The Determinants and Impacts of Executive Stock Options

Evidence from OMXS30

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Abstract

The thesis main objective is to establish the determinants for granting executive stock options and to examine their impact on performance for firms listed on OMXS30. The analysis is based on accounting data gathered from annual reports and Thomson Datastream. The empirical results display that firms grant stock options to mitigate the principal-agent problem. Furthermore, risk proves to be positively significant with executive stock options, implying that either executives increase the level of risk after being granted stock options or influence the decision of the remuneration towards stock options when the firm increase the level of risk, in purpose to boost the expected value of their options. No relation between executive stock options and firm performance could be established.

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Key Words   Executive Stock Options, Cross-Sectional Data, Firm
                                 Performance, Discretionary Accruals, Agency Theory

Purpose   The aim of this study is to identify the determinants of XSO and
                                 the impact of XSO incentive programs on Swedish firm
                                 performance. Hence, the thesis aims to clarify the motives behind
                                 the use of XSO and whether these executive holdings have a
                                 positive or negative impact on firm performance.

Methodology   Cross-sectional regressions using OLS are performed to establish
                                 the determinants of XSO and how XSO affect firm performance.
                                 In addition, t-tests are conducted to compare adjusted performance
                                 and discretionary accruals between firms which have XSO and
                                 firms which do not have XSO.

Theoretical Perspectives   The theoretical framework is based on agency theory and previous
                                 studies on XSO.

Empirical Foundation   The empirical findings present results of determinants of executive
                                 stock options and their impact on firm performance.

Conclusions   The prediction of the principal-agent theory and risk taking act as
                                 determinants for granting executive stock options. Furthermore we
                                 find no statistical evidence that executive stock options have any
                                 value implications on firm performance.

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1. Introduction

*T*he introduction provides a background on the difficulties of aligning managements and shareholders' interests. This background provides a foundation for a more narrow discussion regarding executive stock options incentives program, which leads to the purpose of the thesis. Finally, a thesis outline is presented.

1.1 Background

Corporate governance and compensation schemes have, for decades, attracted an extensive interest from various scholars. In generic terms, financial economists have scrutinized corporate governance and compensation schemes' impact on firm performance. Compensation schemes have also received a high degree of interest from an accounting perspective. These studies mainly focus on how different compensation schemes affect earnings management. The theories of corporate governance and compensation schemes originate from theories concerning the misalignment in interests between management and the owners – the principal-agent relationship.

The principal-agent relationship can be defined as a contract in which the owners or certain stakeholders to the firm (the principals) contracts another party (the agents) to perform a service on their behalf (Jensen and Meckling, 1976). Difficulties in this relationship arise if there is asymmetric information, i.e. if one party have more information than the other. Jensen and Meckling (1976) argue that if the participants of the principal–agent relationship are utility maximizers the agent will not exclusively act in the interest of the principals.

There are several mechanisms in monitoring that can be used to control the problems between the managers[1] and shareholders. Agrawal (1996) examines seven of these; insider and institutional shareholdings, shareholdings by blockholders, the use of outsiders on the board of directors, debt financing, the external labour market for managers, and the market for corporate control. According to Cornett et al. (2008) a high stock and/or option ownership by management could improve the incentives for the agents to act in a value maximizing manor. It could also encourage the stock option holders to make short-term investments to create

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[1] Managers and executives are through this thesis used interchangeable.

value and thereby increase their personal wealth. Hence, a high degree of management ownership could also encourage management to focus on stock prices instead of long-term value creating.

Morck et al. (1988) examine how management ownership affects firm valuation measured by Tobin's Q. They find that Tobin's Q increases when management ownership of the firm increases from 0 to 5 percent and then Tobin's Q falls as ownership rises. Thus, management ownership, up to a certain point, has a positive effect on firm value. Morck et al. conclude that non-value-maximizing behaviour is more extensive in firms in which management has more control, since external shareholders find it difficult to control managers that have too much control over the firm. These findings are coherent with McConnell and Servaes (1990) and Mehran (1995) who also find a positive relationship between Tobin's Q and management ownership. A somewhat more recent study conducted by Short and Keasey (1999) provide further corroboration that managers become entrenched at too high levels of ownership. Contrary, Himmelberg et al. (1999) suggest that there is no relation between management ownership and firm performance.

Nevertheless, executive stock options (XSO) have become increasingly popular to use as executive compensation and as a way to align the interest of management and shareholders. Lam and Chng (2006) present figures showing that stock options accounted for 54 percent of total S&P 500 executive compensation in year 2001, an increase from 34 percent in 1992. The statistics presented by Lam and Chng show that more than 80 percent of the S&P 500 firms used stock options as way to compensate top managers.

There are numerous studies within the stock option field. These studies can be divided into three principal branches; (i) the determinants of stock option incentive programs (e.g. Lewellen, 1997; Himmelberg et al. 1999; Chng and Lam, 2006), (ii) earnings management as a consequence of equity based compensation (e.g Healy and Wahlen, 1999; Bergstresser and Philippon, 2006; Cornett et al., 2008), and (iii) the various impacts that stock options have on the firm (e.g. Jensen and Murphy, 1990; DeFusco et al., 1990; Mehran, 1995; Cornett et al., 2008).

1.2 Problem Discussion

Equity based compensation to executives and how to account for the principal-agent problem has been a subject discussed for several years. The main incentive behind the schemes is to align shareholders and managers interest. Hence, creating a situation in which firm performance is favoured.

Aktiespararna, a Swedish organization that represents and nourishes the minor stockholders, has presented criticism against firms that grant stock options as a means of compensation to the executives. Their criticism is above all a result of the Skandia scandal in 2003, where the enormous amount of executive compensation was considered to be unethical. The organization proclaims that executive stock option incentive programs are not favorable for the shareholders, nor for the confidence of the stock market. (Internet 1) However, Aktiespararna declares that a broader program including other than the executives could be beneficial for the stockholders. (Internet 2)

Albin Rännar, administrative director at Nordic Investor Services and advisor for institutional stock holders, argues that the use of stock options as an approach to remunerate the members of the board are rare in Swedish public firms, but common in the management team in the firm. Mats Gullbrandt, head of the stock division at AMF Pension, explains this phenomena as a way to reduce the will to engage in high risk projects. Furthermore, to create a balance in the risk attitude of the firm by choosing not to grant stock options to both the members of the board and to the management in a firm. This notion is the main reason why the Swedish Code of Corporate Governance, an assembly of voluntary conduct directives, says no to granting stock options to the board members. (Internet 3) These directives, however, only refer to public companies listed in OMX Stockholm with a market value above SEK 3 billions. (Internet 4)

Hans Dalborg, a chairman of a commission that supervises firms which ensures that they act in line with the Swedish Code of Corporate Governance, also criticizes firms for the way they account for their incentive programs and states that they are difficult to grasp and interpret by the stockholders. (Internet 5)

Research conducted by academics suggest that the main purpose of management stock options seems to be aligning managers' incentives to the best of the shareholders, as a preventive measure to the principal-agent problem. Authors like Himmelberg et al. (1999), Lam and Chng (2006), and Chourou (2008) investigate the determinants of executive equity holdings. Himmelberg et al. (1999) and Lam and Chng (2006) conclude that managerial ownership can be explained in ways consistent with the principal-agent theory. The prediction of the principal-agent theory is value enhancement. Other determinants of executive equity ownership are capