into two determinants is done by a principal component analysis (hereafter: PCA).<sup>2</sup> After performing a PCA, the first determinant FINRPT\_1 consisted of the first three proxies in which the loadings were 0.80, 0.81, and 0.51 for EPS\_INCR, BEAT\_FCST, and LEVERAGE respectively. The second determinant FINRPT\_2 captured the last two proxies, ISSUE\_EQ and ISSUE\_DEBT, with loadings of respectively 0.79 and 0.81. These two proxies for financial reporting concerns together with several control variables were used in the following multivariate regression analysis (see appendix III to for an inscription):

$$\begin{aligned} \text{DEP\_VBL}_{it} = & \alpha_0 + \alpha_1 \text{FINRPT\_1}_{it} + \alpha_2 \text{FINRPT\_2}_{it} + \alpha_3 \text{DEV\_INC}_{it} + \\ & \alpha_4 \text{CASH\_CONSTR}_{it} + \alpha_5 \text{DIV\_YLD}_{it} + \alpha_6 \text{EARN\_VOL}_{it} + \\ & \alpha_7 \text{EQ\_CONSTR}_{it} + \alpha_8 \text{TENURE}_{it} + \alpha_9 \text{LNASSET}_{it} + \alpha_{10} \text{BOOK\_MKT}_{it} + \\ & \alpha_{11} \text{RET}_{it} + \alpha_{12} \ln\_pre\_DEP\_VBL_{it} + \varepsilon_{it} \end{aligned}$$

The regression was calculated for three different dependent variables (DEP\_VBL), namely the natural log of the value of stock options granted to CEOs measured by their fair value in ExecuComp using Black-Scholes, the natural log of the value of restricted stocks granted to CEOs, and the natural log of total equity-compensation for CEOs. Since the coefficients FINRPT\_1 and FINRPT\_2 are significantly positive in the regression analysis with the natural log of the value of stock options as dependent variable, it is concluded that firms that face

<sup>2</sup> A principal component analysis is a statistical procedure to derive one variable, the principal component, from more correlated variables.

more financial reporting concerns during the period 1995-2001 indeed make more use of stock options.

Second, to support the relation that accounting considerations have an impact on option use Carter et al. (2007) developed another multivariate regression model that did not contain proxies for financial reporting concerns. Below the model is presented (see also appendix III):

$$\begin{aligned} \text{DEP\_VBL}_{it} = & \alpha_0 + \alpha_1 \text{EXPENSER}_{it} + \alpha_2 \text{DEV\_INC}_{it} + \alpha_3 \text{CASH\_CONSTR}_{it} + \\ & \alpha_4 \text{DIV\_YLD}_{it} + \alpha_5 \text{EARN\_VOL}_{it} + \alpha_6 \text{EQ\_CONSTR}_{it} + \alpha_7 \text{TENURE}_{it} + \\ & \alpha_8 \text{LNASSET}_{it} + \alpha_9 \text{BOOK\_MKT}_{it} + \alpha_{10} \text{RET}_{it} + \alpha_{11} \ln_{\text{pre\_DEP\_VBL}_{it}} + \\ & \varepsilon_{it} \end{aligned}$$

This model calculated variables two years before expensing and one year after expensing. When firms began to expense options in 2002 or 2003 the variable EXPENSER is 1, and respectively 0 if not. Thus, Carter et al. (2007) only examined firms that begin to expense ESOs voluntary. The main reason given by Carter, Lynch, and Tuna is that data of executive equity compensation from 2004 was not yet available. However, this can result in a selection bias that influences the outcomes of the study.

Based on the findings in the first part a negative coefficient is expected. Indeed, the results show a significant negative relation between expensing of ESOs and their use. On the other hand, a significant positive relation is found for restricted stocks, which indicates a substitution effect away from options to restricted stocks. For the last dependent variable, the natural log of total equity-compensation for CEO, no significant relation is shown. Thus, no evidence is found that accounting considerations influence total equity compensation. Carter et al. (2007) state that this is consistent with their expectations that it is difficult for firms to decrease total equity compensation.

To control for the situation that changes in compensation are not explained by option expensing Carter et al. (2007) used a univariate analysis. This analysis showed that changes in the reduction of stock options for firms that began to expense options in 2002 or 2003 were significant higher relative to firms that did not. While Carter et al. (2007) also conducted robustness checks their models do not capture the possibility that firms first decreased option use and then decided to expense ESOs instead of expensing options first and then reduce their use. As Carter et al. (2007) did some additional analyses on this by studying changes in options before the decision to expense options was made and indeed found no significant reductions in options from 1998-2001, this possible explanation cannot be completely

excluded. However, even if firms indeed began to reduce their option use earlier, this only weakens the power of the study, but it does not affect the results in such a way that the conclusions needed to be changed. This is because even with reduction of ESOs in earlier years, the model still shows a significant negative relation, and taking ESO reduction in earlier years into account only strengthens this conclusion.

### **3.4.2 Brown and Lee (2007)**

Brown and Lee (2007) examined the impact of SFAS No. 123(R) on option-based compensation. Following Brown and Lee there are two main reasons for the excessive or overuse of ESOs, namely (1) costly substitution and (2) reckless use of ESOs (Brown and Lee, 2007, p. 2-3). First, costly substitution led to overuse of ESOs. While under the intrinsic value approach firms did not have to recognize ESO expenses, firms had incentives to use ESOs instead of other forms of compensation that had to be recognized in the income statement. Then, reckless use of ESOs is also an explanation for the overuse of ESOs. As there are no accounting costs for fixed ESOs under the intrinsic value approach, firms grant more options than they would have done under the fair value accounting approach. Consequently, Brown and Lee (2007) expect a reduction of ESOs when recognizing ESO expenses became mandatory, because it exposed the true costs and benefits of ESOs. Besides, they also expect a substitution effect between options and restricted stocks. However, due to costly substitution this will be less than dollar for dollar. Or in other words, less restricted stocks have to be given away to reach the same level of compensation as with ESOs.

To examine whether ESO use indeed declined as a result of recognizing ESO expenses and whether this led to substitution between options and restricted stocks Brown and Lee (2007) developed and tested five hypotheses. The first three hypotheses identify firm-specific factors that capture reasons for firms to (over)use ESOs as a result of the intrinsic value accounting approach. These hypotheses are (Brown and Lee, 2007, p. 8-10):

- **H1:** Firms with tighter earnings-based debt covenants in the pre-SFAS 123R period are likely to cut back more on ESOs (proxy BINDING\_COV).
- **H2:** Firms with a greater tendency to achieve earnings benchmarks by using ESOs' favorable accounting in the pre-SFAS 123R period are likely to cut back more on ESOs (proxies MEET\_POS and MEET\_INC → proportion of years in the pre-SFAS123R period that the firm achieves zero or positive

earnings per share (MEET\_POS) or beats last year's EPS (MEET\_INC) using the favorable accounting treatment).

- **H3:** Firms with weaker corporate governance in the pre-SFAS 123R period are likely to cut back more on ESO (proxy Governance Variables).

So, the above-mentioned hypotheses are firm-specific in a way that firms that face debt contracting concerns, earnings pressure, and weak corporate governance are more likely to reduce ESO use. Subsequently, to make sure that firms' concerns about reported earnings are fully captured two more hypotheses were developed (Brown and Lee, 2007, p. 8-10):

- **H4a:** Firms with higher levels of option-based compensation in the pre-SFAS 123R period are likely to cut back more on ESOs (proxy IMPACT).
- **H4b:** Firms with higher grant-date fair values of outstanding unvested employee stock options in the pre-SFAS 123R period are likely to cut back more on ESOs (proxy UNVESTED).<sup>3</sup>
- **H5:** Firms that accelerated the vesting of outstanding unvested ESOs prior to the effective date of SFAS 123R period are likely to cut back more on ESOs (proxy ACC\_VEST).<sup>4</sup>

Besides univariate analysis Brown and Lee tested these hypotheses using the following ordinary least square regression (see below and appendix III for an inscription).

$$\begin{aligned} \text{CHG\_ESO\%} = & \beta_0 + \beta_1\text{BINDING\_COV} + \beta_2\text{MEET\_POS} + \beta_3\text{MEET\_INC} + \\ & \beta_4\text{GovernanceVariables} + \beta_5\text{IMPACT} + \beta_6\text{UNVESTED} + \\ & \beta_7\text{ACC\_VEST} + \beta_8\text{TOP5\%} + \beta_9\text{SIZE} + \beta_{10}\text{CUMRET} + \beta_{11}\text{CHG\_SALES} \\ & + \beta_{12}\text{CHG\_BM} + \beta_{13}\text{CHG\_NOL} + \beta_{14}\text{CHG\_SHORTFALL} + \\ & \beta_{15}\text{CHG\_DIVCON} + \text{IndustryDummies} + \varepsilon \end{aligned}$$

The dependent variable CHG\_ESO% is the change in option-based compensation measured by the Black-Scholes value as a percent of total compensation between the period before mandatory option expensing (2001-2003) and after mandatory option expensing (2005) for the top five executives. In the end, the results of both the univariate analyses and the ordinary least square regression confirm all five abovementioned hypotheses.

A strong characteristic of the model of Brown and Lee (2007) is that they created the proxies TOP5% and SIZE that capture time-related issues surrounding the accounting scandal Enron that resulted in an increased focus on ESO compensation. Brown and Lee argue that the increased attention on ESOs made firms that use relative high levels of options and/or face a

<sup>3</sup> SFAS No. 123(R) only requires the fair value accounting approach for new granted ESOs and unvested ESOs granted after 15 December 1994. Thus, firms with high levels of unvested ESOs have more incentive to reduce ESO use.

<sup>4</sup> SFAS No. 123(R) only requires the fair value accounting approach for new granted ESOs and unvested ESOs granted after 15 December 1994. To avoid expensing some firms accelerated the vesting of ESOs.

relative high level of political control and shareholder pressure reduce their option use around 2002.

In contrast to the study of Carter et al. (2007) Brown and Lee excluded voluntary adopting firms from their sample. Voluntary adopters are excluded, because these firms already changed their compensation schemes as a result of recognizing ESO expenses. Not including voluntary adoption firms can have an advantage with respect to self-selecting bias problems. Also, the study of Brown and Lee differs from the study of Carter et al. (2007) since they use a changes design instead of a level design.<sup>5</sup> Brown and Lee identify two advantages of a changes design over a level design: 1) it leads to a more direct causal link, and 2) it mitigates endogeneity problems, because firms are controlled by themselves (Brown and Lee, 2007, p. 6).

At last, it is critical to point out a possible limitation of the study of Brown and Lee (2007). Brown and Lee took 2001-2003 as the pre-expensing period and measured changes in options in the post-expensing period 2005 relative to this period. However, some firms already began to reduce options during the period 2001-2003. Moreover, when you consider that most options have vesting periods of at least three years reduction of ESOs might have already started before 2001. Concerning this problem it is critical to point out that not taken the reduction of ESO use in earlier years into account does not change the direction of the outcomes and thus the conclusions. As was already mentioned in section 3.4.1, since the study of Carter et al. (2007) faces the same limitation, only the power of the outcomes might decline, because the whole impact, measured by the decline in option use, of expensing is not captured. This is because 2005 is compared with 2001-2003 while in fact reductions of option use started earlier and therefore the impact might be even higher.

### **3.4.3 Choudhary (2007)**

In her study Choudhary (2007) does not only examine the economic consequences of a shift from disclosure ESO expenses to recognizing ESO expenses by looking if the number of ESOs granted is declined, but also by examining changes in the contractual terms of options. This is relevant since firms not only reduced ESO use, but also changed the compensation contracting terms as a response to ESO recognition. Besides looking at these two changes

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<sup>5</sup> Using a changes design instead of a level design means that not the absolute values of ESOs granted in the years 2001 till 2003 and 2005 are provided separately. Instead Brown and Lee (2007) measured the change in option-based compensation by taking the fair value of options calculated by Black-Scholes as a percent of total compensation (salary, bones, options, stocks, etcetera) between the period before mandatory option expensing (2001-2003) and after mandatory option expensing (2005). As a result only one measure, namely the change, instead of four separate measures is provided.

in behavior Choudhary examined whether the determinants volatility, dividend yield, and risk-free interest rate, used in the Black-Scholes model to calculate the fair value of options, are impacted when options are recognized rather than disclosed.

To test whether the number of ESOs granted declined the following model, presented below, was used (Choudhary, 2007, p. 14-15). In appendix III the variables are elaborated:

$$\begin{aligned} \Delta \text{Log} (\# \text{Option grant}_{it}) = & \delta_0 + \delta_1 \Delta \text{Log} (\text{Sales})_{it} + \delta_2 \Delta \text{ROA}_{it} + \delta_3 \text{Return}_{it} \\ & + \delta_4 \text{PostVoluntary}_{it} + \delta_5 \text{Mandatory}_{it} + \delta_6 \Delta \text{Volatility}_{it} + \\ & \delta_7 \Delta \text{DependentVariable}_{it-1} + \sum \delta_i (\text{year}_{it}) + \epsilon_{it} \end{aligned}$$

In the model Choudhary included control variables to capture changes in options that resulted from changes in firms characteristics instead of changes in the accounting treatment of ESOs. The model was developed for the period 2001-2006 in which the variable 'Post Voluntary' was one for firms that already recognized ESO expenses in or before the fiscal year 2004 and zero if not. For the variable 'Mandatory' this works exactly the other way around. Choudhary measured the number of options granted for three different groups of employees, namely the CEO, non-CEO executives, and rank and file employees. Since Choudhary wanted to measure changes in contracting terms, instead of only measuring the change in the amount of options granted, the model is also developed for changes in the statutory length and moneyness of options.<sup>6</sup>

In the end, with regard to contracting consequences Choudhary (2007) found that firms both reduced ESOs by 9% of net income on average and changed the terms of compensation schemes in such a way that firms reduced the statutory length of ESOs. A possible explanation is that a shorter statutory length reduces the fair value of ESOs and thus the recognized ESO amounts. In contrast the moneyness of options was not affected. Also firms reduced estimations of volatility by 4%, dividend yield by 2%, and risk-free interest rate by 0.3%. The latter can be explained by the fact that decreasing those estimates leads to a decline in the fair value of options and consequently a decline in the amount of ESO expenses that need to be recognized. Choudhary (2007) bases these conclusions on comparisons of the expected volatility, the dividend yield, and the risk-free interest rate as reported by firms in their financial statements with benchmarks of these variables that should represent their true values. When the estimated and benchmark value differ for either the volatility, the dividend yield or the risk-free interest rate this might be a result of firms'

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<sup>6</sup> Moneyness of options is related to whether an option has an intrinsic value. Or in other words the moneyness of options measures the difference between the price of the underlying stock at grant date and the exercise price of the option itself.

incentives to adapt the fair value of ESOs and thus to change the impact of ESO expensing on their financial statements.

The study of Choudhary differs both from the study of Carter et al. (2007) as from the study of Brown and Lee (2007). While Carter et al. (2007) measured the change in the level of options granted for voluntary adopting firms in 2002 and 2003 Choudhary measured changes in the amount of options granted for mandatory adopting firms. This eliminates possible self-selection bias problems, since mandatory expensing firms did not have the choice on whether to disclose or recognize ESO expenses. Then, in contrast to Brown and Lee (2007) Choudhary did not use a changes design.<sup>7</sup> Choudhary points out several weaknesses of the use of a changes design. First, this measure does not isolate the reduction in option use, because changes in other types of compensation that do not result from changes in the accounting treatment of ESOs affect the outcome of this measure. Second, using the fair value to measure changes might leads to biases since other determinants than the number of options influence the fair value of options. Choudhary pointed out that this is the main reason why she used the number of options granted instead of their fair value. Subsequently, Choudhary argued that the number of options is the main determinant that influences the fair value of options and using the number of options granted reflects the change in option use best. However, it is critical to state that both Brown and Lee (2007) and Carter et al. (2007) used ExecuComp BLK\_value to determine the fair value of options by the Black-Scholes model. Since the fair value of options, which is named BLK\_value in Execucomp, is calculated with estimated determinants by ExecuComp, biased and manipulated estimates by management are not included. Despite this, it is still the case that the other estimates needed to determine the fair value at least to some extent influence the fair value of options. Therefore the change in the fair value of options granted is also determined by changes in those estimates. Or in other words, it does not isolate changes in option use perfectly.

A major contribution of Choudhary's study is that it examined whether the economic consequences of ESO expense recognition differ between voluntary and mandatory adopters. Following Choudhary both types of adopters reduced ESO use, substitute between ESOs and other types of compensation, and reduced estimates of the determinants volatility, dividend yield, and risk-free interest rate used in the Black-Scholes model in the same way. Or in other words, there is only a time-period effect that led to changes in option use between these two types of firms. This is because voluntary adopters already adapted their

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<sup>7</sup> Brown and Lee (2007) measured the change in option-based compensation by taking the fair value of options calculated by Black-Scholes as a percent of total compensation (salary, bones, options, stocks, etcetera) between the period before mandatory option expensing (2001-2003) and after mandatory option expensing (2005).

compensation schemes earlier. Yet, voluntary and mandatory firms do differ in the way the estimates of the Black-Scholes model are determined, because the dividend yield and the risk-free interest rate are estimated more precisely with mandatory adoption firms.

At last, to mitigate problems concerning increased focus on executive compensation and option use as a result of major accounting scandals Choudhary (2007) tried to capture these time-period effects and their influence on option use. Choudhary (2007) did this by using the voluntary adopters of ESO recognition as a control group. Choudhary's arguments for doing so are as follows:

“Voluntary recognizers are not affected by FAS 123-R, but have observations in the same time period, rendering them a useful control for time period effects. Time period controls are important because the accounting changes are synchronous (Choudhary, 2007, p.5).”

“An alternative explanation of recognition changes identified is that they are driven by time period effects such as shareholder pressure or changing economic views. In order to address this possibility, I also perform time series tests on firms voluntarily recognizing fair value cost prior to FAS 123-R. Since they already recognize fair values, voluntary adopters are unaffected by FAS 123-R. They serve as a control for mean time period effects that may influence firm's compensation decisions (Choudhary, 2007, p.14).”

Thus, where Brown and Lee developed two proxies to capture effects of shareholder pressure Choudhary included a control group.

#### **3.4.4 Feng and Tian (2009)**

The last study that will be discussed in this section is the study of Feng and Tian (2009). Feng and Tian also studied whether mandatory option expensing led to a decline in the use of stock options.

Feng and Tian began their paper by developing an optimal contracting model that shows that equity-compensation and especially options are negatively related with mandatory recognition of ESO expenses. Based on this model Feng and Tian (2009) determined two hypotheses. The first hypothesis stated that mandatory expensing led to a decline of equity-based executive compensation while the second hypothesis focused on stock options and stated that mandatory expensing led to a decline of ESOs for executives. To come to a conclusion the following model was developed for the sample period 1993-2005 (Feng and Tian, 2009, p. 204). See appendix III for an inscription.

$$\text{COMP}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + (\text{control variables})_{it} + \varepsilon_{it}$$

Feng and Tian used firm size, growth opportunities, leverage, liquidity constraints, corporate taxes, stock return volatility, past stock returns, CEO tenure, and corporate governance as control variables to isolate changes in option expensing caused by the accounting treatment (Feng and Tian, 2009, p. 206). As dependent variable Feng and Tian decided to use the pay-performance sensitivity from Jensen and Murphy's (1990). This variable is estimated by taking the ratio of options granted to total shares outstanding times the Black-Scholes hedge ratio. This measure reflects the change in value of options holdings for a €1000 increase in firm value or the market value of equity. The main argument to use this measure is that it shows the incentive component of options instead of the compensation component. Using this measure thus agrees with their optimal contracting model in the beginning of their paper (Feng and Tian, 2009, p. 196).

To test whether stock option use declined as expected Feng and Tian took the year 2002 as event year. Based on the hypotheses and the aforementioned model that ESO use declined after expensing became mandatory in period two it is expected that  $\beta_2 < \beta_1$ . Indeed the results of Feng and Tian (2009) showed that option use declined since  $\beta_2$  was significantly negative and  $\beta_1$  was significantly positive. Besides the null-hypothesis that  $\beta_1 = \beta_2$  was rejected.

In contrast to the studies of Brown and Lee (2007) and Choudhary (2007) in which 2004 was picked as the event year Feng and Tian (2009) set the year 2002 as the event date.<sup>8</sup> Feng and Tian (2009) motivated their choice on the basis that the FASB announced in 2002 that option expensing will become mandatory within years. Also, firms already prepared for mandatory expensing in 2002 since voluntary expensing of ESOs increased from 11 firms in the beginning of 2002 to more than 170 at the end of 2002. At last, not only the use of options started to change in 2002, also the terms of options contracts started to change in 2002.<sup>9</sup> Feng and Tian (2009) therefore believe that 2002 should be the event year (Feng and Tian, 2009, p. 197).

However, around 2002 there were time-period related happenings that might also explain the decline in options. First, in 2002 the Sarbanes-Oxley Act required firms to disclose more information on options. This could have led to a reduction in option use, because from then

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<sup>8</sup> While Carter et al. (2007) indeed took 2002 as event year they focused on voluntary firms. Therefore, when using voluntary adopting firms it is more logical to use the year 2002 as event year. In contrast, Feng and Tian (2009) used mandatory adopting firms, but also picked 2002 as the event year.

<sup>9</sup> Feng and Tian (2009) showed that firms in 2002 began to accelerate their options dramatically. The percentage of unvested options relative to outstanding options remained flat and around 45% between 1993-2001, but declined steadily during 2002-2005 till 27%.

on firms had to report more extensively on their executive compensation. Since shareholders often do not agree with enormous amounts of compensation paid to executives, firms could have had incentives to reduce option use. Second, around the year 2000 the stock market changed from bull to bear market. As a consequence of the decreased stock prices ESOs became less attractive which also could lead to a decline in their use. At last, regulation against backdating was implemented which made ESOs less attractive and indeed could also have led to a decline of ESOs.<sup>10</sup> While Feng and Tian (2009) controlled for these situations and concluded that these alternative explanations not significantly affected ESO use, these alternative explanations cannot be completely ruled out.

### ***3.4.5 Summary prior models examining the impact of expensing of ESOs***

To summarize, all four studies find a negative relation between ESO expensing and the use of ESOs. While Carter et al. (2007), Brown and Lee (2007), and Feng and Tian (2009) conducted their studies for executive or CEO compensation only Choudhary (2007) also examined changes in ESOs granted to all employees. Consistent with CEO and executive compensation ESOs granted to all employees also reduced as a result of recognition of ESO expenses. However, it is critical to mention that the studies were all performed for US data and therefore their conclusions cannot simply be generalized to Dutch firms. Which model is selected to study the impact of IFRS 2 in The Netherlands will be discussed in chapter four.

In appendix III an inscription of the determinants used in the different models is provided to integrate the studies of Carter et al. (2007), Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009).

## **3.5 Summary and conclusions**

This chapter presented a literature review in which equity-based compensation, the main determinants of ESOs, and models that examined the impact of ESO expensing were discussed. Now, after the institutional background and accounting for ESOs in chapter two and a literature review in chapter three have been provided the following chapter continues with the hypotheses development.

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<sup>10</sup> Following Feng and Tian (2009, p. 223) with backdating "executives manipulate the option grant date to reduce strike prices." Thus, with backdating firms that issue options 'in the money' can claim that they issued them 'at the money' for example.

## 4 Hypotheses development

In chapter three it was shown that the studies of Matsunaga (1995), Core and Guay (1999), Hall and Murphy (2003), Bodie et al. (2003), Carter et al. (2003, 2007), Brown and Lee (2007), Choudhary (2007), and Feng and Tian (2009) all find at least to some extent a link between accounting considerations for ESOs and their use. However, these studies were all conducted for US firms and in contrast to these studies this thesis examines whether there is a negative relation between the implementation of IFRS 2 and ESO use in The Netherlands.

As Hall and Murphy (2003) mentioned, the old accounting approach for ESOs did not reflect the true economic costs of ESOs. While the perceived costs underestimated the true economic costs this resulted in an overuse of ESOs. Also, the relation with the managerial power theory and the fact that the old accounting approach for ESOs allowed executives to camouflage their compensation provides an explanation for the overuse of options. Taking the outcome of prior research in the US, the aforementioned arguments of Hall and Murphy (2003), and the managerial power theory into account a negative relation between the implementation of IFRS 2 and ESO use in The Netherlands is expected.

However, it is critical to point out that there are differences surrounding ESOs between the Dutch and the US setting. First, the use of options as a way to compensate employees is lower in Europe than in the US. This even is the case for the UK, France, and Ireland where relative to other European countries option use is already high. For The Netherlands relative to European countries the use of ESOs is above average. In the Netherlands more than 80 percent of the listed firms used stock options in 2003 (Personeelopties, 2003, p. 26). Based on this, it might look that the amount of ESO use in The Netherlands is not that low relative to the US. However, in the US ESOs are used more broadly. Where in The Netherlands and Europe ESOs are in general only granted by big listed firms for the US this is not the case. Taking into account that the use of options is smaller in The Netherlands than in the US this might contradicts the expectation that in The Netherlands ESO use also declined when the fair value accounting approach was implemented. This can be argued because since in The Netherlands less ESOs are granted, the impact of the new regulations will also be smaller and therefore the decline in the use of ESOs will be less. On the other hand however this study only examines changes in ESO use for Dutch firms that grant relative high amounts of ESOs. Since option use for these firms does not differ significantly from option use in the US a negative relationship can still be expected.

A second difference between the Dutch and the US setting that was already discussed in chapter 2.2 is that in the US under SFAS No. 123 both the intrinsic value approach and the fair value approach were allowed. When firms chose to use the intrinsic value approach they were required to disclose the fair value of ESOs. Thus, before SFAS No. 123(R) was implemented the fair value of ESOs was already, either by recognition or disclosure, known. In contrast, in The Netherlands the fair value of ESOs was not reported prior to IFRS 2. As a result of this it can be concluded that the information asymmetry was higher in The Netherlands on the time IFRS 2 was implemented. Taking this into account in The Netherlands the impact of IFRS 2 might be even higher. Besides, while in the US SFAS No. 123 already removed the possibility to camouflage ESO use, it was not until the implementation of IFRS 2 that the camouflage possibility was removed for Dutch firms completely. Also, this supports the expectation that ESO use declined in The Netherlands after IFRS 2 became mandatory.

At last, it is critical to point out that this study focuses on changes in ESO use for CEOs. How these changes in CEO compensation will be measured is described in chapter five. But besides of only focusing on ESO use for CEO this study will, just as Choudhary (2007) did, also be conducted for total ESOs granted to all employees. This is because, IFRS 2 is expected to influence CEO compensation, because of both outrage costs and the expense-effect. Separating changes in ESOs for the CEO and total employees provides the ability to examine if not only investor sentiments, but also the impact of expensing on earnings led to a decline in ESOs. Linking investor sentiments with CEO compensation is reasonable because an important consequence of the fair value accounting approach is that it makes executive compensation more transparent. As a result of this higher transparency and the fact that high amounts of CEO compensation can generate outrage costs, part of the decline in ESO compensation for CEO is a result of investor sentiments rather than only the impact of expensing on financial statements itself. Yet, both reductions caused by investor sentiments as the financial statement impact are the outcome of the fair value accounting approach and they both reflect the economic consequences of the fair value accounting approach by determining the decline of ESOs. Thus, to examine whether a reduction in ESOs is not only caused by investor sentiments, but also by the impact expensing has on firms' financial statements, changes in ESO use will also be studied for total employees. As a result of this two hypotheses are defined. Besides a hypothesis that examines the impact of IFRS 2 on CEO compensation, a second hypothesis is developed to rule out the possibility that investor sentiments are the only reason for changes in ESOs granted.

Concluded, since the purpose of this paper is to determine whether there is a link between accounting rules for ESOs and the use of ESOs as equity-based compensation in The Netherlands the following two hypotheses are formulated:

Hypothesis 1: Adoption of the fair value accounting approach for ESOs has had a negative influence on the use of ESOs as equity-based compensation for CEOs in The Netherlands.

Hypothesis 2: Adoption of the fair value accounting approach for ESOs has had a negative influence on the use of ESOs as equity-based compensation in The Netherlands.

The hypotheses will, among other models, be tested by a multivariate regression analysis. This is critical with respect to heterogeneity. A multivariate regression analysis controls for variables that take into account other reasons and explanations for a decline or increase in the use of ESOs. After studying the academic literature the determinants that influence the use of ESOs were already identified. Based on this literature review the hypothesized relations between these variables and the use of ESOs are determined. The figure presented below shows these hypothesized relations.

Summary of the hypothesized relations		
Variable	Expected relation	Measure
Investment and growth opportunities	+	See chapter five and appendix IV
Firm size	+	
Firm performance	+	
Debt covenants and leverage	-	
Liquidity constraints	+	
Managerial horizon and CEO tenure	+	
Stock volatility	-	
Ownership structure	-	

## 5 Research design and methodology

### 5.1 Introduction

Now, after hypotheses have been formulated in chapter four this section discusses the research design and methodology that will be used to test these hypotheses. As a consequence this chapter shows which model will be used to test the hypotheses. Besides it is shown how the dependent variable, which measures ESO use, and the proxies used for the control variables that take into account firm-specific factors are going to be measured and how data for both the dependent and independent variables is gathered.

### 5.2 Research model

#### 5.2.1 Model selection

##### 5.2.1.1 Brief overview of differences in institutional background

In chapter three, four studies from Carter et al. (2007), Brown and Lee (2007), Choudhary (2007), and Feng and Tian (2009) that all examined the impact of recognizing ESO expenses in the financial statement by using a fair value approach were elaborated. Although all four studies found that the use of ESOs reduced after firms began to expense options, every study used a different research model, sample, and sample-period to come to their conclusions. Concerning differences in methodology between these studies this chapter shows which model is selected to test the formulated hypotheses and supplementary provides underlying reasons for this selection. However, before discussing the reasons why a particular model is selected, it is critical to shortly point out the differences in the institutional background for ESOs between the US and The Netherlands, as they were given in chapter two again, since these differences have a large impact on the selection of a research model.

While in The Netherlands the fair value approach for ESOs became mandatory in 2005 with the implementation of IFRS 2 *Share-based Payment*, in the US there was an interim period during October 1995 and December 2004 in which SFAS No. 123 allowed firms to either use the fair value approach or the intrinsic value approach to recognize ESO costs. Firms that decided not to use the fair value approach to recognize ESO expenses had to disclose fair value information of ESOs in the notes of the financial statement. Thus, in contrast to The

Netherlands, before expensing of ESOs became mandatory, in the US information on the fair values of ESOs was already known. Besides, in the US, during the interim period a relative large amount of firms that granted ESOs, voluntarily shifted to the fair value accounting approach. In contrast, in The Netherlands, even though the fair value accounting method was allowed to be used before the implementation of IFRS 2, the amount of firms that voluntarily adopted the fair value accounting approach was nihil as in the sample of this study no voluntarily adopters were identified. Consequently, studies conducted for the US could make use of this large group of voluntarily adopters either by using them as control group or by testing the impact of expensing on ESOs granted for the group of voluntarily adopting firms before expensing became mandatory.

#### *5.2.1.2 Selection of a model*

The difference in institutional background between the US and The Netherlands provides one of the main reasons why some of the models discussed were unable to be used to examine the impact of IFRS 2 in The Netherlands. Why this is the case will be elaborated in more detail below. However, the fact that some models are not being picked, does not mean that they will not be used at all. Namely, for determining proxies for the control variables, which were identified in chapter three, all the models are taken into consideration. This is to find the most common ways the control variables are measured.

The model that applies best to the Dutch situation and is therefore selected is the model of Feng and Tian (2009). This is since no voluntary adopting firms are needed to be included as control group and since the model is designed 'to capture a separate trend in two periods before and after an event year' (Feng and Tian, 2009, p. 205). However, this model is not strictly taken over, since other proxies for both the dependent variable and the control variables are used. For example, the study of Feng and Tian (2009) is only performed for changes in ESOs granted to CEOs rather than for changes in ESOs granted to both CEOs and total employees. While there are two hypotheses formulated in chapter four, one that relates to ESOs granted to CEOs and one that relates to ESOs granted to total employees, this study also uses ESOs granted to total employees as dependent variable. How the dependent variable and the control variables are measured exactly will be discussed in later in this chapter.

Now, after the model of Feng and Tian (2009) is selected to measure the impact of IFRS 2 in The Netherlands, arguments why the other three models are not used, will be elaborated.

Firstly, although Carter et al. (2007) developed two models to study the impact of expensing on ESO use neither model is selected. Since the first model of Carter et al. (2007) included proxies for financial reporting concerns instead of including a variable that directly captures whether a firm expensed or not expensed ESOs, this model is not selected. Given that assumptions about ESO use are made and linked to reductions in ESOs, this model does not directly relate expensing of ESOs and ESO use. In fact, this model actually identifies determinants that influence the use of ESOs and does not capture the immediate impact of expensing on ESO use itself. Besides, selecting proxies that measure financial reporting concerns is difficult and subjective and therefore possibly includes an additional risk because of measurement errors. Then, the second model is dropped since this model is not applicable for The Netherlands. The fact that the model of Carter et al. (2007) contains the variable  $EXPENSER_{it}$  that is 1 if firms expenses options in 2002 or 2003 and 0 if not, together with the fact that the firms in the sample of this study does not contain any voluntary adopters explain why this model cannot be used. Thus, because the sample of Carter et al. (2007) included both voluntary adopters of the fair value accounting approach and non-voluntarily adopters, who continued their use of the intrinsic value approach, this variable could be used in their model. However, such differences are not available for the sample of this study and therefore the model is not usable. Nevertheless, only including mandatory adopters has the advantage that self-selection bias problems are avoided.

Second, for the same reason why the first model of Carter et al. (2007) is not picked, the model of Brown and Lee (2007) is not selected. Likewise the model of Carter et al. (2007), Brown and Lee (2007) included proxies that are expected to influence reductions in ESOs rather than measuring the direct impact of expensing. For instance, Brown and Lee (2007) assumed that firms with high earnings-based debt covenants, with usage of ESOs to achieve earnings benchmarks, with weak corporate governance, with high usage of ESOs, and with relative large amounts of accelerated ESOs are more likely to reduce ESO use after expensing them. While a relation between these proxies and reductions in ESO use indicate a linkage between accounting considerations, expensing of ESOs, and ESO use, including these proxies does not measure the impact of expensing on ESO use directly. Given that the purpose of this study is not to identify firm-specific factors that influence changes in ESO use, this model is not selected.

Then, at last while Choudhary (2007), in contrast to Carter et al. (2007) and Brown and Lee (2007), also conducted her study for ESOs granted to non-executive employees and while the study also examined the impact of expensing on firms' estimations needed to calculate the fair value of ESOs using Black-Scholes, the model Choudhary (2007) designed is not

picked. This is also since it is simply not possible to use the model, because the model distinguishes voluntary and mandatory adopting firms. However, despite the fact that the model is not selected the idea to use both ESOs granted to executives and total employees is incorporated into this studies' hypotheses.

A major contribution of Choudhary's study is that it examined changes in contracting terms, instead of only measuring the change in the amount of options granted by looking at firms' estimations of the stock volatility, the dividend yield, and the risk-free interest rate. As will be elaborated more extensively in chapter 5.3, these determinants influence the value of ESOs when determining their fair value with the Black-Scholes model. Since firms need to make expectations for these variables themselves, mandatory recognizing of ESO expenses can provide managers with incentives to adjust their expectations. While Choudhary found that expensing of ESOs indeed influences firms' expectations of the aforementioned variables, this similar research cannot be performed for The Netherlands.<sup>11</sup> This results from the fact that for The Netherlands no data on firms' estimations of the stock volatility, the dividend yield, and the risk-free interest rate is available before the implementation of IFRS 2. Hence, a potential weakness of this study performed for The Netherlands is that not the whole impact of mandatory ESO expensing is captured, because only reductions in ESOs granted are measured. In chapter nine this will be further elaborated.

### **5.2.2 Model specification**

To test the hypotheses developed in chapter four both descriptive statistics and multivariate regression models will be performed.

First, after sampling has been taken place descriptive statistics will be provided. These statistics show for both the dependent variables and the control variables the mean and median for the total sample for every year individually. The purpose of this is to get an impression of the development of ESOs granted during the sample period.

Supplementary to these descriptive statistics a multivariate regression model is developed to test the hypotheses. The main model that will be used is presented below. This model is developed by Feng and Tian (2009).

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<sup>11</sup> Choudhary (2007) found that firms reduced estimations of volatility by 4%, dividend yield by 2%, and risk-free interest rate by 0.3%. Reducing these estimates leads to a decline of the fair value of ESOs and thus to a decline in the amount of ESO expenses that need to be recognized.

$$\text{ESOuse}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + (\text{control variables})_{it} + \varepsilon_{it}$$

In this model  $t$  is the year index (taking values of 1, 2, etcetera),  $i$  is a firm index, and the dependent variable is a measure of ESO use of firm  $i$  in year  $t$ . The following section shows the computation of the dependent variable for both hypotheses precisely. At last, since IFRS 2 became mandatory in 2005 this year is taken as the event year. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t_{2004}$  after 2004. Based on the hypotheses that after the implementation of IFRS 2 the use of ESOs declined it is expected that  $\beta_2 < \beta_1$  and that the null hypothesis  $\beta_1 = \beta_2$  will be rejected.

However, as was stated in chapter 3.2 in The Netherlands there was an increasing believe that ESOs were not an optimal long-term equity-based incentive instrument to compensate CEOs. This trend together with more strict corporate governance is also appointed by Hewitt (2006) as a cause for the decline in ESOs in The Netherlands. Therefore, to control for this possibility additional analyses and robustness checks are being performed to examine ESO use in different years separately. In specific the year 2005 will be isolated, since this is the year expensing became mandatory.

## 5.3 Dependent variable description

### 5.3.1 Introduction

Since the purpose of this thesis is to determine if the use of ESOs has declined the dependent variable should capture the level of ESOs granted. However, the fact that this study is being performed for Dutch firms influences the selection of the dependent variable. As was already mentioned, prior to the implementation of IFRS 2 the fair value of ESOs was not required to be disclosed in The Netherlands in contrast to the US. On the other hand art. 2:383d BW and the Code Tabaksblat required firms to disclose at least to some extent information about their employee remuneration and thus implicitly ESOs. Therefore, selecting the dependent variable is limited by the fact that the fair value prior to IFRS 2 is not known and that the availability of remuneration data is smaller. As a result of this, different measures for the dependent variable to test the hypotheses will be defined. These measures are discussed in section 5.3.3 and 5.3.4. However section 5.3.2 first, again, will briefly explain why both ESOs granted to CEOs and total employees are identified as separable groups.

### **5.3.2 CEO and total employee compensation**

Chapter four already elaborated why both CEO and total employee compensation are used as dependent variables. As separating changes in ESOs for the CEO and total employees provides the ability to examine if not only investor sentiments, but also the impact of expensing on earnings led to a decline in ESOs both measures are used.

The question that remains is why CEO compensation rather than total executive compensation is taken as dependent variable? Multiple reasons for this choice can be named, however two main reasons are conclusive. The first reason is that CEO compensation is broadly discussed in economic literature as a separate, identifiable group in firms' compensation schemes. For example, in chapter three it was shown that outrage costs have a large impact on CEO compensation. Also, in chapter four CEO compensation was separated from total employee compensation to examine whether option expensing has declined because of both investor sentiments and income-effects. Besides, Hewitt (2006) states that stockholders and other stakeholders pay attention to CEO compensation on its own, since CEO compensation is related to the value of a firm. Thus, as CEO compensation has an unique, standalone place in firms' remuneration schemes, it is chosen to examine the impact of IFRS 2 on CEO compensation in specific. The second decisive reason is that the studies from Carter et al. (2007), Brown and Lee (2007), Choudhary (2007), and Feng and Tian (2009), which were discussed in chapter three, use CEO compensation as dependent variable. To make a comparison with these studies it is crucial that in sequence with these studies CEO compensation is used.

### **5.3.3 Amount of ESOs granted**

At first, the dependent variable will be measured by the natural log of the number of ESOs granted in year  $t$  by firm  $i$ . There are two main reasons for this purpose.

First, changing the number of ESOs granted is the most effective and simple way for firms to response to IFRS 2. Namely, when IFRS 2 was implemented firms could react by either reducing the number of ESOs granted, by changing the estimates needed to calculate the fair value of ESOs with the Black-Scholes-Merton model, or by changing the contracting terms. While reducing the number of ESOs granted can be fully controlled by firms and while changing the number of ESOs has, by far, the largest impact on ESO value, it is expected that the impact of IFRS 2 can be observed best by examining the amount of ESOs granted.

Choudhary (2007), who also measured the change in ESO use by the number of ESOs granted rather than their fair value, supports this view and states that using the number of ESOs granted is sufficient, because the number of options is the main determinant of the fair value of ESOs.

Besides, measuring the number of ESOs granted rather than their fair value provides the potential advantage that other factors, which are not under full control of a firm, like the stock price, are left out. Supplementary, also uncertain assumptions about the risk free interest rate, the expected dividend yield, and the stock volatility are not taking into account.<sup>12</sup> Leaving out uncontrollable factors and uncertain assumptions reduces the risk of biases.

Another reason why the amount rather than the value of ESOs is used is the limited data availability, especially for ESOs granted to all employees, to calculate the fair value with the use of the Black-Scholes-Merton model precisely. There are two reasons why the fair value cannot be calculated precisely. Firstly, the risk free interest rate, the expected dividend yield, and the volatility of stock-returns prior to the implementation of IFRS 2 are not always given and assumptions to calculate these determinants need to be made. Secondly, sometimes means instead of precise data for ESOs granted are used. As a result of the limited data availability the Black-Scholes-Merton value of options is only calculated for the period after the implementation of art. 2:383d BW.

In addition to the abovementioned arguments in chapter nine further limitations of the Black-Scholes-Merton model will be given. These limitations also provide reasons why not only the Black-Scholes-Merton value of ESOs should be used as dependent variable.

### **5.3.4 Fair value of ESOs granted**

Besides measuring the dependent variable by calculating the fair value of ESOs granted the dependent variable is also measured by the natural log of the value of ESOs granted in year  $t$  by firm  $i$ . To measure the value of the annual ESOs granted to CEOs and total employees the fair value of ESOs needs to be estimated with the use of the Black-Scholes-Merton model. While for US firms the database ExecuComp consists of data that measure the fair value of options for The Netherlands such database is not available. Thus, data about the fair value of ESOs have to be hand collected by using firms' annual statements. However, for

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<sup>12</sup> As will be shown in chapter 5.3.4 assumptions about the risk free interest rate, the expected dividend yield, and the stock volatility are needed to be made to calculate the fair value of ESOs with the Black-Scholes-Merton model.

some firms on the website <http://www.veb.net/bestuursvoorzitter> data on CEO option compensation is provided. When data is provided for a specific firm this website will be used to gather data on CEO compensation more efficiently.

How the fair value is determined with the use of the Black-Scholes-Merton model is presented below (Bryan et al., 2000, p. 690).

$$\text{Option} = \text{Option}_{\text{share}}N = [Pe^{-dT}\Theta(d1) - Xe^{-rT}\Theta(d2)]N$$

where:

Option <sub>share</sub>	= the per share value of a CEO stock option award
N	= the number of CEO stock options granted each year during the test period
P	= the stock price on the date of CEO stock option grants
X	= the exercise price of CEO stock options
d	= the expected dividend yield over the life of the options
r	= the risk-free rate
σ	= the expected stock return volatility
T	= the time to expiration set
Θ	= the cumulative normal distribution function
d1	= $[\ln(P/X) + (r - d + 0,5\sigma^2)T] / \sigma T^{1/2}$
d2	= $[\ln(P/X) + (r - d - 0,5\sigma^2)T] / \sigma T^{1/2}$

Thus, to estimate the fair value with the Black-Scholes-Merton model detailed information about ESOs granted must be known. While the number of ESOs granted, the exercise price of the ESOs, and the price of the underlying stock are not hard to gather for CEO options, for ESOs granted to total employees the exercise price is often not precisely provided in firms' financial statements. This is a result of the fact that most firms grant different types of ESOs to different groups of employees and consequently do not disclose individual data for all these different types of ESOs. Instead they provide means of these determinants. When means are indeed provided in the financial statement they will be used, if not a weighted average will be calculated. Therefore, the Black-Scholes-Merton value, or the fair value, for ESOs granted to CEOs can be determined more precisely than the fair value of ESOs granted to total employees.

In addition, when calculating the Black-Scholes-Merton value of ESOs the time to expiration is needed to estimate their value. However, in this thesis not the time to expiration, but the

total life time of ESOs granted is used. This is, since the time to expiration is uncertain and therefore open to manipulation. Thus, to control for the possibility that firms underestimated the remaining life of ESOs to reduce ESO expenses, it is chosen to use ESOs’ total life rather than their expected remaining life time. Besides, prior to IFRS 2 estimations of the remaining life are not always provided in firms’ financial statements, which provides another reason for the use of the total life time of ESOs. Nonetheless, while ESOs are often exercised before the expiry date this can lead to an overestimation of their value.

Then, for ESOs granted to both CEOs and total employees the risk free interest rate, the expected dividend yield, and the stock volatility are market conditions and assumptions need to be made before the fair value of granted ESOs can be estimated. Before these assumptions are made it is critical to point out that the purpose of calculating the fair value is not to measure the exact recognized amount of ESOs for every company individually, but to determine if ESO use is changed. Therefore for every company in the sample assumptions for the three unknown determinants rather than firms’ expectations for the unknown determinants will be used. Besides, using pre-determined rather than firms’ own assumptions has the additional advantage that firms’ own expectations are not taken into account. While executives might have incentives to change the fair value of ESOs and since the determinants are open to manipulation the change in option use is not isolated when firms’ own expectations are used.

For the risk free interest rate, the expected dividend yield, and the volatility of stock-returns the table presented below shows the applied assumptions. The calculation of the ESO value by means of the Black-Scholes-Merton model will be performed by using an option calculator that is available on the website <http://www.nbsc.co.uk/services/blackscholes>.

Assumptions Black-Scholes-Merton model												
Abbreviation	Variable	Assumption										
r	Risk-free rate	<p>Year-end nominal interest rate of zero coupon bonds with a 5-year lifetime as is stated by the DNB. Lifetime is based on the average lifetime of the sample, which is 5,36 years.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Nominal interest rate</th> </tr> </thead> <tbody> <tr> <td>2002</td> <td>3.675</td> </tr> <tr> <td>2003</td> <td>3.717</td> </tr> <tr> <td>2004</td> <td>3.160</td> </tr> <tr> <td>2005</td> <td>3.210</td> </tr> </tbody> </table>	Year	Nominal interest rate	2002	3.675	2003	3.717	2004	3.160	2005	3.210
Year	Nominal interest rate											
2002	3.675											
2003	3.717											
2004	3.160											
2005	3.210											

		<table border="1"> <tr> <td>2006</td> <td>4.122</td> </tr> <tr> <td>2007</td> <td>4.553</td> </tr> <tr> <td>2008</td> <td>3.261</td> </tr> </table>	2006	4.122	2007	4.553	2008	3.261
2006	4.122							
2007	4.553							
2008	3.261							
d	Expected dividend yield over the life of the options	= $\frac{\text{Annual dividend per share}}{\text{Price per share at year-end}}$						
$\sigma$	Expected stock return volatility	The stock price volatility using Thomson One Banker						

### 5.3.5 Summary

This section described how the dependent variable is determined and it was shown that both the number of ESOs granted and the fair value are used as dependent variables. Data for these dependent variables need, for the larger extent, to be hand collected. However, for CEO remuneration the website <http://www.veb.net/bestuursvoorzitter> will be used. For both dependent variables the natural log will be used to reduce the impact of outliers.

## 5.4 Independent variables description

As is mentioned earlier in chapter three and four control variables are included in the model to control for firm-specific characteristics that also influence ESO use. The model controls for investment and growth opportunities, firm size, firm performance, debt covenants, liquidity constraints, managerial horizon, stock volatility and the ownership structure. Since these variables also influence the use of options and to isolate the effect of changes in the accounting approach it is critical that these variables are included. The figure stated below presents how these variables are going to be measured and their abbreviations.

Written out the control variables the multivariate regression model is as follows:

$$\begin{aligned}
 \text{ESOuse}_{it} = & \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Performance}_{it} \\
 & + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \beta_8 \text{CEOTenure}_{it} + \beta_9 \text{Volatility}_{it} + \\
 & \beta_{10} \text{Ownership}_{it} + \epsilon_{it}
 \end{aligned}$$

Data for the control variables is largely subtracted from the database Thomson One Banker. However, when for specific firms in the sample data is not provided by Thomson One Banker additional databases and annual reports of these firms will be used. To see how the data is gathered with the use of the database Thomson One Banker appendix IV provides a schedule that shows for every control variable individually how it is computed.

Summary of the hypothesized relations			
Variable	Abbreviation	Expected relation	Measure
Investment and growth opportunities	Investment <sub>it</sub>	+	Market-to-book ratio ((market value of equity + book value of debt)/total assets) at end of year <i>t</i> for firm <i>i</i>
Firm size	Size <sub>it</sub>	+	Natural log of total assets at end of year <i>t</i> for firm <i>i</i>
Firm performance	Performance <sub>it</sub>	+	Return on assets (ROA) of year <i>t</i> for firm <i>i</i>
Debt covenants and leverage	Leverage <sub>it</sub>	-	Book value of total debt/ Book value of total assets at end of year <i>t</i> for firm <i>i</i>
Liquidity constraints	Liquidity <sub>it</sub>	+	Three-year average over <i>t-3</i> to <i>t-1</i> of sum of ((common and preferred dividends + cash flow used in investing activities - cash flow generated from operations)/ total assets) for firm <i>i</i>
Managerial horizon and CEO tenure	CEOtenure <sub>it</sub>	+	Number of years a CEO is in position at end of year <i>t</i> for firm <i>i</i>
Stock volatility	Volatility <sub>it</sub>	-	Standard deviation of 24 monthly stock returns prior to year <i>t</i> for firm <i>i</i>
Ownership structure	Ownership <sub>it</sub>	-	Percentage of common shares owned by the CEO at end of year <i>t</i> for firm <i>i</i>

## 5.5 Summary

The purpose of this section was to show how the hypotheses that are formulated in chapter four are going to be tested. After the sample selection process has been described in the following section the main findings are presented in section seven. However, robustness checks and additional tests will take place to test the main findings and to provide more in-depth explanations for the main findings. How these robustness checks and additional analyses will look like will be discussed in section eight.

## 6 Sample

### 6.1 Introduction

This chapter provides an overview of the sample that is selected. Both data requirements that must be met before a firm is included in the final sample and underlying reasons for the sample-period are discussed. In appendix V the results of the sample selection process are presented in a table.

### 6.2 Data requirements

As is already mentioned this study will be conducted for Dutch listed firms. Firms are only included in the sample when the following data requirements are met:

- the firm is listed on the AEX, the AMX, or the AScX;
- the firm has a Dutch seat or has significant managerial reporting activities in The Netherlands and refer to Dutch GAAP and/or the Corporate Governance Code in their annual reports;
- prior to IFRS 2 the firm granted ESOs;
- prior to IFRS 2 the firm reported specific information on ESOs in their annual statements;
- the firm was a mandatory adopter of IFRS; and
- data for the proxies of the control variables are available.

As is shown a firm prior to IFRS 2 had to report information on ESOs. For The Netherlands, because regulation required firms to disclose certain information on ESOs it is expected that most firms indeed report on ESOs. Because for Dutch firms no database that contains data on ESOs granted exists, this data have to be hand collected from firms' annual statements. Besides, voluntary adopters are not included in the sample since they are expected to have already adapted their remuneration schemes.

The original sample consists of 75 active listed firms on either the AEX, the AMX, or the AScX. From this sample 34 firms were not included in the final sample, because they lack data or did not grant ESOs during the implementation of IFRS 2. The table presented on the following page provides a systematic overview of the sample selection process and table V in the appendix shows all the firms included in the original sample and the final sample.

Sample selection				
Criteria	Number of firms			
• Firms selected (AEX, AMX, AScX)	<b>75</b>			
	<i>AEX</i>	<i>AMX</i>	<i>AScX</i>	
• Less: firms not included in final sample				
- Lack of data	3	2	4	9
- Foreign firm that do not refer to Dutch GAAP and/or the Corporate Governance Code	-	1	2	3
- No ESOs granted	7	7	8	22
- Voluntary adopter	-	-	-	-
	<i>10</i>	<i>10</i>	<i>14</i>	
→ Total amount of firms not included in the sample				<b>34</b>
• Final sample	<b>41</b>			

### 6.3 Sample-period

While Dutch firms are required to report information on ESOs as stated in art. 2:383d BW, art. 2:383d BW was not implemented until September 2002. Therefore, since often, prior to 2002, no specific information about ESOs granted in firms’ financial statements is provided, it is more difficult to obtain specific information about ESOs before art. 2:383d BW was implemented. As a result, only for the period 2002 till 2007 both the amount and fair value of ESOs granted to employees and to CEOs will be calculated. Though, as a robustness check data about the amount of ESOs granted to CEOs in the years 2000 and 2001 will also be gathered. This is to obtain a better insight into the movement and trend of ESOs granted to CEOs and to examine whether indeed a significant permanent change in ESO compensation can be observed.

However, to reduce the possibility that other time-related issues influence the outcome of the model most weight will be placed on the multivariate regression model that is drafted for the period 2002-2007. As was said, the reason to leave out years prior to 2002 concerns difficulties to calculate the fair value of ESOs granted prior to the implementation of art. 2:383d BW in 2002. Then, the year 2008 is left out of the main sample-period, because the impact of IFRS 2 is expected to have little impact in that year, while firms are expected to have already adapted their remuneration schemes in previous years. Besides, with respect to symmetry in the sample-period it is chosen to examine a three year period before and

after the implementation of IFRS 2. In addition to this, for the amount of ESOs granted to CEOs the years 2000, 2001, and 2008 will also be studied.

#### **6.4 Summary and conclusions**

Concluding, the final sample consists of 41 firms that are listed on either the AEX, the AMX, or the AScX. For these firms, data about the amount and fair value of ESOs granted to both CEOs and total employees is collected for the years 2002 till 2007. Supplementary, for CEO compensation also the amount of ESOs granted for the years 2000, 2001, and 2008 will be gathered.

## 7 Findings

### 7.1 Introduction

Now, after the institutional background and a literature review concerning ESOs are provided and the research design, the methodology and the sample are elaborated, this chapter discusses the main outcomes of the study. At first, CEO compensation will be examined, since CEO compensation stands central in this thesis. Both descriptive statistics and the results of the research model will be performed, to draw a first conclusion. Thereafter, to see whether changes in ESOs granted, if any, are also caused by the effect expensing has on firms' results, total employee compensation will be studied. Here, also descriptive statistics and the results of the research model will be provided.

In addition, to support the conclusions drawn in this chapter robustness checks and additional analyses will be carried out. In chapter eight the outcomes of these tests are shown.

### 7.2 CEO compensation

#### 7.2.1 Introduction

In this section the first and main hypothesis of this thesis, which studies changes in CEO compensation, will be tested. As was stated in chapter four, hypothesis one is as follows:

Hypothesis 1: Adoption of the fair value accounting approach for ESOs has had a negative influence on the use of ESOs as equity-based compensation for CEOs in The Netherlands.

Thus, the implementation of IFRS 2 is expected to have had a negative impact on the use of ESOs for CEOs. While CEO compensation takes a special place in firms' remuneration schemes, both outrage costs and the effect IFRS 2 has on firms' results are expected to cause this effect. To see whether mandatory expensing indeed negatively influenced ESO use, in this section the outcomes of the study are discussed.

### 7.2.2 Descriptive statistics

In appendix VI descriptive statistics for the dependent variables that measure ESOs granted to CEOs for the period 2002 to 2007 are shown. Since the dependent variable is measured by the amount and the fair value of ESOs granted, in panel A, B, and C the means and medians of both measures are provided. By simply observing the figures and tables for the amount of ESOs granted as well as the fair value of ESOs granted, a steep decline in the year 2005 can be observed. While 2005 is the year IFRS 2 became mandatory, observing this steep decline supports the expectation that IFRS 2 indeed has had a negative impact on ESO use.

In addition to panel A, B and C, panel D of appendix VI shows the outcomes of the Wilcoxon signed-rank tests. The Wilcoxon signed-rank test is a non-parametric test that is used to compare the amount and fair value of ESOs granted to CEOs between two different years. A non-parametric test is used, because the amount and value of ESOs granted in different years is not normally distributed.

Having performed the Wilcoxon signed-rank test for differences in the amount of ESOs granted in separate years, the differences between the year 2004 and 2005 and 2005 and 2006 are significant at a significance level of 1% and 10% respectively. Since both tests are based on a positive rank, it can be concluded that there was a significant decrease in the amount of ESOs granted from 2004 to 2005 and from 2005 to 2006. Supplementary a second Wilcoxon signed-rank test was performed for the amount of ESOs granted by comparing the period before and after the implementation of IFRS 2. As the test was based on a positive rank and as the outcome is significant at a 1% level, it is allowed to state that the amount of ESOs granted significantly decreased in the period after expensing became mandatory.

Then, as panel D of appendix VI shows, for the value of ESOs granted the Wilcoxon signed-rank test per year only is significant for the difference between 2004 and 2005. In contrast, the difference between the year 2005 and 2006 is not significant. This can be explained by the fact that to calculate the fair value the exercise price, the time to expiration, the price of the underlying stock, the risk free interest rate, the expected dividend yield, and the stock volatility of an ESO must be known. However, since assumptions are needed to be made to estimate the value of some determinants and while calculating the Black-Scholes-Merton value is subjected to biases (see also chapter nine), the outcomes of the Black-Scholes-Merton model should be taken in with consideration. Nevertheless, when comparing the

period before and after IFRS 2 was implemented with the help of the Wilcoxon signed-rank test, in corresponds with the amount of ESOs granted, a significant decrease is found for the period after the implementation of IFRS 2.

Additionally, while data for the amount of ESOs granted to CEOs is also gathered for the years 2000, 2001 and 2008, in panel E these years are included. Including these years is necessary to obtain a better insight into the movement and trend of ESOs granted to CEOs and to examine whether the change in ESO compensation is significant and permanent. In the end, the outcomes of both the charts and the Wilcoxon signed-rank tests indeed provide additional support that the decline in ESOs granted is permanent. This is, because a clear distinction, which appears to be stable and lasting, in the amount of ESOs granted before and after the implementation of IFRS 2 in 2005 is visible.

Ultimately, based on the descriptive statistics a significant decrease in ESO use for CEOs after the year 2004, with the year 2005 in particular, is revealed. This provides a foundation for the expectation that the impact of IFRS 2 on ESO use was negative and significant.

### 7.2.3 Multivariate regression

To further examine the conclusions drawn on the basis of the descriptive statistics the following research model for both the natural logarithm of the amount and fair value of ESOs granted was drafted for the period 2002 till 2007:

$$\text{ESO use for CEOs}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Performance}_{it} + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \beta_8 \text{CEOTenure}_{it} + \beta_9 \text{Volatility}_{it} + \beta_{10} \text{Ownership}_{it} + \varepsilon_{it}$$

The outcomes of the research models are provided in appendix VII. In panel A, first, descriptive statistics of the independent variables are shown. Subsequently, the results of the regression models for the amount and value of ESOs plus the outcomes of the Wald tests are presented in panel B and C. Below the results are discussed for every variable separately and as the findings are more or less similar for the ESO amount and the ESO value their results will be discussed simultaneously.

### 7.2.3.1 Time-related variables and the Wald test

At first, the time-related variables and the outcomes of the Wald test are studied, since these are the main determinants that examine whether IFRS 2 negatively influenced ESO use for CEOs.

After running the regressions, for both the amount and value of ESOs granted the coefficient  $\beta_2$ , which relates to the variable TL2, is significantly negative. This indicates that after 2004, and thus after the implementation of IFRS 2, ESO use declined. For the period prior to IFRS 2 both models found a small positive coefficient for the determinant TL1. However, this determinant is only significant at a 10% significance level for the amount of ESOs granted. Nevertheless, the fact that  $\beta_2$  is significantly negative supports the conclusion made in section 7.2.2 that ESO use indeed declined after IFRS 2 was implemented

After, concluding that the coefficient of TL2 is significant negative, it should be examined whether the difference between  $\beta_1$  and  $\beta_2$  is significant. Therefore a Wald test is performed. Based on the expectations made in chapter five it is expected that  $\beta_1 > \beta_2$  and that the null hypothesis  $\beta_1 = \beta_2$  is rejected. With the use of Eviews the null hypothesis for both the ESO amount and the ESO value is indeed rejected at a 1% significance level for both models. These outcomes prove that the difference in ESO use, before and after the implementation of IFRS 2, is significant.

Complementary to the outcomes for the regressions that were run for the period 2002 till 2007, a third regression model is drafted for the amount of ESOs granted to CEOs for the period 2001 till 2008. The year 2000 is left out to accomplish symmetry in the sample period by including an equal number of years prior and after IFRS 2 became mandatory. The outcomes of this regression are presented in panel D of appendix VIII. As appendix VIII shows, the outcomes correspond with those of the regression model that is drafted for the period 2002 till 2007. Thus, it is found that  $\beta_1$  is significant positive, that the coefficient  $\beta_2$  is significant negative, and that the Wald test rejects the null hypothesis  $\beta_1 = \beta_2$ . Besides, while the significance values were even smaller when more years were included, this strengthens the conclusions made above.

All in all, the descriptive statistics of section 7.2.2 together with the outcomes of this sections' research model provide conclusive evidence to state that the first hypothesis, which expected that IFRS 2 has had a negative impact on ESOs granted to CEOs, is fulfilled. To support this statement, in chapter eight robustness checks and additional analyses will be performed. In this chapter, among others things, substitution away from ESOs towards other

types or long-term equity-based compensation and differences between firms listed on the AEX, AMX, and AScX will be examined. Besides, in chapter eight also a comparison with the outcomes of the four studies, which were discussed in section 3.4, will be provided.

#### *7.2.3.2 Investment and growth opportunities*

Based on the literature review in chapter three, the expectation was that investment and growth opportunities are positively related with ESO use. This expectation is related to the agency theory and the fact that CEOs have more and better inside information than stockholders of a firm. And while in fast growing firms it is more difficult for stockholders to monitor all investment decisions that are made, CEOs' interests are aligned with those of the stockholders. Or in other words, to ensure that CEOs make decisions that are in stockholders' best interests, CEO compensation is linked to shareholder value.

The outcomes of the regression model confirm that there is a positive relation between investment and growth opportunities and ESO use. Namely, in panel B and C of appendix VII in both models the variable 'Investment', that captures investment and growth opportunities, is significantly positive at a 5% level.

#### *7.2.3.3 Firm size*

Also, for firm size a positive relation was expected. The arguments that underlie this expectation are more or less similar to the arguments provided for investment and growth opportunities. Just as with fast growing firms, for large firms it is also difficult for stockholders to obtain honest and sufficient information. As a result, it is supposed that large firms make more use of equity-based compensation, and thus ESOs.

In the end, both models validate the expectation made as the variable 'Size' is positive at a 1% level for both models.

#### *7.2.3.4 Performance*

Previous research of for example Murphy (1985), Carter et al. (2007), and Feng and Tian (2009) found that better performing firms, more often remunerate CEOs with equity-based

compensation. This study supports this relation as the variable 'Performance' is positive at a 5% and 1% significance level for the amount and fair value of ESOs granted respectively.

#### *7.2.3.5 No significant relationships*

While for the time-related variables, for investment and growth opportunities, for firm size, and for firm performance significant relationships were found for the remaining variables this was not the case.

First, the determinant 'Leverage' is not significant. Based on previous literature a negative relationship was expected since more leveraged firms are supposed to have incentives to decrease ESO use with the purpose to eliminate or reduce agency costs that are related with debt holding. Despite this, no such relation is identified. A possible explanation can be the fact that the measure of the variable 'Leverage', which is the debt-to-asset ratio, does not truly capture firms' debt constraints. This is because this measure only shows how leveraged a firm is rather than that the terms of firms debt contracts are included. Whereas, other factors also influence firms' bargaining power and thus the tightness of the debt covenants and while some contracts are more closely linked to earning-based covenants than others, including the terms of debt covenants perhaps could have led to a significant relationship. Above that, the tightness of the debt covenants are based on negotiations that took place in the past. Hence, it can be stated that measuring firms' recent leverage ratios is not effective. Thus, as the tightness of debt contracts is related to the level of agency costs and consequently ESO use, the fact that the measure is not very detailed and specific might be an explanation why no significant relationship was found.

However, due to the fact that measuring this variable by examining firms' debts contracts is very time-consuming, that limited data availability sometimes makes it impossible to measure debt constraints and that measuring this variable precisely is not a critical part of the research question it is chosen not to include another, more detailed, measure. Besides, in general, to some extent the debt-to-asset ratio does give insight into firms' bargaining power and therefore their tightness of debt covenants.

Secondly, for liquidity constraints as well no significant relationship held. While ESOs do not lead to an outlay of cash on the moment they are granted, it is often assumed that firms that face liquidity constraints grant more ESOs relative to firms that do not. As was said, this study does not confirm this relationship. How this can be explained is difficult. A cause can

be that, in fact, ESO use and liquidity constraints are only positively related as far as it concerns new firms. This can be motivated as follows. As, for young firms it is acceptable that they face liquidity constraints, CEOs and other employees, are willing to accept ESOs, because they expect the ESOs to rise in the future. In contrast, for older firms that are facing liquidity constraints and are not able to pay CEOs and other employees, being compensated with ESOs is less attractive. Therefore, as this effect influences the relation between liquidity constraints and ESO use the other way around, having two counteracting effects might be the explanation why no significant relationship was found. Besides, while firms often have remuneration committees, which do not include liquidity constraints as determinant when developing remuneration schemes, it is not strange that no relationship was found. Namely the main purpose of these committees is to obtain remuneration schemes that provide optimal incentives. Further, in addition to the aforementioned explanations, simply the fact the sample only included 41 firms can be explanation.

Thirdly, the variable 'CEOtenure' is not significant. This variable captures the effect between managerial horizons and ESO use. In chapter three it was already described that, in academic literature, there is no consensus concerning the relationship between CEO tenure and ESO use. In this study the expectation was made that there is a positive relationship between CEO tenure and ESO use. However, as was said, in the end no significant linkage was identified. This can be clarified by the fact that for almost all firms of the sample at least one CEO turnover took place, which could have distorted the outcomes. In supplement to this, the fact that the sample included only 41 firms and that only six years were observed, might also provide reasons.

Fourth, stock volatility was expected to be negatively related to ESO use as a result of the informativeness principle developed by Holmstrom (1979). Nevertheless, this relationship was not observed.

At last, ownership structure is not significant while a negative relationship was anticipated. However, the variable 'Ownership' only measures the percentage of common stocks held by the CEO. Yet, nowadays a substitution effect from ESOs towards other types of equity-based compensation is visible. As a result, while ESO use is more related with, for example, restricted shares than with common shares this can be an explanation for the fact that no significant relation was found. In chapter eight, the results of additional analyses in which substitution away from ESOs is studied, are discussed.

## 7.2.4 Summary and conclusion

The first and main hypothesis of this thesis examines whether IFRS 2, which made expensing of ESOs mandatory, has had a negative impact on the use of stock options as equity-based compensation in The Netherlands for CEOs. While for the US, studies of Carter et al. (2007), Brown and Lee (2007), Choudhary (2007) and Feng and Tian (2009) all showed a significant negative relationship between option expensing and ESO use for CEOs, for The Netherlands no such study was performed. Although a report of Hewitt (2006) already identified IFRS 2 as explanation for the fact that ESOs were becoming less popular in The Netherlands, this study actually provides evidence that this is indeed the case. Based on the descriptive statistics and the research models decisive evidence is given to conclude that ESO use for CEOs had declined. However, to strengthen the outcomes of the study and to obtain a more detailed view on changes in CEO compensation, chapter eight shows the results of robustness checks and additional analyses.

In supplement to hypothesis one, a second hypothesis that examined ESOs granted to total employees was developed. The purpose of this is to separate outrage costs and the expense-effect as causes for a decline in ESOs after the implementation of IFRS 2. Now, to see whether not only CEO compensation but also total employee compensation was negatively affected by the implementation of IFRS 2, section 7.3 continues with examining ESO use for total employees.

## 7.3 Total employee compensation

### 7.3.1 Introduction

While the aim of this section is to test hypothesis two, ESOs granted to total employees rather than to CEOs in specific is studied. Below hypothesis two is shown:

Hypothesis 2: Adoption of the fair value accounting approach for ESOs has had a negative influence on the use of ESOs as equity-based compensation in The Netherlands.

As was said, this second hypothesis is developed with the purpose to examine whether a reduction in ESOs is not only caused by investor sentiments, but also by the impact expensing has on firms' financial statements. Below the outcomes of the tests that were performed will be discussed.

### 7.3.2 Descriptive statistics

Firstly, to test hypothesis two in appendix IX descriptive statistics of both the amount and value of ESOs granted to total employees for the period 2002 till 2007 are shown. In panel A the mean and median of both measures are provided and in addition to this, panel B and C show line charts and bar charts to get an impression of changes in the amount and value of ESOs granted. From these charts, in agreement with ESOs granted to CEOs, a decline in ESO use after 2004 can be identified. To test whether the decline in ESO use was indeed significant, the outcomes of Wilcoxon signed-rank tests are studied and elaborated.

After studying the results of the first Wilcoxon signed-rank test that examined differences in the amount of ESOs granted between separate years, for the year 2005 a significant outcome was found (see panel D). As this outcome was based on a positive rank, the assumption that there was an increase in the amount of ESOs granted in 2005 is rejected. Hence, it is allowed to state that the amount of ESOs granted in 2005 declined relative to the year before. In addition to observing differences per year a second Wilcoxon signed-rank test is performed that examined the period before and after IFRS 2 was implemented. This test proves that IFRS 2 has had a negative impact as the outcome of the test is based on a positive rank and is significant at a 1% level.

Supplementary, the same Wilcoxon signed-rank tests are used to test changes in the value of ESOs granted to total employees. While in the charts a decline can be observed, in contradiction to the amount of ESOs granted the outcomes of the Wilcoxon signed-rank test, which calculated differences in the value of ESOs per year, are not significant. Thus, in contrast to the amount of ESOs granted the decline in 2005 was not significant. However, as was already stated the outcomes of the Black-Scholes-Merton model should be taken in with consideration. This is since uncertain and influenceable assumptions have to be made before the fair value can be calculated, since the Black-Scholes-Merton model by itself faces limitations, and since, for firms, uncontrollable factors also influence the fair value of ESOs. As the year 2005 was not significant at an 11.5% level, the possibility that the outcome changed in the other direction if other assumptions were made or if another model was used, is present. As a result, less weight is placed on the fair value of ESOs granted. Moreover, as the outcome of the second Wilcoxon signed-rank test proves that there is indeed a significant decline in ESO use between the period before and after the implementation of IFRS 2, the conclusion that IFRS 2 has had a negative impact still holds.

All in all, in conformity with CEO compensation, for ESOs granted to total employees IFRS 2 also has had a negative impact.

### 7.3.3 Multivariate regression

In addition to the descriptive statistics the following multivariate regression was drafted for the natural logarithm of both the amount and value of ESOs granted to total employees for the period 2002 till 2007:

$$\begin{aligned} \text{Total ESO use}_{it} = & \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \\ & \beta_5 \text{Performance}_{it} + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \\ & \beta_8 \text{CEOTenure}_{it} + \beta_9 \text{Volatility}_{it} + \beta_{10} \text{Ownership}_{it} + \varepsilon_{it} \end{aligned}$$

The outcomes of the research models are presented in appendix X. Below these outcomes for both regressions models are elaborated concurrently.

#### 7.3.3.1 Time-related variables and the Wald test

The variables that were observed in this part of section 7.3 are the variables ‘TL1’ and ‘TL2’ as these variables are related to the impact of IFRS 2. For both regression models, of which the outcomes are provided in appendix X, the variable ‘TL2’ is significantly negative at a 1% level, indicating a decline in ESO use after the implementation of IFRS 2. In contrast, for the period prior to IFRS 2 no significant relationship is found.

To test the expectation that IFRS 2 led to a decline in ESO use after IFRS 2 became mandatory, the null hypothesis  $\beta_1 = \beta_2$  is tested with the use of Eviews. It is expected that  $\beta_1 > \beta_2$  and that the null hypothesis  $\beta_1 = \beta_2$  will be rejected. The outcomes of the Wald tests show, for both the amount and value of ESOs, that the null hypothesis is indeed rejected.

Therefore, after having studied the regression models that were drafted for total employee compensation, the second hypothesis is, just as hypothesis one, fulfilled.

### 7.3.3.2 Other variables

In section 7.2 of this chapter the relationships and significance of the other variables, that were expected to also influence ESO use, were already elaborated. While for the larger part the outcomes of this sections' regression models are similar to those of the regression models drafted in section 7.2, for the variable 'Performance' the outcomes differ. Namely, the regression models for CEO compensation found a significant positive relationship between firm performance and ESO use, but for ESOs granted to total employees no such relationship is identified. A possible explanation for this difference can be found in the fact that ESOs granted to total employees are more strongly related to retention than to the incentive effects ESOs cause. As a result, ESOs granted to total employees are less strongly linked to firm performance and consequently no significant relationship is found. A study of Oyer and Schaefer (2005) supports this explanation, while their study proved that ESOs are not granted to total employees with the purpose of aligning incentives, but with the purpose of sorting and retention. In addition to this, another argument can be that it is more difficult to develop effective ESO schemes that relate performance and compensation for broadly-based ESO plans than it is for ESOs granted to CEOs.

### 7.3.4 Conclusion

In agreement with CEO compensation total employee compensation is also significantly negatively affected by the implementation of IFRS 2. As the purpose of studying the impact on ESOs granted to total employees was to examine the two main causes why ESO use was expected to be reduced after expensing became mandatory, it is proven that indeed not only outrage costs, but also the income-effect contributed to the decline in ESO use.

However, as the significance levels of the results on which conclusions were based, are larger for employee compensation, it can be concluded that the impact of IFRS 2 on total employee compensation was less. This can be explained by the same argument that was given in section 7.3.3 as explanation for the fact why firm performance and ESO use for total employees were not related. Namely, assuming that CEOs are primarily provided with ESOs with the purpose to align their incentives and that there was a growing general belief that ESOs were not optimal to align CEOs' incentives, this also negatively affected ESO use. In contrast, total employee compensation is expected to be less affected by this negative trend as lower level employees were mainly compensated with ESOs for the purpose of employee retention rather than aligning incentives (Oyer and Schaefer, 2005). As a result of this, the

fact that CEO compensation declined more is not extraordinary. Besides, another, to some extent related, explanation is the fact that CEO compensation is exposed to outrage costs. As IFRS 2 makes ESOs granted to CEOs more transparent, reluctance of the public is also likely to have impacted ESOs granted to CEOs negatively.

Nevertheless, as the outcomes for total employee compensation are indeed significant, the conclusion that IFRS 2 has had a negative impact on ESOs granted to total employees too still holds.

## **7.4 Summary and conclusions**

After studying changes in the amount and value of ESOs granted to both CEOs and total employees, the research question that stood central in this thesis can be answered. The research question was defined as follows:

Has the adoption of the fair value accounting approach for ESOs had a negative impact on the use of ESOs as equity-based compensation for both CEOs and total employees in The Netherlands?

Although this question was already answered for the US, for The Netherlands this was not the case. In end, the results of this study, which were elaborated in section 7.2 and 7.3 show that IFRS 2 indeed has had a negative impact on both CEO compensation and total employee compensation in The Netherlands.

## 8 Robustness and additional analyses

### 8.1 Introduction

This chapter is an extension of chapter seven as robustness checks and additional analyses that were made in addition to the outcomes presented in chapter seven are elaborated. This chapter starts with briefly discussing the outcomes of robustness checks. Thereafter, the results of additional analyses are provided.

### 8.2 Robustness checks

The first robustness checks, which are provided in appendix XI in panel A and B, examine the correlation matrixes of the regression models developed in chapter seven, to test for multicollinearity. As all matrixes show no substantial correlation between the predictors of the models, this proves that there are no problems concerning multicollinearity and that all predictors represent separate factors that influence ESO use.

Then, in addition three other types of robustness checks were performed to support the conclusions made in chapter seven. The results of the robustness checks are shown in panel B, C, and D of appendix XI.

At first, in panel B the outcomes of Wilcoxon signed-rank tests that compare the period before and after the implementation of IFRS 2 by shifting the event year to 2004 are provided. As the outcomes are not significant when the event year is shifted to 2004, this supports the conclusion that IFRS 2 has had a negative influence on ESO use.

Secondly, for the regression models instead of the variables 'TL1' and 'TL2', a dummy for the year 2005 is included to see whether the year 2005 played a significant role with respect to changes in ESOs granted to CEOs and total employees. In panel C the results are presented and indeed for both models negative coefficients are found, that are significant at a 10% level.

Thirdly, in panel D it is tested whether the value of ESOs granted to CEOs relative to their fixed salaries declined. By observing whether ESOs were granted less relative to CEOs' fixed salaries proves that ESOs were indeed becoming less popular rather than that it was the outcome of decreasing CEO compensation on the whole. As panel C shows, in

corresponds with the conclusions made in chapter seven, a significant decrease is found for both the year 2005 and for the whole period after IFRS 2 was implemented.

All in all, the robustness checks strengthen the outcomes of this study.

## **8.3 Additional analyses**

### **8.3.1 Introduction**

In this section two different additional analyses will be elaborated. First, in section 8.3.2 a brief comparison of the results of this study with the results of the four studies of Carter et al. (2007), Brown and Lee (2007), Choudhary (2007), and Feng and Tian (2009) will be provided. Thereafter, additional analyses that were performed to obtain a better insight into changes in and substitution effects of CEO compensation are discussed in section 8.3.3. Changes in ESO use and substitution towards other types of long-term incentive plans are observed after the sample had been divided into three groups based on firms' listing classifications on either the AEX, the AMX, or the AScX.

### **8.3.2 Comparison with prior studies**

In section 3.4 of chapter three, four studies that all examined the impact of ESO expensing on their use were discussed. As was said the studies of Carter et al. (2007), Brown and Lee (2007), Choudhary (2007), and Feng and Tian (2009) all proved that ESO expensing has had a negative impact on ESO use.

However, since these studies were conducted for the US and while there are differences in the institutional background between the US and The Netherlands, the results of these studies could not simply be generalized. Especially, the fact that in the US in contrast to The Netherlands, prior to the implementation of SFAS No. 123(R), there already were a lot of firms that voluntarily expensed ESOs, was an important reason for this matter. As the models of Carter et al. (2007) and Choudhary (2007) both included a variable which captured the difference between mandatory and voluntary adopters to conclude whether expensing had negatively affected ESO use, these models were not applicable for the Dutch setting. In addition, since the second model of Carter et al. (2007) and the model of Brown and Lee (2007) did not measure the impact accounting has on ESO use directly, these models were

also not selected. In the end, the model that applied best to the Dutch institutional setting and as a consequence was used to examine ESO use in The Netherlands, was the model of Feng and Tian (2009). Ultimately, after having studied the Dutch institutional setting by descriptive statistics and the research model of Feng and Tian (2009), in chapter seven, it was proven that for The Netherlands the same conclusion can be drawn as for the US.

Nevertheless, it is critical to mention that the studies of Carter et al. (2003, 2007), Brown and Lee (2007), and Feng and Tian (2009) only examined CEO or top five executive compensation. Besides studying CEO compensation, in agreement with Choudhary (2007), this study also examined ESOs granted to total employees. Compatible with CEO compensation and the study of Choudhary (2007) ESOs granted to total employees was also significantly negatively affected.

Concluded, notwithstanding differences in the institutional background, ESO expensing has had a negative impact in both the US and The Netherlands.

### **8.3.3 Changes in CEO compensation**

Before examining the results of the analyses, which are provided in appendix XII, it is critical to make clear what the aim of dividing the sample into AEX, AMX, or ACSX listed firms is. It is chosen to divide the sample, because when data about ESOs was gathered with the use of financial statements, different trends and movements between firms listed on the AEX, the AMX, and the AScX were noticeable. Consequently, to examine these differences and to see whether IFRS 2 impacted all three groups equally the sample is divided.

To examine whether there are indeed significant differences between the three groups, for each group changes in ESO use, the use of other long-term incentive remuneration plans, and linkage to two different types of performances criteria are observed. In the table presented on the following page the main findings are shown for each group separately and for the sample as a whole.

As the table shows the total number of firms that granted ESOs declined most for the year 2005. In contrast, the use of long-term incentive plans by the whole sample rose most during this year. This provides evidence that IFRS 2 caused substitution towards other types of long-term incentive plans.

To see what kind of long-term incentive plans were used, after having observed the long-term incentive plans, it became clear that only 2 firms, of the total of 33 firms that used other types of long-term incentive plans, did not made use of equity-based plans.<sup>13</sup> Therefore, it can be concluded that ESOs were, for the greater part, substituted into other types of equity-based compensation. The report of Hewitt (2006) in which CEO compensation for The Netherlands was examined, supports these findings as the researchers also observed a substitution effect away from ESOs towards mainly performance shares.

<b>Changes in long-term incentive plans*</b>							
<b>ESO use for CEOs</b>							
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
AEX	14	14	13	12	11	11	10
AMX	10	8	10	4	3	4	4
AScX	10	9	8	7	4	6	6
<i>Total</i>	<i>34</i>	<i>31</i>	<i>31</i>	<i>23</i>	<i>18</i>	<i>21</i>	<i>20</i>
<b>Other long-term incentive plans</b>							
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
AEX	4	5	9	13	14	14	14
AMX	2	3	6	11	12	12	12
AScX	0	1	2	4	5	5	5
<i>Total</i>	<i>6</i>	<i>9</i>	<i>17</i>	<i>28</i>	<i>31</i>	<i>31</i>	<i>31</i>
<b>Use of TSR</b>							
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
AEX	5	7	11	13	13	13	13
AMX	0	0	0	6	8	8	9
AScX	0	0	0	0	0	0	1
<i>Total</i>	<i>5</i>	<i>7</i>	<i>11</i>	<i>19</i>	<i>21</i>	<i>21</i>	<i>23</i>
<b>Use of income, EPS, etc.</b>							
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
AEX	8	8	5	4	4	4	4
AMX	5	6	7	3	3	3	1
AScX	3	4	4	5	5	6	6
<i>Total</i>	<i>16</i>	<i>18</i>	<i>16</i>	<i>12</i>	<i>12</i>	<i>13</i>	<i>11</i>
*The sample is divided as follows AEX: n=15, AMX: n=15, AScX: n=11							

<sup>13</sup> These firms both remunerate their CEOs with deferred cash bonus plans.

Yet, as the sample was divided into three groups, the impact of IFRS 2 and changes in long-term equity-based CEO compensation will be discussed for every group individually.

### 8.3.2.1 AEX

In panel A of appendix XII two bar charts are provided to observe changes in the amount and value of ESOs granted to CEOs for the period 2002 till 2007. To test whether IFRS 2 played a significant role for AEX listed firms in panel B the outcomes of two Wilcoxon signed-rank tests are shown. Based on the bar charts and the outcomes of the Wilcoxon signed-rank tests it can be concluded that IFRS 2 has had a negative impact on the use of ESOs for AEX listed firms. This is because both the difference between 2004 and 2005 and the difference between the period before and after the implementation of IFRS 2 are significant at a 5% and 1% level respectively.

In addition to this, another trend became clear after having observed the financial statements of AEX listed firms. Namely, already prior to the implementation of IFRS 2, Total Shareholder Return (hereafter: TSR) as performance criterion for granting options, performance shares, and other types of long-term incentive-based compensation, became more popular. TSR is a measure used to determine the performance of a firm's stock through time or relative to other firms by combining share prices and dividend. In practice, TSR and peer grouping is used simultaneously to compare a firm's performance relative to their competition.

It is difficult to provide arguments that explain the rising trend in TSR. A possible explanation for the increase can be the fact that the Corporate Governance Code recommended the use of performance criteria in relation to peer groups and that there was a general belief that TSR provides a good indication of firm performance. Besides this, the fact that firms copy each other might be another explanation.

### 8.3.2.2 AMX

For AMX firms the bar charts show a steep decline in both the amount and fair value of ESOs granted in the year 2005. This indicates that, just as for AEX listed firms, the impact of IFRS 2 was significant. Based on the outcomes of the Wilcoxon signed-rank tests it is allowed to conclude that this is indeed the case, since the outcomes are significant.

Supplementary to this, another similarity between AEX and AMX listed firms can be identified from the table presented above. Namely, also AMX listed firms became to use TSR, as performance criteria, on a larger scale. Nevertheless, in comparison with the AEX listed firms the use of TSR by AMX listed firms is modest.

### 8.3.2.3 AScX

In contrast to the AEX and AMX listed firms, in the bar charts for firms listed on the AScX no steep decline in ESO use in 2005 is visible. This indicates that the impact of option expensing might not be significant for these firms. To see whether this is indeed the case the outcomes of the Wilcoxon signed-rank tests should be examined. Based on the first test, it appears that the year 2005 is not significant and therefore it should be concluded that AScX listed firms were less impacted by IFRS 2. This can be explained by the fact that AScX listed firms make, relative to AEX and AMX firms, little use of ESOs as a tool to compensate CEOs. Consequently, as ESO use is already low for these firms, the impact IFRS 2 has, will be smaller. In addition, another explanation can be that as CEO compensation for AScX is smaller, IFRS 2 is expected to cause less outrage costs and as a result has a smaller impact. Nevertheless as the second Wilcoxon signed-rank test was on the contrary significant, still a declining trend in ESO use can be observed for AScX as well.

### **8.3.3 Summary**

All in all, the first part of section 8.3 showed that the outcomes of this study correspond with prior research that was already conducted in the US. Then in the second part, after having studied CEO compensation in more detail additional support was provided for the conclusion that IFRS 2 has had a negative impact on ESO use. This is since it was reconfirmed that the year 2005 played a crucial role with regard to a decline in ESO use and, in addition, a substitution effect towards other types of long-term equity-based incentive plans. Besides, based on the additional analyses it became clear that IFRS 2 impacted AScX listed firms less after the sample has been divided into three groups. However, it is critical to mention that this conclusion has been taken in with consideration as the sample includes only 41 firms.

## 8.4 Summary and conclusions

To further examine the results that were found in chapter seven both robustness checks and additional analyses were performed. First, in section 8.2 the results of the robustness checks were elaborated and in the end all tests reconfirmed the conclusions drawn in chapter seven. Then, in section 8.3 the results of this study were compared with those of the studies elaborated in chapter three. Besides, in this section the outcomes of additional analyses concerning long-term incentive remuneration plans for CEOs were provided. Here also, the conclusions were strengthened and in addition it was shown that there was a substitution effect towards other types of equity-based compensation.

## 9 Limitations

In this study several limitations can be identified.

First, since this study only captures the effect of the implementation of the fair value accounting approach by looking if ESO use had been reduced, this study might not capture the full impact of IFRS 2. This is because, besides reductions in the use of ESOs, it can also be the case that the terms under which ESOs were granted or the determinants necessary to calculate the fair value of ESOs were adapted. IFRS 2 can have impacted the terms of ESOs that were already granted since IFRS 2 only required firms to expense ESOs that were granted after November 2002, but not yet vested on January 2005. Consequently, firms had incentives to accelerate ESOs with the purpose to vest the ESOs and to avoid expensing. As this behavior is a reaction on the implementation of IFRS 2, adaptations of ESOs should also be studied. Supplementary to this, with respect to newly granted ESOs there is a possibility that the determinants of ESOs were adapted. Namely, while executives might have incentives to reduce the fair value of ESOs and since the determinants needed to calculate the fair value are open to manipulation, estimations of these determinants might be biased to limit ESO expenses.

Hence, a potential weakness of this study is that not the whole impact of mandatory ESO expensing is captured, because only reductions in ESOs granted are measured. However, since in this study already a significant decline in ESO use was observed and since it is expected that IFRS 2, by far, has the largest impact on ESO use, examining the terms of ESO contracts or changes in the fair value determinants cannot turn down the conclusions made in this study.

The second limitation of this study relates to the possibility that reductions in ESO use started prior to 2005 since the exposure draft *Share-based Payment* was already published in November 2002. In fact, this caveat is somewhat related to the aforementioned limitation, because it also relates to concerns that not the whole impact of IFRS 2 is captured. Nevertheless, even if firms indeed began to reduce ESO use prior to the implementation of IFRS 2, this only weakens the power of the study, but it can not affect the results in such a way that the conclusions have to be changed. This is because even when there is a possibility that reductions in ESO use started earlier, evidence still shows a significant decline in ESO use after IFRS 2 was implemented.

The third limitation that can be identified, is subjected to use of the Black-Scholes-Merton model to calculate the fair value of ESOs. The use of the Black-Scholes-Merton model is questionable for several reasons. First, as the Black-Scholes-Merton model was originally used to calculate the fair value of traded options the inability of the model to calculate the fair value of ESOs is disputable. This is because ESOs are, in contrast to tradable options, often not freely tradable as they are restricted by vesting conditions. Besides, as ESOs are being increasingly granted unconditionally based on all kind of performance criteria and as the Black-Scholes-Merton model has limited abilities to incorporate these conditions, the outcomes of the model might not always be a good representation of ESOs' true values.

In addition to this, and as was already mentioned in chapter five and seven, the Black-Scholes-Merton model can lead to uncertain and biased outcomes as assumptions have to be made before the fair value can be calculated. For example, by changing expectations of the risk free interest rate, the expected dividend yield, and the stock volatility a firm can influence ESO expenses. However, since in this study own assumptions were used, this concern is not applicable to this study. Thus, while it can be an advantage to not include firms' own expectations, at the same time firm specific factors are left out which might bias the outcomes of the model. Besides, with respect to the changeability of the determinants the Black-Scholes-Merton model is a 'so-called' closed model as the model cannot take changes in these determinants into account. This is a disadvantage as in reality the determinants fluctuate and change over time.

Nonetheless, due to limited data availability for the period prior to IFRS 2, the fact that both the IASB and the FASB recommend the Black-Scholes model to calculate the fair value of ESOs, and the fact that the purpose of calculating the fair value of ESOs granted was not to calculate ESO expenses exactly, the Black-Scholes-Merton model was picked. A study of Botosan and Plumlee (2001) supported this choice as they state that:

“Carpenter finds that the estimated fair value of ESOs produced by Black-Scholes are close to those produced by more complex models. Thus the SFAS approach, while not perfect, appears to produce fair value estimates that are reasonable. (Botosan and Plumlee, p. 328, 2001)”

Furthermore, as other more complicated models, like the binominal or the Monte Carlo model, as well are subjected to limitations it is expected that these models also do not provide precise estimations of ESOs' true values.

At last, with respect to the sample, the fact that only 41 firms are included and that the main model is drafted for the period 2002 till 2007 can be seen as limitations of this study.

However, while initially 75 firms were observed, no more than 41 firms met the sample selection criteria. To avoid biases and with respect to sample homogeneity it was chosen not to include additional firms that were indeed active during a large part of the sample period or to include firms that were listed on local markets. Besides, while the main model was indeed drafted for the period 2002 till 2007 for the amount of ESOs granted also the years 2000, 2001, and 2008 were taken into account.

All things considered, while this study is subjected to several limitations still there is convincing and decisive evidence that makes it allowed to state that IFRS 2 has had a negative impact on ESOs granted to both CEOs and total employees.

## 10 Conclusion

### 10.1 Final summary and main conclusions

To conclude, this thesis provided convincing and decisive evidence to prove that IFRS 2 has had a negative impact on ESOs granted to both CEOs and total employees. This conclusion contributes to the debate concerning economic consequences of accounting standards and the role of accounting. As accounting can influence the behavior of people, standard setters should be aware of the impact implementation of new accounting rules can have.

Besides, on the other hand the knowledge that sometimes changes in accounting standards cause economic consequences, can also be used to influence people's behavior into specific directions and to obtain desired outcomes. As IFRS 2 was introduced as a result of the growing general belief that ESOs were not effective and that accounting rules for ESOs led to subsidies, it can be stated that the implementation of IFRS 2 has had its desired effect in The Netherlands as ESO use actually reduced. However, a critical note has to be made with respect to using accounting standards to influence people's behavior as this can lead to a situation in which accounting standards become too much a product of lobbying behavior.

### 10.2 Recommendations for further research

In extension to this study it might be interesting to examine whether IFRS 2 also has had an impact on firms' assumptions of the determinants that are needed to calculate the fair value of ESOs. Namely, as IFRS 2 provided firms with incentives to adapt their assumptions in such a way that ESO expenses were reduced, by studying these assumptions a more complete picture of the full impact of IFRS 2 can be obtained. To find out whether the assumptions were biased, benchmarks for the determinants have to be developed. However, as this is really hard to accomplish with respect to firm-specific information it is expected that this study will be difficult to carry out in practice.

Furthermore, another recommendation for further research relates to the discovery made in chapter 7.3.3.2, that showed that only CEO compensation and not total employee compensation was linked to firm performance. It might be interesting to see to what causes this difference can be subscribed. Is it the fact that ESOs are granted to CEOs with the purpose of aligning their incentives and to total employees with the purpose of retention? Or

is it an unwilling outcome of the fact that it is more difficult to develop effective ESO schemes for more broadly-based remuneration plans?

Nevertheless, while the abovementioned recommendations are interesting to study, boundaries have to be set to not make this study an infinite project. And while decisive and convincing evidence was found to state that IFRS 2 indeed has had a negative impact on ESO use, this study is concluded.

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## Appendix I - The Dutch Corporate Governance Code (2003)

### II.2 Remuneration

**Principle** The amount and structure of the remuneration which the management board members receive from the company for their work shall be such that qualified and expert managers can be recruited and retained. If the remuneration consists of a fixed and a variable part, the variable part shall be linked to previously-determined, measurable and influenceable targets, which must be achieved partly in the short term and partly in the long term. The variable part of the remuneration is designed to strengthen the board members' commitment to the company and its objectives.

The remuneration structure, including severance pay, is such that it promotes the interests of the company in the medium and long term, does not encourage management board members to act in their own interests and neglect the interests of the company and does not 'reward' failing board members upon termination of their employment. The level and structure of remuneration shall be determined in the light of, among other things, the results, the share price performance and other developments relevant to the company.

The shares held by a management board member in the company on whose board he sits are long-term investments. The amount of compensation which a management board member may receive on termination of his employment may not exceed one year's salary, unless this would be manifestly unreasonable in the circumstances

#### Best practice provisions

- II.2.1 Options to acquire shares are a conditional remuneration component, and become unconditional only when the management board members have fulfilled predetermined performance criteria after a period of at least three years from the grant date.
- II.2.2 If the company, notwithstanding best practice provision II.2.1, grants unconditional options to management board members, it shall apply

performance criteria when doing so and the options should, in any event, not be exercised in the first three years after they have been granted.

- II.2.3 Shares granted to management board members without financial consideration shall be retained for a period of at least five years or until at least the end of the employment, if this period is shorter. The number of shares to be granted shall be dependent on the achievement of clearly quantifiable and challenging targets specified beforehand.
- II.2.4 The option exercise price shall not be fixed at a level lower than a verifiable price or a verifiable price average in accordance with the official listing on one or more predetermined days during a period of not more than five trading days prior to and including the day on which the option is granted.
- II.2.5 Neither the exercise price nor the other conditions regarding the granted options shall be modified during the term of the options, except in so far as prompted by structural changes relating to the shares or the company in accordance with established market practice.
- II.2.6 The supervisory board shall draw up regulations concerning ownership of and transactions in securities by management board members, other than securities issued by their 'own' company. The regulations shall be posted on the company's website. A management board member shall give periodic notice, but in any event at least once a quarter, of any changes in his holding of securities in Dutch listed companies to the compliance officer or, if the company has not appointed a compliance officer, to the chairman of the supervisory board. A management board member who invests exclusively in listed investment funds or who has transferred the discretionary management of his securities portfolio to an independent third party by means of a written mandate agreement is exempted from compliance with this last provision.
- II.2.7 The maximum remuneration in the event of dismissal is one year's salary (the 'fixed' remuneration component). If the maximum of one year's salary would be manifestly unreasonable for a management board member who is dismissed during his first term of office, such board member shall be eligible for a severance pay not exceeding twice the annual salary.

II.2.8 The company shall not grant its management board members any personal loans, guarantees or the like unless in the normal course of business and on terms applicable to the personnel as a whole, and after approval of the supervisory board. No remission of loans shall be granted.

### ***Determination and disclosure of remuneration***

**Principle** The report of the supervisory board shall include the principal points of the remuneration report of the supervisory board concerning the remuneration policy of the company, as drawn up by the remuneration committee. The notes to the annual accounts shall, in any event, contain the information prescribed by law on the level and structure of the remuneration of the individual members of the management board. The remuneration policy proposed for the next financial year and subsequent years as specified in the remuneration report shall be submitted to the general meeting of shareholders for adoption. Every material change in the remuneration policy shall also be submitted to the general meeting of shareholders for adoption. Schemes whereby management board members are remunerated in the form of shares or rights to subscribe for shares, and major changes to such schemes, shall be submitted to the general meeting of shareholders for approval.

The supervisory board shall determine the remuneration of the individual members of the management board, on a proposal by the remuneration committee, within the scope of the remuneration policy adopted by the general meeting of shareholders.

### **Best practice provisions**

II.2.9 The remuneration report of the supervisory board shall contain an account of the manner in which the remuneration policy has been implemented in the past financial year, as well as an overview of the remuneration policy planned by the supervisory board for the next financial year and subsequent years.

II.2.10 The overview referred to in II.2.9 shall, in any event, contain the following information:

- a) a statement of the relative importance of the variable and non-variable remuneration components and an explanation of this ratio;
- b) an explanation of any absolute change in the non-variable remuneration component;
- c) if applicable, the composition of the group of companies (peer group) whose remuneration policy determines in part the level and composition of the remuneration of the management board members;
- d) a summary and explanation of the company's policy with regard to the term of the contracts with management board members, the applicable periods of notice and redundancy schemes and an explanation of the extent to which best practice provision II.2.7 is endorsed;
- e) a description of the performance criteria on which any right of the management board members to options, shares or other variable remuneration components is dependent;
- f) an explanation of the chosen performance criteria;
- g) a summary of the methods that will be applied in order to determine whether the performance criteria have been fulfilled and an explanation of the choice of these methods;
- h) if performance criteria are based on a comparison with external factors, a summary should be given of the factors that will be used to make the comparison; if one of the factors relates to the performance of one or more companies (peer group) or of an index, it should be stated which companies or which index has been chosen as the yardstick for comparison;
- i) a description and explanation of each proposed change to the conditions on which a management board member can acquire rights to options, shares or other variable remuneration components;

j) if any right of a management board member to options, shares or other variable remuneration components is not performance-related, an explanation of why this is the case;

k) current pension schemes and the related financing costs;

l) agreed arrangements for the early retirement of management board members.

II.2.11 The main elements of the contract of a management board member with the company shall be made public immediately after it is concluded. These elements shall in any event include the amount of the fixed salary, the structure and amount of the variable remuneration component, any redundancy scheme, pension arrangements and performance criteria.

II.2.12 If a management board member or former management board member is paid special remuneration during a given financial year, an explanation of this remuneration shall be included in the remuneration report. The remuneration report shall in any event account for and explain remuneration paid or promised in the year under review to a management board member by way of severance pay.

II.2.13 The remuneration report of the supervisory board shall, in any event, be posted on the company's website.

II.2.14 The company shall state in the notes to the annual accounts, in addition to the information to be included pursuant to article 2:383d of the Civil Code, the value of any options granted to the management board and the personnel and shall indicate how this value is determined.

**Appendix II – Reference list of the literature review**

<b>Author(s)</b>	<b>Object of study</b>	<b>Sample</b>	<b>Methodology</b>	<b>Outcome(s)</b>
<i>3.2 Equity-based compensation</i>				
Bebchuk and Fried (2003)	Provide an overview of the main theoretical elements and empirical underpinnings of a 'managerial power' approach to executive compensation	Not empirical	Not empirical	The managerial power and rent extraction play an important role in executive compensation
Core and Guay (1999)	Determine if accounting for ESOs is used for income management strategies	6214 CEO-year observations from 1992 to 1997 using ExecuComp database	Tobit model and Heckman model to estimate determinants of equity incentives	Firms not only set an optimal level of CEO incentives, but even actively manage to this level by varying equity incentives
Dechow et al. (1996)	Examine the economic consequences of requiring mandatory expensing of ESOs.	(1) firms that submitted comment letters, (2) firms in the biotechnology industry, (3) firms with intensive use of ESOs	Multivariate OLS regression	Stock markets did not negatively react on expensing of ESOs
Ittner et al. (2003)	Examine the economic determinants of CEO stock option compensation	196 Canadian firms over the period 2001 - 2004	Tobit regression model	Show the relation with firm's growth set, firm size, firm's specific risk, leverage, CEO age, CEO stock ownership, blockholder ownership, CEO tenure, noise, and liquidity constraints
Oyer and Schaefer (2005)	Examine three possible explanations why ESOs are granted to all employees: (1) providing incentives to employees, (2) inducing employees to sort, (2) and employee retention	Three sources: (1) National Center for Employee Ownership (NCEO), (2) 1000 SEC firms, (3) Bureau of Labor Statistics' (BLS) Pilot Survey	Cross-sectional regression analyses	No incentives-based explanation for broad-based stock option plans, but sorting and retention explanation.
Hall and Murphy (2003)	Find explanations for the dramatical increase of stock options	Not empirical	Not empirical	Main reason for excessive use option-based compensation is asymmetry in accounting for stock options relative to other types of compensation

Butzbach and Di Carlo (2008)	Examine if the change in stock option accounting regulation had an impact on corporate governance	All listed Italian and French firms, excluding financial institutions, which had stock option plans in 2005 and 2006	Gather market indicators (stock prices) and governance indicators (issuance new ESOs, changes BoD, etc.). Data analyses are exclusively qualitative	Impact of new accounting rules is not significant since there are not any substantial change in their management or governance structure
Ditmann and Maug (2007)	Analyze the optimal structure of CEO pay and the optimal balance among stock, options, and base salary in executive compensation contracts	Sample of 598 U.S. CEOs	Standard principal–agent model with constant relative risk aversion and lognormal stock prices	The standard principal–agent model typically used in the literature cannot rationalize observed contracts and most CEOs should not hold any stock options
<i>3.3 Determinants of the use of ESOs</i>				
Core et al. (2003)	Analyze literature surrounding equity compensation and executives compensation	Not empirical	Not empirical	Highlight various areas for future research. For example, examine the relation between accounting and use of stock options
Bodie et al. (2003)	Discuss whether options should be expensed or disclosed	Not empirical	Not empirical	Not recognizing ESOs lead to accounting subsidies which result in an overuse of ESOs.
Matsunaga (1995)	Determine if accounting for ESOs is used for income management strategies	Data of 123 firms over a 11 year period from 1979-1989 with Compustat	Pooled cross-sectional, time series analyses	There is a positive relation between use of ESOs and a firms’ financial reporting benefits
Carter et al. (2003)	Examine repricing activity surrounding the FASB’s 1998 announcement	213 firms that reprice in 1997, 324 firms that reprice in 1998, and 31 firms that reprice in 1999 in contrast with 5201 other firms in Compustat	Multivariate analysis using a logit regression	Firms trade off financial reporting benefits and reputation costs to get favorable accounting treatment
Carter et al. (2007)	Examine the role of accounting in CEO equity compensation	A sample of 6242 firms in 1995-2001 using Execucomp	(1) Regression using pooled data to study the relation between financial reporting concerns and equity compensation, (2) regression to examine changes in equity compensation	Favorable accounting treatment for options lead to a higher use of options and lower use of restricted stocks

Brown and Lee (2007)	Study determinants and consequences of the changes in option-based compensation for the top five executives around the issuance of SFAS 123R	1022 firms of the January 2007 version of ExecuComp	OLS model between change in ESO and determinants that reduce the use of ESOs after the implementation of SFAS 123R	ESOs favorable accounting treatment have a significant effect on executives compensation decisions
Choudhary (2007)	Examine how fair value disclosure and recognition affects both the compensation decision and the financial reporting decision	795 mandatory disclosure firms, 783 mandatory recognition firms, and 127 control firms using the ExecuComp database	Multivariate regression	Preparers of financial statements treat recognition differently from disclosure
Feng and Tian (2009)	Examine the impact of mandatory expensing in managerial equity incentives	1684 ExecuComp firms over the sample period 1993-2005	Multivariate regression using 2002 as event date	Mandatory expensing has lead to a decrease of ESOs after the event date 2002
Aboody et al. (2004)	Examine factors related with firms’ decisions to recognize stock-based compensation expenses under SFAS 123R	150 firms that voluntarily recognize ESOs and control firms (1090 firms in the S&P 500, S&P 400 midcapitalization, and S&P 600 small-capitalization indices)	Multivariate regression	Users of financial statements equally value stock options whether recognized or disclosed
Espahbodi et al. (2002)	Examine value relevance of recognition versus disclosure in financial reporting for accounting issues on stock-based compensation	Sample of 595 firms using Compustat and CRSP	Multivariate regression	Disclosure is not a substitute for recognition
Smith and Watts (1992)	Examine whether there is a significant relation between corporate policy decisions and various firm characteristics	(1) Executive compensation industry-level data for every fourth year from 1965-1985 using Fox, (2) use Compustat to get investment, financing and industry data	Multivariate regression model and pooled cross-section and time-series observations	Contracting theories are more important than tax-based and signaling theories in explaining variation in financial compensation and dividend policies
Gaver and Gaver (1993)	Examine relation between the investment opportunity set and financing, dividend, and compensation policies	Sample of 237 growth firms and 237 no growth firms	Multivariate regression	Growth firms issue a significantly higher level of stock options than no growth firms

Chourou (2008)	Examine the economic determinants of CEO stock option compensation	196 Canadian firms over the period 2001-2004	Tobit regression model	Show the relation with firm’s growth set, firm size, firm’s specific risk, leverage, CEO age, CEO stock ownership, blockholder ownership, CEO tenure, noise, liquidity constraints
Bryan et al. (2000)	Examine economic determinants of stock options and restricted stocks by looking at incentive-intensity and relative mix	(1) 1788 firms over period 1992-1997 of which 872 S&P firms, 364 non-S&P firms with midcap index, and 522 non-S&P firms with small-cap index	Tobit regression model	Find that stock-based compensation (stock options and restricted stocks) is issued following most predictions of formal theories about optimal level of stock-based awards
Bizjak et al. (1993)	Examine how manager’s concerns over stock prices can motivate them to use observable investment decisions to manipulate market’s view about the firm	430 large US corporations listed in the Forbes executives compensation surveys for at least eight years from 1975 through 1989	Multivariate OLS regression model	Firms that face high levels of asymmetry between managers and shareholders adopt compensation methods that are based on long-term stock returns rather than on near-term stock returns
Murphy (1985)	Examine the relation between executive pay and corporate governance	An eighteen-year time series (1964-1981) of publicly held corporations in the Fortune; final sample consist of 72 firms, 461 executives, and 4500 executive-years	Econometric methodology and time-series and cross-sectional regression models	There is a significant positive relation between executive compensation and corporate performance
Watts and Zimmerman (1990)	Review and critique the positive accounting literature following to the publication of Watts and Zimmerman in 1978 and 1979	Not empirical	Not empirical	Summarize evolution and state of positive accounting theory, the criticisms, and future research directions
Yermack (1995)	Examine whether there is a significant association between use of stock option performance incentives and explanatory variables related to reduction of agency costs	792 US public corporations between 1984 and 1991	Tobit model	CEO stock option contracts can not significantly be explained by the agency or financial contracting theory

Holmstrom (1979)	Examine efficient contractual agreements in a principal-agent relationship under various assumptions		Econometric methodology	Any additional information about agent’s action, however imperfect, can be used to improve the welfare of both the principal and the agent
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**Appendix III - Comparison of prior models measuring changes in ESOs granted**

		<b>Carter et al. (2007) - model 2</b>		<b>Brown and Lee (2007)</b>		<b>Choudhary (2007)</b>		<b>Feng and Tian (2009)</b>
<b><u>Dependent variable</u></b>		<b>-ln_OPT<sub>it</sub></b> natural log of value of stock options granted to CEO of firm i in year t (Black-Scholes model used)		<b>CHG_ESO%</b> change in ESO compensation as a percent of total compensation between the pre-SFAS 123R period (2001-2003) and the post-SFAS 123R period (2005) for top five executives (Black-Scholes model used) scaled by total compensation		<b>Δ Log(#Option grant<sub>it</sub>)</b> amount of options granted for mandatory adopting firms to CEO, non-CEO executives, and rank and file employees for firm i in year t		<b>COMP<sub>it</sub></b> ESO grants as a proportion of total shares outstanding times the Black-Scholes-Merton hedge ratio
<b><u>Independent variables:</u></b> For each variable the predicted sign, the symbol and the measure is provided. First accounting motivated variables following the study are discussed.								
	-	<b>EXPENSER<sub>it</sub></b> 1 if firm i expenses options in 2002 or 2003, 0 otherwise				<b>PostVoluntary<sub>it</sub></b> 1 in all periods after voluntary recognition for firms that voluntarily expensed options, 0 otherwise	+	<b>TL1<sub>it</sub></b> equal to t before 2002 and zero after 2001 (t takes values of 1,2,3, etc.)
						<b>Mandatory<sub>it</sub></b> 1 for firms that mandatorily adopted ESO recognition, 0 otherwise	-	<b>TL2<sub>it</sub></b> equal to zero before 2002 and (t - t2001) after 2001 (t takes values of 1,2,3, etc.)

Earnings-based debt constraints			-	<b>BINDING_COV</b> determine fixed charge coverage, debt service coverage, interest coverage or cash interest coverage for firms' debt contracts in 1999-2003		
Concern to meet or beat earnings benchmarks			-	<b>MEET_POS (MEET_inc)</b> proportion of years during the pre-SFAS 123R period that the firm used ESOs' favorable accounting treatment to achieve positive earnings levels (changes) benchmarks.		
Corporate governance			+	<b>Proxy governance variables</b> 12 factors Core et al. (1999)		
Level of ESO use prior to expensing			-	<b>IMPACT</b> pro forma ESO expense disclosed in the SFAS 123 footnote scaled by the market value of equity at the end of the fiscal year, averaged over 2001-2003		
Level of unvested ESOs prior to expensing			-	<b>UNVESTED</b> estimate the grant-date Black-Scholes value of outstanding unvested ESOs held by the top five executives		

Acceleration of ESOs prior to mandatory expensing				<b>ACC_VEST</b> indicator variable: 1 if firms accelerated ESOs, 0 otherwise			
<i>Control variables: nonaccounting motivated variables following the study</i>							
Stock volatility	?	<b>EARN_VOL<sub>it</sub></b> the square of the standard deviation of ROA, where the standard deviation of ROA is calculated over ten years prior to year t for firm i	+	<b>CUMRET</b> cumulative stock return over 2003-2005	<b>ΔVolatility<sub>it</sub></b> historical volatility using 5 years prior returns for firm i in year t	? <b>STK_VOL<sub>it</sub></b> the standard deviation of trailing 36 monthly stock returns	
Firm size	+	<b>LNASSET<sub>it</sub></b> natural log of total assets at the end of year t for firm i	+	<b>CHG_SALES</b> logarithm of sales (measured as their 2005 values minus their average values during 2001-2003)	<b>ΔLog(sales)<sub>it</sub></b> change in the log of sales for firm i in year t	+	<b>FIRM_SIZE<sub>it</sub></b> the logarithm of the market value of equity (\$MM)
Investment and growth opportunities	-	<b>BOOK_MKT<sub>it</sub></b> book value of equity /market value of equity at the end of year t for firm i	-	<b>CHG_BM</b> book to market ratio (measured as their 2005 values minus their average values during 2001-2003)		+	<b>GROWTH_OPP<sub>it</sub></b> market to book ratio (book value of debt + market value of equity)/total assets
Firm performance	+	<b>RET<sub>it</sub></b> cumulative 12-month returns for year t for firm i			<b>*ΔROA<sub>it</sub></b> change in return on assets in year t compared to t-1 for firm i <b>* Return<sub>it</sub></b> compounded annual return using monthly stock prices in year t for firm i	+	<b>PAST_RET<sub>it</sub></b> the cumulative stock returns in the past 36 months

Liquidity constraints	+	<b>CASH_CONSTR<sub>it</sub></b> the three-year average over year $t_3$ to $t_1$ of [(Common and preferred dividends + cash flow from investing + cash flow from operations) / total assets] for firm $i$	+	<b>CHG_SHORTFALL</b> three-year average of cash flow used in investing activities plus common and preferred dividends minus cash flow from operations, all deflated by total assets.		+	<b>CASH_SHORT<sub>it</sub></b> the three-year average of (common dividends + preferred dividends + cash flow used in investing activities – cash flow from operations)/total assets
CEO TENURE	+	<b>TENURE</b> the number of years the CEO has been in that position (if missing, the number of years at the firm) in firm $i$ as of the end of year $t$				?	<b>CEO_TENURE<sub>it</sub></b> the number of years the CEO has been presiding over the current firm
Equity constraints	-	<b>EQ_CONSTR<sub>it</sub></b> (CEO options outstanding at the end of the year $t_1$ / the three-year average over year $t_3$ to $t_1$ of percent of total options granted to executives) / total shares outstanding at the end of year $t_1$ for firm $i$	+	<b>CHG_DIVCON</b> 1 if [(retained earnings + cash dividends + stock repurchases)/the prior year’s cash dividends and stock repurchases] is less than 2.0 in any of the previous three years, 0 otherwise.			
Previous year(s) granted ESOs	+	<b>In_pre_DEP_VBL<sub>it</sub></b> natural log of average value of stock options granted to CEO of firm $i$ in years $t_2$ and $t_1$			<b>DependentVariable<sub>it-1</sub></b> Dependent variable for year $t-1$ for firm $i$		
Marginal tax rate			+	<b>CHG_NOL</b> proxy for firms’ marginal tax rates (1 if firm has net operating loss carry- forwards in any of the previous three years, and 0 otherwise)		-	<b>MTR<sub>it</sub></b> the marginal tax rate based on income before interest expense, simulated by John Graham

Outside pressure	-		<p><b>*TOP5%</b>                  number of options granted to the top five executives as a percent of total options granted to all employees, averaged over 2001-2003</p> <p><b>*SIZE</b>                  logarithm of the market value of equity averaged over 2001-2003</p>		
Changes in ESOs, because of adjustments of deviations from predicted equity incentive level (proxy Core and Guay)	-	<p><b>DEV_INC<sub>it</sub></b>                  In (actual incentive level / predicted incentive level) at the beginning of year t for firm i where actual incentive level is the delta of the equity portfolio and predicted incentive level is estimated from a model based on Core and Guay (1999) for the CEO in firm i</p>			<p><b>INCT_RES<sub>it</sub></b>                  excess equity incentives (actual minus predicted equity incentives) estimated using the Core and Guay (1999) method</p>
Dividend yield	-	<p><b>DIV_YLD<sub>it</sub></b>                  the three-year average over year t_3 to t_1 of [dividends per share / price per share at the end of the year t]</p>			
Leverage					<p><b>LEVERAGE<sub>it</sub></b>                  total debts/total assets</p>
Corporate governance					<p><b>GIM<sub>it</sub></b>                  the Gompers, Ishii and Metrick (2003) governance index</p>

<p><b><u>Additional information:</u></b></p>	<p><i>Also, the model is conducted with the natural log of the value of restricted stocks granted (<math>\ln\_RSTK_{it}</math>) and the total compensation for the CEO (<math>\ln\_TC_{it}</math>) of firm <math>i</math> in year <math>t</math> as dependent variables.</i></p>		<p><i>In advance Choudhary did not state any expectations or predictions</i></p>	<p><i>Also, the model is conducted with restricted stocks and the sum of restricted stock and options as a proportion of total shares outstanding as dependent variables.</i></p>
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**Appendix IV – Description of control variables  
Database: Thomson One Banker**

<b>Variable</b>	<b>Measure</b>	<b>Computation</b>	<b>Source Code</b>
Investment and growth opportunities	Market-to-book ratio ((market value of equity + book value of debt)/total assets) at end of year <i>t</i> for firm <i>i</i>	<ul style="list-style-type: none"> <li>• <i>Market Capitalization</i></li> <li>• <i>Total Debt</i></li> <li>• <i>Total Assets</i></li> </ul> <p>→ <u>Market-to-book ratio</u> = (Market Capitalization + Total Debt/ Total Assets)</p>	<ul style="list-style-type: none"> <li>• MV</li> <li>• 03225</li> <li>• 02999</li> </ul>
Firm size	Natural log of total assets at end of year <i>t</i> for firm <i>i</i>	<ul style="list-style-type: none"> <li>• <i>Total Assets</i></li> </ul> <p>→ <u>LN of Total Assets</u> = LN(Total Assets)</p>	<ul style="list-style-type: none"> <li>• 02999</li> </ul>
Firm performance	Return on assets (ROA) of year <i>t</i> for firm <i>i</i>	<ul style="list-style-type: none"> <li>• <i>Return on assets:</i> (Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Last Year's Total Assets * 100</li> </ul>	<ul style="list-style-type: none"> <li>• 08326</li> </ul>
Debt covenants and leverage	Book value of total debt/ Book value of total assets at end of year <i>t</i> for firm <i>i</i>	<ul style="list-style-type: none"> <li>• <i>Total Debt</i></li> <li>• <i>Total Assets</i></li> </ul> <p>→ <u>Leverage</u> = Total Debt/ Total assets</p>	<ul style="list-style-type: none"> <li>• 03225</li> <li>• 02999</li> </ul>
Liquidity constraints	Three-year average over <i>t-3</i> to <i>t-1</i> of sum of ((common and preferred dividends + cash flow used in investing activities - cash flow generated from operations)/ total assets) for firm <i>i</i>	<ul style="list-style-type: none"> <li>• <i>Free Cash Flow:</i> NetCashFlowOperatingCFStm t-CashDividendsCFStm- CapitalExpendituresCFStm</li> <li>• <i>Total Assets</i></li> </ul>	<ul style="list-style-type: none"> <li>• No source code</li> <li>• 02999</li> </ul>

		→ <u>Liquidity constraints</u> = Sum ((Free Cash Flow * -1)/Total assets) <sub>t-3,t-2,t-1</sub> / 3	
<b>Managerial horizon and CEO tenure</b>	Number of years a CEO is in position at end of year <i>t</i> for firm <i>i</i>	• Hand collected	• Not applicable
<b>Stock volatility</b>	Standard deviation of 24 monthly stock returns prior to year <i>t</i> for firm <i>i</i>	• <i>Price Volatility</i> : Measure of a stock's average annual price movement to a high and low from a mean price for each year	• 08806
<b>Ownership structure</b>	Percentage of common shares owned by the CEO at end of year <i>t</i> for firm <i>i</i>	• Hand collected	• Not applicable

Appendix Va – Sample			
Original sample	Listed on	Included in final sample	Reason for not including firm
Aalberts Industries N.V.		NO	No use of ESOs in research period
Accell Group N.V.	ASXC	YES	
Aegon N.V.		NO	ESOs already replaced by SARs in 2002
Air France-KLM		NO	Lacking data, because of merger in 2004
Akzo Nobel N.V.	AEX	YES	
AMG Advanced Metallurgical Group		NO	Founded in 2006
Antonov		NO	From United Kingdom and prior to IFRS the firm audited in accordance with United Kingdom Auditing Standards
Arcadis N.V.	AMX	YES	
ArcelorMittal		NO	Lacking data, because of merger in 2007
Arseus		NO	Founded in 2007
ASM International N.V.	AMX	YES	
Asml Holding N.V.	AEX	YES	
Ballast Nedam N.V.		NO	No use of ESOs in research period
Beter Bed Holding N.V.	AScX	YES	
Binckbank N.V.	AMX	YES	
Brunel International N.V.	AScX	YES	
Corio N.V.		NO	No use of ESOs in research period
Crucell N.V.	AMX	YES	
CSM N.V.	AMX	YES	
Draka Holding N.V.	AMX	YES	
Delta Lloyd Group N.V.		NO	No use of ESOs in research period
Eurocommercial Properties N.V.	AMX	YES	
Exact Holding N.V.		NO	No use of ESOs in research period
Fornix Biosciences N.V.	AScX	YES	
Fugro N.V.	AEX	YES	
Gamma Holding N.V.	AScX	YES	
Grontmij N.V.		NO	No use of ESOs in research period

Heijmans N.V.		NO	No use of ESOs in research period
Heineken N.V.		NO	No use of ESOs in research period
Homburg Invest		NO	No data available on CEO compensation
Imtech N.V.	AMX	YES	
ING Groep N.V.	AEX	YES	
InnoConcepts N.V.		NO	No use of ESOs in research period
Kardan N.V.		NO	Founded in 2003
KAS Bank N.V.	AScX	YES	
Koninklijke Ahold N.V.	AEX	YES	
Koninklijke BAM Groep N.V.		NO	No use of ESOs in research period
Koninklijke DSM N.V.	AEX	YES	
Koninklijke KPN N.V.	AEX	YES	
Koninklijke Philips Electronics N.V.	AEX	YES	
Koninklijke Ten Cate N.V.	AMX	YES	
Koninklijke Vopak N.V.	AMX	YES	
Koninklijke Wessanen N.V.	AMX	YES	
Logica		NO	From United Kingdom and prior to IFRS the firm audited in accordance with United Kingdom Auditing Standards
Macintosh Retail Group N.V.	AScX	YES	
Mediq N.V.		NO	No use of ESOs in research period
Nieuwe Steen Investments		NO	No use of ESOs in research period
Nutreco Holding N.V.	AMX	YES	
Océ N.V.	AMX	YES	
Ordina N.V.	AMX	YES	
Pharming Group N.V.	AScX	YES	
Phoenix Group		NO	From United Kingdom and prior to IFRS the firm audited in accordance with United Kingdom Auditing Standards
Prologis European Properties		NO	Not listed on Euronext Amsterdam until 2006
Qurius N.V.		NO	No use of ESOs in research period
Randstad Holding N.V.	AEX	YES	

Reed Elsevier N.V.	AEX	YES	
Royal Boskalis Westminster N.V.		NO	No use of ESOs in research period
Royal Dutch Shell	AEX	YES	
SBM Offshore N.V.	AEX	YES	
Sligro Food Group N.V.	AScX	YES	
Smit Internationale N.V.		NO	No use of ESOs in research period
SNS REAAL N.V.		NO	No use of ESOs in research period
Telegraaf Media Groep		NO	No use of ESOs in research period
TKH Group N.V.	AScX	YES	
TNT N.V.	AEX	YES	
Tom Tom		NO	No use of ESOs in research period
Unibail-Rodamco SA		NO	Lacking data, because of merger in 2007
Unilever N.V.	AEX	YES	
Unit 4 Agresso N.V.	AScX	YES	
USG People N.V.	AMX	YES	
Vastned Offices Industrial		NO	No use of ESOs in research period
Vastned Retail N.V.		NO	No use of ESOs in research period
Wavin N.V.		NO	Founded in 2005
Wereldhave N.V.		NO	No use of ESOs in research period
Wolters Kluwer N.V.	AEX	YES	
	<b>n= 75</b>	<b>n= 41</b>	

<b>Appendix Vb – Sample (classified)</b>		
<b>AEX</b>	<b>AMX</b>	<b>AScX</b>
Akzo Nobel N.V.	Arcadis N.V.	Accell Group N.V.
Asml Holding N.V.	ASM International N.V.	Beter Bed Holding N.V.
Fugro N.V.	Binckbank N.V.	Brunel International N.V.
ING Groep N.V.	Crucell N.V.	Fornix Biosciences N.V.
Koninklijke Ahold N.V.	CSM N.V.	Gamma Holding N.V.
Koninklijke DSM	Draka Holding N.V.	KAS Bank N.V.
Koninklijke KPN N.V.	Eurocommercial N.V.	Macintosh Retail Group N.V.
Koninklijke Philips Electronics N.V.	Imtech N.V.	Pharming Group N.V.
Randstad Holding N.V.	Koninklijke Ten Cate N.V.	Sligro Food Group N.V.
Reed Elsevier N.V.	Koninklijke Vopak N.V.	TKH Group N.V.
Royal Dutch Shell	Koninklijke Wessanen N.V.	Unit 4 Agresso N.V.V
SBM Offshore N.V.	Nutreco N.V.	
TNT N.V.	Océ N.V.	
Unilever N.V.	Ordina N.V.	
Wolters Kluwer N.V.	USG People N.V.	
<b>n=15</b>	<b>n=15</b>	<b>n=11</b>

## Appendix VI – Descriptive statistics for CEO compensation (2002 -2007)

### Panel A: Dependent variables

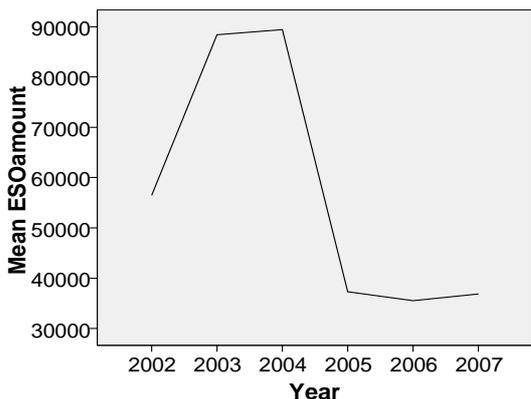
Panel A provides an overview of the mean, median and number of cases for both the amount and Black-Scholes-Merton value of ESOs granted to CEOs in the year 2002 till 2007.

<b>Report</b>			
Year		ESOamount	ESOvalue
2002	Mean	51088.29	212592.74
	Median	30000	56520,00
	N	41	41
2003	Mean	86931.12	169660,25
	Median	39000	73560,00
	N	41	41
2004	Mean	91194.22	229443,40
	Median	40000	78817,50
	N	41	41
2005	Mean	37020.71	132369.12
	Median	10737	40149,16
	N	41	41
2006	Mean	35497.85	191556,93
	Median	,00	,00
	N	41	41
2007	Mean	36889.29	221214,90
	Median	,00	,00
	N	41	41
Total	Mean	56436.91	192806.22
	Median	20000	42168,80
	N	246	246

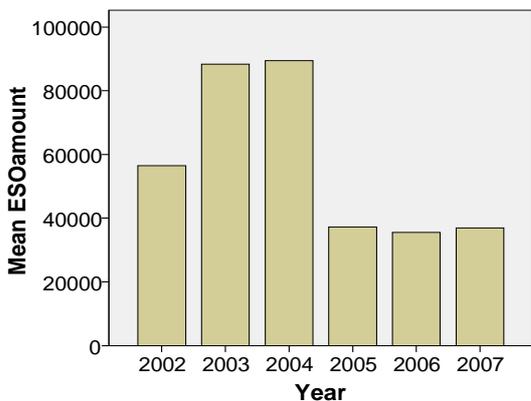
**Panel B: ESO amount**

On the y-axis the mean of the amount of ESOs granted to CEOs is shown for the period 2002-2007 in both a line chart and a bar chart.

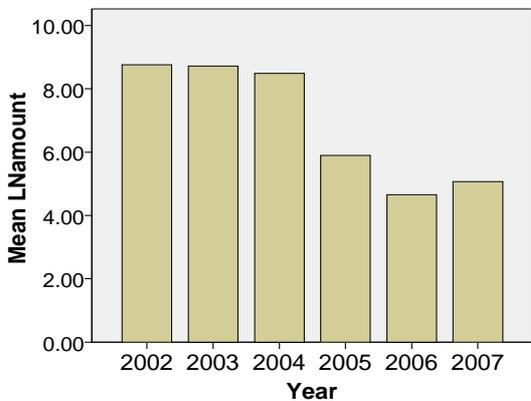
**Line chart:**



**Bar chart:**

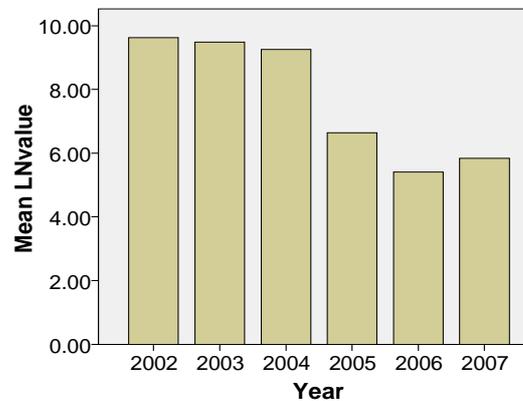
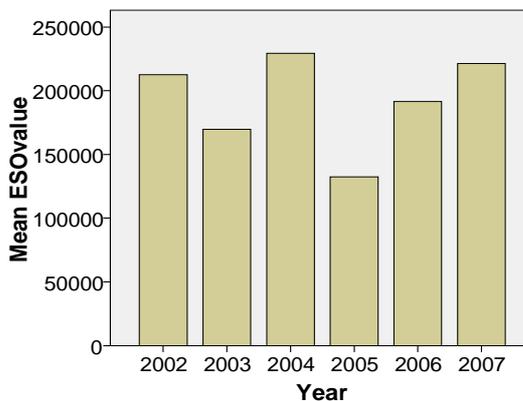
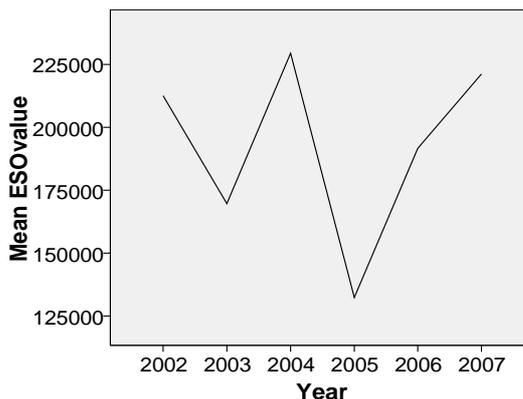


**Bar chart:**



**Panel C: ESO value**

On the y-axis the mean of the fair value of ESOs granted to CEOs is shown for the period 2002-2007 in both a line chart and a bar chart.



**Panel D: Significance of change of the dependent variables (2002 – 2007)**

Panel D shows the outcomes of Wilcoxon signed-rank tests that are performed for both the amount and the fair value of ESOs granted to CEOs. The Wilcoxon signed-rank test is a non-parametric test that is used, because both dependent variables are not normally distributed. The outcomes of the tests are shown in the table ‘Test Statistics(c)’. The results must be interpreted as follows. First, it is important to see whether the test is based on a negative or a positive rank. Thereafter, the significance of the test must be determined. Depending on the level of significance the assumptions that the rank is either negative or positive might be or might be not rejected. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**ESO amount:**

<b>Test Statistics(c)</b>					
	Year2003 -	Year2004 -	Year2005 -	Year2006 -	Year2007 -
	Year2002	Year2003	Year2004	Year2005	Year2006
Z	-1.282(a)	-.273(b)	-3.304(b)	-1.891(b)	-.356(a)
Asymp. Sig. (2-tailed)	.200	.785	.001***	.059*	.722

- a Based on negative ranks.
- b Based on positive ranks.
- c Wilcoxon Signed Ranks Test

<b>Test Statistics(b)</b>	
	AmountAfter2004 -
	AmountBefore2005
Z	-5.621(a)
Asymp. Sig. (2-tailed)	.000***

- a Based on positive ranks.
- b Wilcoxon Signed Ranks Test

ESO value:

Test Statistics(d)					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-.934(a)	-.440(b)	-2.043(a)	.000(c)	-.821(b)
Asymp. Sig. (2-tailed)	.351	.660	.041**	1.000	.411

- a Based on positive ranks.
- b Based on negative ranks.
- c The sum of negative ranks equals the sum of positive ranks.
- d Wilcoxon Signed Ranks Test

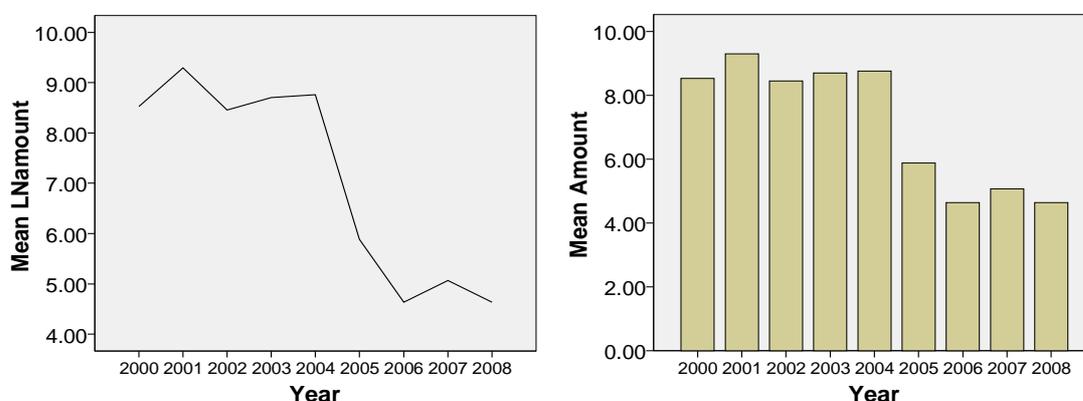
Test Statistics(b)	
	ValueAfter2004 - ValueBefore2005
Z	-3.700(a)
Asymp. Sig. (2-tailed)	.000***

- a Based on positive ranks.
- b Wilcoxon Signed Ranks Test

**Panel E: Significance of change of the dependent variables (including the years 2000, 2001, and 2008)**

In addition to panel A, B, C, and D of this appendix, panel E includes the years 2000, 2001 and 2008. However, data is only gathered for the amount of ESOs granted rather than for both the amount and the fair value of ESOs granted. To get an impression of the movement in ESOs granted first a line and bar chart are provided. Thereafter the results of the Wilcoxon signed-rank test are shown. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**Bar and line chart:**



**Wilcoxon signed-rank tests:**

**Test Statistics(c)**

	2001 - 2000	2002 - 2001	2003 - 2002	2004 - 2003	2005 - 2004	2006 - 2005	2007 - 2006	2008 - 2007
Z	-1.130(a)	-.700(b)	-1.282(a)	-.273(b)	-3.304(b)	-1.891(b)	-0.356(a)	-.156(b)
Asymp. Sig. (2-tailed)	.258	.484	.200	.785	.001***	.059*	.722	.876

- a Based on negative ranks.
- b Based on positive ranks.
- c Wilcoxon Signed Ranks Test

**Test Statistics(b)**

	AmountAfter2004	–
	AmountBefore2005	
Z	-5.875(a)	
Asymp. Sig. (2-tailed)	.000***	

a Based on positive ranks.

b Wilcoxon Signed Ranks Test

## Appendix VII – Research models for CEO compensation (2002-2007)

### Panel A: Independent variables

Panel A provides an overview of the mean, median and number of cases for the control variables of the research model as given in chapter five for the years 2002 till 2007.

#### Report

Year		Investment	Size	Performance	Leverage	Liquidity	CEOtenure	Volatility	Ownership
2002	Mean	.9689	7.2496	3.1732	.2625	.0021	4.6585	31.0671	1.6683
	N	41	41	41	41	41	41	41	41
	Std. Deviation	.66146	2.27554	9.89991	.16614	.08810	5.01303	11.51809	5.72238
2003	Mean	1.2111	7.2127	2.7646	.2555	-.0068	3.9512	32.0120	2.0500
	N	41	41	41	41	41	41	41	41
	Std. Deviation	.82917	2.25766	13.92242	.15934	.09120	3.49965	11.56996	6.41023
2004	Mean	1.3179	7.2912	5.0388	.2248	-.0152	4.5366	30.2237	2.0307
	N	41	41	41	41	41	41	41	41
	Std. Deviation	.91027	2.18247	10.87806	.16128	.09840	3.62697	10.14505	6.39481
2005	Mean	1.7058	7.4433	7.1917	.2049	-.0204	4.5366	29.3898	1.0768
	N	41	41	41	41	41	41	41	41
	Std. Deviation	1.68762	2.14912	11.46116	.14078	.09106	3.25651	9.71964	3.96275
2006	Mean	1.6935	7.5851	9.5956	.2102	-.0195	5.0976	27.9846	1.0936
	N	41	41	41	41	41	41	41	41
	Std. Deviation	1.25258	2.01272	10.76936	.11934	.08576	3.13692	8.87192	4.16461
2007	Mean	1.3948	7.7241	11.9941	.2347	-.0181	5.9024	27.1412	.4149
	N	41	41	41	41	41	41	41	41
	Std. Deviation	.90616	1.97957	13.79116	.12649	.08074	3.32269	8.43445	1.24021
Total	Mean	1.3820	7.4177	6.6263	.2321	-.0130	4.7805	29.6364	1.3890
	N	246	246	246	246	246	246	246	246
	Std. Deviation	1.11450	2.13200	12.23376	.14674	.08883	3.70887	10.15192	4.97221

**Panel B: ESO amount (2002-2007)**

Model

This section of panel B shows the results of the following regression model for the natural logarithm of the amount of ESOs granted to CEOs:

$$\text{LNamountCEO}_{it} = \alpha_i + \beta_1\text{TL1}_t + \beta_2\text{TL2}_t + \beta_3\text{Investment}_{it} + \beta_4\text{Size}_{it} + \beta_5\text{Performance}_{it} + \beta_6\text{Leverage}_{it} + \beta_7\text{Liquidity}_{it} + \beta_8\text{CEOtenure}_{it} + \beta_9\text{Volatility}_{it} + \beta_{10}\text{Ownership}_{it} + \epsilon_{it}$$

The variables TL1 and TL2 represent the period before and the period after expensing of ESOs was mandatory. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t2004$  after 2004. Or in other words, TL1 is 1 for 2002, 2 for 2003, and 3 for 2004, while TL2 is 1 for 2005, 2 for 2006, and 3 for 2007. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.159	2.331		.497	.619
	TL1	.668	.395	.148	1.691	.092*
	TL2	-1.323	.408	-.293	-3.241	.001***
	Investment	.793	.317	.169	2.503	.013**
	Size	.647	.157	.264	4.110	.000***
	Performance	.091	.038	.212	2.374	.018**
	Leverage	.790	2.278	.022	.347	.729
	Liquidity	1.399	4.886	.024	.286	.775
	CEOtenure	-.020	.088	-.014	-.222	.824
	Volatility	-.006	.038	-.012	-.161	.872
	Ownership	.025	.065	.024	.383	.702

a Dependent Variable: LNamount

Wald test

In this part of panel B the outcomes of the Wald test are shown. The Wald test is a coefficient test that is performed to test the significance of coefficients. As it is expected that  $\beta_1$  of  $TL1_t > \beta_2$  of  $TL2_t$  the null hypothesis that  $\beta_1 = \beta_2$  should be rejected. In Eviews this hypothesis was tested as follows:

$$H_0: c(2)=c(3)$$

Were  $c(2) =$  coefficient TL1

$c(3) =$  coefficient TL2

The results of the test should be interpreted by looking at the probability given by the F-statistic. When this value is significant the hypothesis, for which the Wald test is performed, that is tested is rejected. (The sign \*\*\* indicate a significance level of 1%)

**Wald test**

Equation: Untitled

Periods included: 6

Cross-sections included: 41

Total panel (balanced) observations: 246

Equation:

$$\text{Inamount} = c(1) + c(2) * \text{tl1} + c(3) * \text{tl2} + c(4) * \text{investment} + c(5) * \text{size} + c(6) * \text{performance} + c(7) * \text{leverage} + c(8) * \text{liquidity} + c(9) * \text{ceotenure} + c(10) * \text{volatility} + c(11) * \text{ownership}$$

Test Statistic	Value	df	Probability
F-statistic	44.57418	(1, 235)	0.0000***
Chi-square	44.57418	1	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2) - C(3)	1.992501	0.298440

Restrictions are linear in coefficients.

**Panel C: ESO value (2002-2007)**

Model

This section of panel C shows the results of the following regression model for the natural logarithm of the value of ESOs granted to CEOs:

$$\text{LNvalueCEO}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Performance}_{it} + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \beta_8 \text{CEOtenure}_{it} + \beta_9 \text{Volatility}_{it} + \beta_{10} \text{Ownership}_{it} + \varepsilon_{it}$$

The variables TL1 and TL2 represent the period before and the period after expensing of ESOs was mandatory. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t2004$  after 2004. Or in other words, TL1 is 1 for 2002, 2, for 2003, and 3 for 2004, while TL2 is 1 for 2005, 2 for 2006, and 3 for 2007. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-.119	2.613		-.045	.964
	TL1	.431	.444	.086	.970	.333
	TL2	-1.515	.458	-.304	-3.309	.001***
	Investment	.834	.355	.161	2.349	.020**
	Size	.758	.176	.280	4.302	.000***
	Performance	.121	.043	.257	2.834	.005***
	Leverage	1.550	2.555	.039	.607	.545
	Liquidity	2.629	5.482	.040	.480	.632
	CEOtenure	-.044	.099	-.028	-.445	.657
	Volatility	.040	.043	.070	.929	.354
	Ownership	.019	.073	.016	.258	.797

a Dependent Variable: LNvalue

Wald test

In this part of panel C the outcomes of the Wald test are shown. The Wald test is a coefficient test that is performed to test the significance of coefficients. As it is expected that  $\beta_1$  of  $TL1_t > \beta_2$  of  $TL2_t$  the null hypothesis that  $\beta_1 = \beta_2$  should be rejected. In Eviews this hypothesis was tested as follows:

$$H_0: c(2)=c(3)$$

Were  $c(2) =$  coefficient TL1

$c(3) =$  coefficient TL2

The results of the test should be interpreted by looking at the probability given by the F-statistic. When this value is significant the hypothesis, for which the Wald test is performed, that is tested is rejected. (The sign \*\*\* indicate a significance level of 1%)

**Wald test**

Equation: Untitled

Periods included: 6

Cross-sections included: 41

Total panel (balanced) observations: 246

Equation:

$$\text{Invalue} = c(1) + c(2) * tl1 + c(3) * tl2 + c(4) * \text{investment} + c(5) * \text{size} + c(6) * \text{performance} + c(7) * \text{leverage} + c(8) * \text{liquidity} + c(9) * \text{ceotenure} + c(10) * \text{volatility} + c(11) * \text{ownership}$$

Test Statistic	Value	df	Probability
F-statistic	33.83961	(1, 235)	0.0000***
Chi-square	33.83961	1	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2) - C(3)	1.947348	0.334758

Restrictions are linear in coefficients.

## Appendix VIII – Research model for CEO compensation (2001-2008)

### Model

This section of panel B shows the results of the following regression model for the natural logarithm of the amount of ESOs granted to CEOs:

$$\text{LNamountCEO}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Performance}_{it} + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \beta_8 \text{CEOtenure}_{it} + \beta_9 \text{Volatility}_{it} + \beta_{10} \text{Ownership}_{it} + \varepsilon_{it}$$

The variables TL1 and TL2 represent the period before and the period after expensing of ESOs was mandatory. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t2004$  after 2004. Or in other words, TL1 is 1 for 2001, 2 for 2002, 3 for 2003, and 4 for 2004, while TL2 is 1 for 2005, 2 for 2006, 3 for 2007, and 2 for 2008. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

### Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	T	
1	(Constant)	1.259	2.053		.613	.540
	TL1	.553	.259	.157	2.138	.033**
	TL2	-.877	.264	-.249	-3.321	.001***
	Investment	.761	.254	.167	3.000	.003***
	Size	.530	.137	.216	3.856	.000***
	Performance	.053	.030	.128	1.750	.081*
	Leverage	2.633	1.975	.075	1.333	.183
	Liquidity	1.230	3.882	.021	.317	.752
	CEOtenure	.003	.074	.002	.037	.971
	Volatility	.005	.034	.010	.160	.873
	Ownership	.008	.058	.007	.133	.894

a Dependent Variable: LNamount

Wald test

In this part of panel B the outcomes of the Wald test are shown. The Wald test is a coefficient test that is performed to test the significance of coefficients. As it is expected that  $\beta_1$  of  $TL1_t > \beta_2$  of  $TL2_t$  the null hypothesis that  $\beta_1 = \beta_2$  should be rejected. In Eviews this hypothesis was tested as follows:

$$H_0: c(2)=c(3)$$

Were  $c(2)$  = coefficient TL1

$c(3)$  = coefficient TL2

The results of the test should be interpreted by looking at the probability given by the F-statistic. When this value is significant the hypothesis, for which the Wald test is performed, that is tested is rejected. (The sign \*\*\* indicate a significance level of 1%)

**Wald test**

Equation: Untitled

Periods included: 8

Cross-sections included: 41

Total panel (balanced) observations: 328

Equation:

Inamount=c(1)+c(2)\*tl1+c(3)\*tl2+c(4)\*investment+c(5)\*size+c(6)\*performanc  
 e+c(7)\*leverage+c(8)\*liquidity+c(9)\*ceotenure+c(10)\*volatility+c(11)\*owners  
 hip

Test Statistic	Value	df	Probability
F-statistic	49,88075	(1, 317)	0.0000***
Chi-square	49,88075	1	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2) - C(3)	1.430188	0.202501

Restrictions are linear in coefficients.

## Appendix IX – Descriptive statistics for total employee compensation (2002 - 2007)

### Panel A: Dependent variables

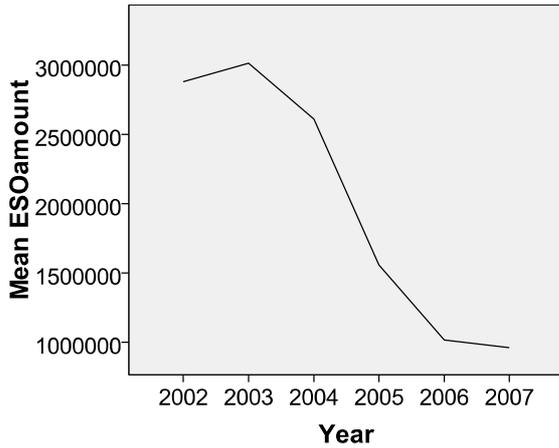
Panel A provides an overview of the mean, median and number of cases for both the amount and Black-Scholes-Merton value of ESOs granted to total employees in the year 2002 till 2007.

<b>Report</b>			
Year		ESOamount	ESOvalue
2002	Mean	2878946.39	13361680.12
	Median	617600	1283140.36
	N	41	41
2003	Mean	3012867.02	7388017.73
	Median	624500	1006900.48
	N	41	41
2004	Mean	2610468.98	8037121.71
	Median	535530	645887
	N	41	41
2005	Mean	1557543.73	5489298.59
	Median	165000	606070.50
	N	41	41
2006	Mean	1017959,05	6236453.45
	Median	201200	756520.68
	N	41	41
2007	Mean	960754.46	5878921.42
	Median	204000	976752
	N	41	41
Total	Mean	200642.27	7731915.50
	Median	253074.50	774348
	N	246	246

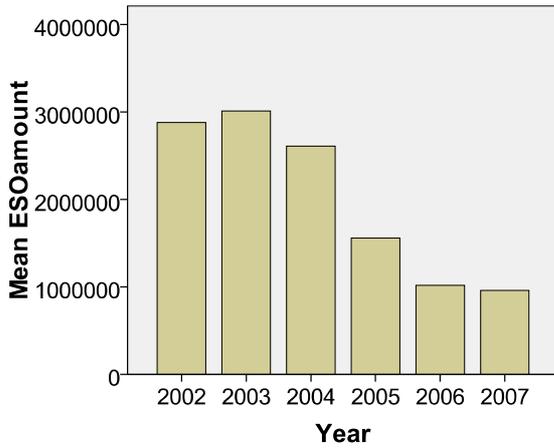
**Panel B: ESO amount**

On the y-axis the mean of the amount of ESOs granted to total employees is shown for the period 2002-2007 in both a line chart and a bar chart.

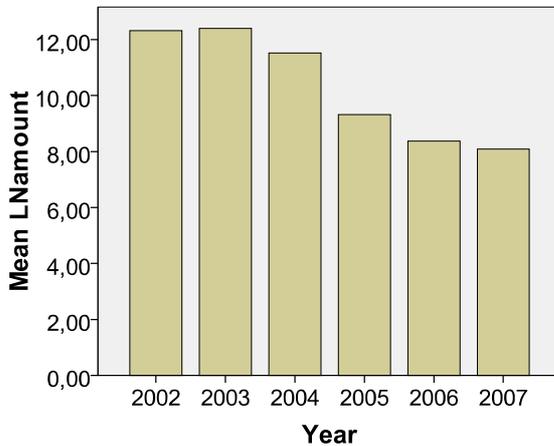
**Line chart:**



**Bar chart:**

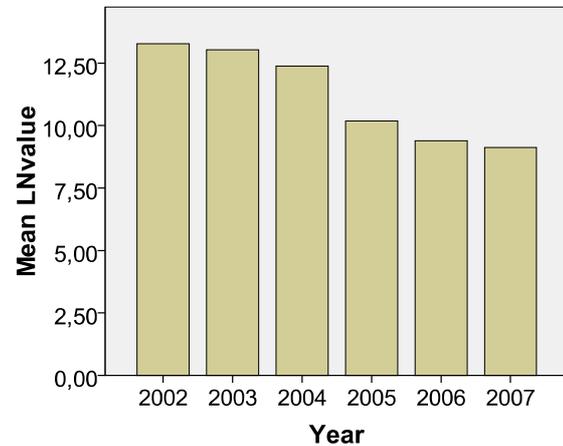
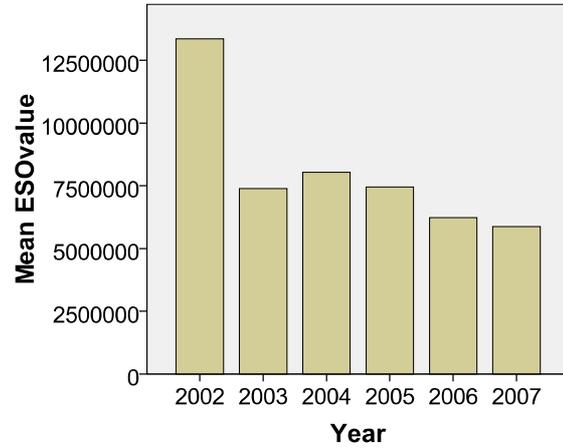
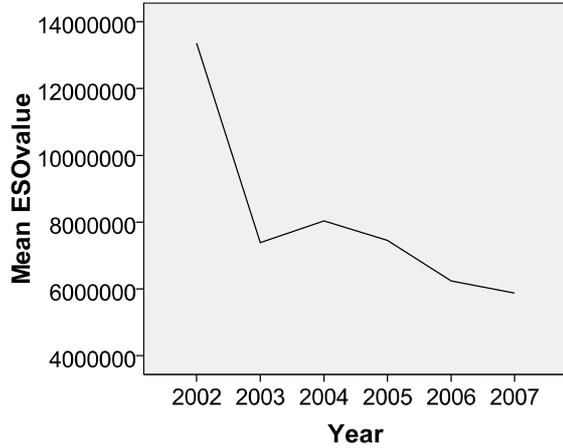


**Bar chart:**



**Panel C: ESO value**

On the y-axis the mean of the fair value of ESOs granted to total employees is shown for the period 2002-2007 in both a line chart and a bar chart.



**Panel D: Significance of change of the dependent variables (2002 – 2007)**

Panel D shows the outcomes of Wilcoxon signed-rank tests that are performed for both the amount and the fair value of ESOs granted to CEOs. The Wilcoxon signed-rank test is a non-parametric test that is used, because both dependent variables are not normally distributed. The outcomes of the tests are shown in the table ‘Test Statistics(c)’. The results must be interpreted as follows. First, it is important to see whether the test is based on a negative or a positive rank. Thereafter, the significance of the test must be determined. Depending on the level of significance the assumptions that the rank is either negative or positive might be or might be not rejected. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**ESO amount:**

<b>Test Statistics(c)</b>					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-1.775(a)	-.766(b)	-1.966(b)	-.930(b)	-.038(b)
Asymp. Sig. (2-tailed)	.076*	.444	.049***	.352	0.970

a Based on negative ranks.

b Based on positive ranks.

c Wilcoxon Signed Ranks Test

<b>Test Statistics(b)</b>	
	AmountAfter2004 - AmountBefore2005
Z	-5.187(a)
Asymp. Sig. (2-tailed)	.000***

a Based on postive ranks.

b Wilcoxon Signed Ranks Test

ESO value:

Test Statistics(d)					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-1.574(a)	-1.263(b)	-1,577(a)	-1.092(b)	-1.009(b)
Asymp. Sig. (2-tailed)	0.115	.206	0,115	0.275	.313

a Based on positive ranks.

b Based on negative ranks.

c Wilcoxon Signed Ranks Test

Test Statistics(b)	
	ValueAfter2004 - ValueBefore2005
Z	-2.834 (a)
Asymp. Sig. (2-tailed)	.005***

a Based on positive ranks.

b Wilcoxon Signed Ranks Test

**Appendix X – Research models for total employee compensation (2002-2007)**

**Panel A: ESO amount (2002-2007)**

Model

This section of panel A shows the results of the following regression model for the natural logarithm of the amount of ESOs granted to total employees:

$$\text{LNamountTOTAL}_{it} = \alpha_i + \beta_1 \text{TL1}_t + \beta_2 \text{TL2}_t + \beta_3 \text{Investment}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Performance}_{it} + \beta_6 \text{Leverage}_{it} + \beta_7 \text{Liquidity}_{it} + \beta_8 \text{CEOtenure}_{it} + \beta_9 \text{Volatility}_{it} + \beta_{10} \text{Ownership}_{it} + \varepsilon_{it}$$

The variables TL1 and TL2 represent the period before and the period after expensing of ESOs was mandatory. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t2004$  after 2004. Or in other words, TL1 is 1 for 2002, 2 for 2003, and 3 for 2004, while TL2 is 1 for 2005, 2 for 2006, and 3 for 2007. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	T	
1	(Constant)	1.235	2.520		.490	.624
	TL1	.327	.427	.065	.766	.445
	TL2	-1.401	.441	-.280	-3.174	.002***
	Investment	1.068	.343	.206	3.115	.002***
	Size	1.036	.170	.382	6.089	.000***
	Performance	.018	.041	.039	.445	.657
	Leverage	-1.154	2.463	-.029	-.469	.640
	Liquidity	6.486	5.283	.100	1.228	.221
	CEOtenure	-.080	.095	-.051	-.834	.405
	Volatility	.052	.041	.091	1.254	.211
	Ownership	.076	.070	.066	1.088	.278

a Dependent Variable: LNamount

Wald test

In this part of panel A the outcomes of the Wald test are shown. The Wald test is a coefficient test that is performed to test the significance of coefficients. As it is expected that  $\beta_1$  of  $TL1_t > \beta_2$  of  $TL2_t$  the null hypothesis that  $\beta_1 = \beta_2$  should be rejected. In Eviews this hypothesis was tested as follows:

$$H_0: c(2)=c(3)$$

Were  $c(2)$  = coefficient TL1

$c(3)$  = coefficient TL2

The results of the test should be interpreted by looking at the probability given by the F-statistic. When this value is significant the hypothesis, for which the Wald test is performed, that is tested is rejected. (The sign \*\*\* indicate a significance level of 1%)

**Wald test**

Equation: Untitled

Periods included: 6

Cross-sections included: 41

Total panel (balanced) observations: 246

Equation:

Inamount=c(1)+c(2)\*tl1+c(3)\*tl2+c(4)\*investment+c(5)\*size+c(6)\*performanc  
 e+c(7)\*leverage+c(8)\*liquidity+c(9)\*ceotenure+c(10)\*volatility+c(11)\*owners  
 hip

Test Statistic	Value	df	Probability
F-statistic	28.72648	(1, 235)	0.0000***
Chi-square	28.72648	1	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2) - C(3)	1.729370	0.322661

Restrictions are linear in coefficients.

**Panel B: ESO value (2002-2007)**

Model

This section of panel B shows the results of the following regression model for the natural logarithm of the value of ESOs granted to total employees:

$$\text{LNvalueTOTAL}_{it} = \alpha_i + \beta_1\text{TL1}_t + \beta_2\text{TL2}_t + \beta_3\text{Investment}_{it} + \beta_4\text{Size}_{it} + \beta_5\text{Performance}_{it} + \beta_6\text{Leverage}_{it} + \beta_7\text{Liquidity}_{it} + \beta_8\text{CEOtenure}_{it} + \beta_9\text{Volatility}_{it} + \beta_{10}\text{Ownership}_{it} + \varepsilon_{it}$$

The variables TL1 and TL2 represent the period before and the period after expensing of ESOs was mandatory. As a consequence, TL1 is equal to  $t$  before 2005 and zero after 2004 and TL2 is equal to zero before 2005 and  $t - t2004$  after 2004. Or in other words, TL1 is 1 for 2002, 2, for 2003, and 3 for 2004, while TL2 is 1 for 2005, 2 for 2006, and 3 for 2007. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-.444	2.771		-.160	.873
	TL1	.299	.470	.055	.637	.525
	TL2	-1.354	.485	-.249	-2.789	.006***
	Investment	1.137	.377	.201	3.017	.003***
	Size	1.178	.187	.399	6.298	.000***
	Performance	.031	.045	.060	.685	.494
	Leverage	-.338	2.709	-.008	-.125	.901
	Liquidity	5.122	5.809	.072	.882	.379
	CEOtenure	-.078	.105	-.045	-.742	.459
	Volatility	.089	.045	.143	1.949	.250
	Ownership	.083	.077	.066	1.078	.282

a Dependent Variable: LNvalue

Wald test

In this part of panel B the outcomes of the Wald test are shown. The Wald test is a coefficient test that is performed to test the significance of coefficients. As it is expected that  $\beta_1$  of TL1<sub>t</sub> >  $\beta_2$  of TL2<sub>t</sub> the null hypothesis that  $\beta_1 = \beta_2$  should be rejected. In Eviews this hypothesis was tested as follows:

$$H_0: c(2)=c(3)$$

Were c(2) = coefficient TL1

c(3) = coefficient TL2

The results of the test should be interpreted by looking at the probability given by the F-statistic. When this value is significant the hypothesis, for which the Wald test is performed, that is tested is rejected. (The sign \*\*\* indicate a significance level of 1%)

**Wald test**

Equation: Untitled

Periods included: 6

Cross-sections included: 41

Total panel (balanced) observations: 246

Equation:

$$\text{Invalue} = c(1) + c(2) * \text{tl1} + c(3) * \text{tl2} + c(4) * \text{investment} + c(5) * \text{size} + c(6) * \text{performance} + c(7) * \text{leverage} + c(8) * \text{liquidity} + c(9) * \text{ceotenure} + c(10) * \text{volatility} + c(11) * \text{ownership}$$

Test Statistic	Value	df	Probability
F-statistic	21.73892	(1, 235)	0.0000***
Chi-square	21.73892	1	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2) - C(3)	1.654354	0.354821

Restrictions are linear in coefficients.









**Panel C: Shifting event year to 2004**

Panel C of appendix XI provides the outcomes of Wilcoxon signed-rank tests that were performed after having shifted the event year from 2005 to 2004. Test results for the amount and the fair value of ESOs granted are shown separately. In addition also the outcomes for ESOs granted to CEOs and total employees are segregated. Left the outcomes of the model for ESOs granted to CEOs and right the outcomes for ESOs granted to total employees are presented.

**ESO amount CEOs (2002-2007):**

<b>Test Statistics(b)</b>	
	ValueAfter2003 –
	ValueBefore2004
Z	-2,083 (a)
Asymp. Sig. (2-tailed)	.370

a Based on positive ranks.

b Wilcoxon Signed Ranks Test

**ESO amount total employees (2002-2007):**

<b>Test Statistics(b)</b>	
	ValueAfter2003 –
	ValueBefore2004
Z	-.434 (a)
Asymp. Sig. (2-tailed)	0.664

**ESO value CEOs (2002-2007):**

<b>Test Statistics(b)</b>	
	ValueAfter2003 –
	ValueBefore2004
Z	-1.208 (a)
Asymp. Sig. (2-tailed)	.227

a Based on positive ranks.

b Wilcoxon Signed Ranks Test

**ESO value total employees (2002-2007):**

<b>Test Statistics(b)</b>	
	ValueAfter2003 –
	ValueBefore2004
Z	-.875 (a)
Asymp. Sig. (2-tailed)	.0.382

**Panel C: Including year dummy in the research models (2002-2007)**

This section shows the results of the following regression model for the natural logarithm of the amount of ESOs granted to CEOs and total employees for the period 2002 till 2007:

$$\text{ESOuse}_{it} = \alpha_i + \beta_1 \text{Investment}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{Performance}_{it} + \beta_4 \text{Leverage}_{it} + \beta_5 \text{Liquidity}_{it} + \beta_6 \text{CEOTenure}_{it} + \beta_7 \text{Volatility}_{it} + \beta_8 \text{Ownership}_{it} + \beta_9 \text{Year2005} + \varepsilon_{it}$$

(The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**CEO compensation:**

**Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.751	2.409		1.142	.255
	Investment	.569	.343	.122	1.660	.098*
	Size	.517	.169	.211	3.065	.002***
	Performance	.033	.040	.077	.817	.414
	Leverage	.990	2.467	.028	.401	.689
	Liquidity	-2.195	5.276	-.037	-.416	.678
	CEOTenure	-.098	.095	-.069	-1.030	.304
	Volatility	-.010	.041	-.019	-233	.816
	Ownership	.059	.070	.057	.850	.396
	Year2005	-1.496	.888	-.107	-1.684	.094*

a Dependent Variable: LNAmount

Total employee compensation:

**Coefficients(a)**

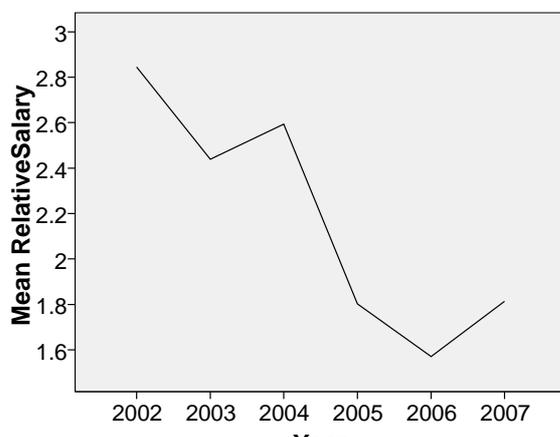
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2,214	2,534		,874	,383
	Investment	,886	,361	,171	2,457	,015**
	Size	,922	,178	,340	5,190	,000***
	Performance	-,035	,042	-,073	-,818	,414
	Leverage	-,998	2,596	-,025	-,384	,701
	Liquidity	3,120	5,550	,048	,562	,575
	CEOtenure	-,151	,100	-,096	-1,515	,131
	Volatility	,048	,044	,084	1,103	,271
	Ownership	,106	,074	,091	1,444	,150
	Year2005	-1,572	,934	-,102	-1,683	,094*

a Dependent Variable: LNvalue

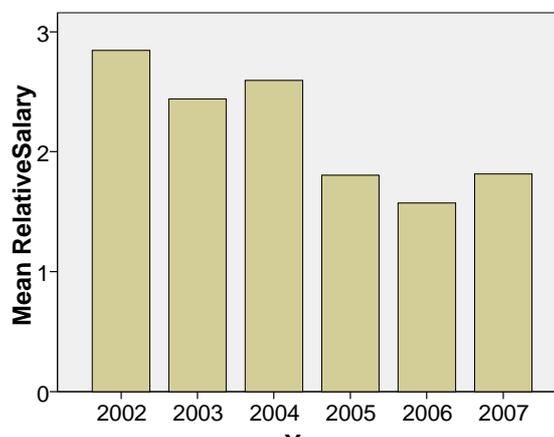
**Panel D: Value of ESOs relative to CEOs’ fixed salaries**

In this panel the relation between the fair value of ESOs granted to CEOs and CEOs’ fixed salaries is observed by dividing the fair value of ESOs granted to CEOs by CEOs’ fixed salaries. Below the outcomes of this relation are shown with the use of charts and Wilcoxon signed-rank tests. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

Line chart:



Bar chart:



Wilcoxon signed-rank tests:

Test Statistics(d)					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-1.854(a)	-.475(b)	-2.163(a)	-.086(a)	-1.008(b)
Asymp. Sig. (2-tailed)	.064**	.635	.031**	.932	.313

a Based on positive ranks.

b Based on negative ranks.

c Wilcoxon Signed Ranks Test

Test Statistics(b)	
	ValueAfter2004 - ValueBefore2005
Z	-3.790(a)
Asymp. Sig. (2-tailed)	.000***

a Based on positive ranks.

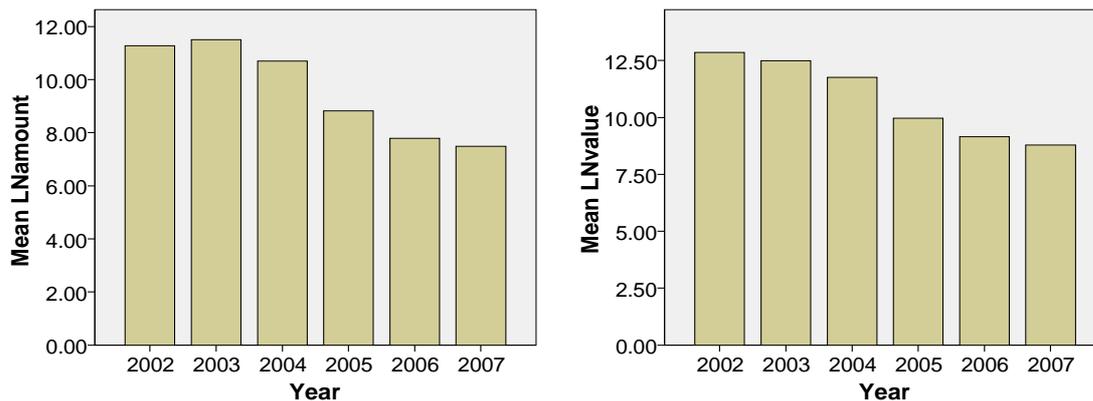
b Wilcoxon Signed Ranks Test

## Appendix XII – Additional analyses

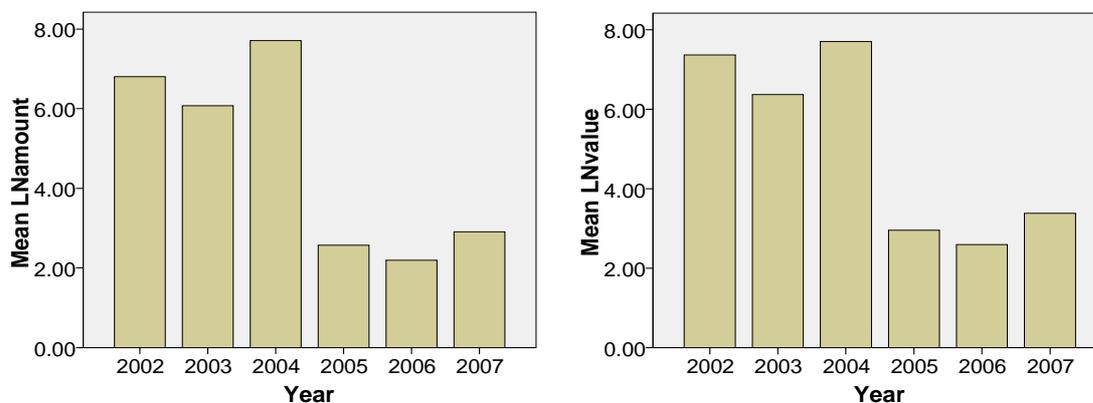
### Panel A: Differentiate between AEX, AMX, and AScX

Below the amount and the fair value of ESOs granted to CEOs are shown after having separated the sample into three groups based on firms’ listing classifications.

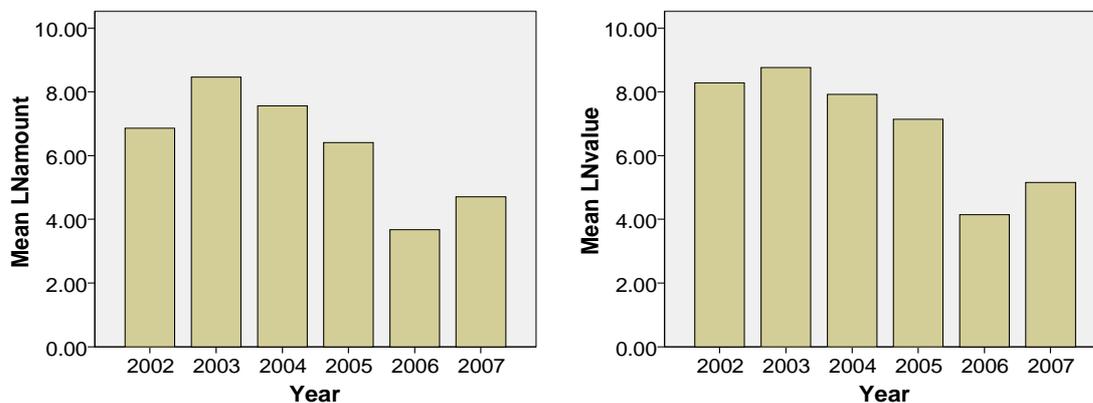
#### AEX:



#### AMX:



#### AScX:



**Panel B: Wilcoxon signed-rank tests**

In panel B the outcomes of the Wilcoxon signed-rank tests for both differences between years and the period before and after the implementation of IFRS 2 are provided for the amount of ESOs granted to CEOs during the period 2002 till 2007. As the sample was divided into three groups based on firms’ listing classifications for each groups the outcomes are shown individually. (The signs \*\*\*, \*\*, \* indicates significance at a 1%, 5% and 10% level respectively).

**AEX:**

Test Statistics(d)					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-1.260(a)	-.863(b)	-2.401(b)	-1.274(b)	-.280(b)
Asymp. Sig. (2-tailed)	.208	.388	.016**	.203	.779

- a Based on negative ranks.
- b Based on positive ranks..
- c Wilcoxon Signed Ranks Test

Test Statistics(b)	
	ValueAfter2004 - ValueBefore2005
Z	-3.420(a)
Asymp. Sig. (2-tailed)	.001***

- a Based on positive ranks.
- b Wilcoxon Signed Ranks Test

**AMX:**

Test Statistics(d)					
	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-.734(a)	-.968(b)	-2.357(a)	.000(c)	-.447(b)
Asymp. Sig. (2-tailed)	.463	.333	.018**	1.000	.655

- a Based on positive ranks.
- b Based on negative ranks.
- c The sum of negative ranks equals the sum of positive ranks.
- d Wilcoxon Signed Ranks Test

**Test Statistics(b)**

	ValueAfter2004 - ValueBefore2005
Z	-3.307(a)
Asymp. Sig. (2-tailed)	.001***

a Based on positive ranks.

b Wilcoxon Signed Ranks Test

AScX:

**Test Statistics(d)**

	Year2003 - Year2002	Year2004 - Year2003	Year2005 - Year2004	Year2006 - Year2005	Year2007 - Year2006
Z	-1.680(a)	-.524(b)	-.944(b)	-1.753(b)	-1.000(a)
Asymp. Sig. (2-tailed)	.093*	.600	.345	.080*	.317

a Based on negative ranks.

b Based on positive ranks..

c Wilcoxon Signed Ranks Test

**Test Statistics(b)**

	ValueAfter2004 - ValueBefore2005
Z	-2.453(a)
Asymp. Sig. (2-tailed)	.014**

a Based on positive ranks.

b Wilcoxon Signed Ranks Test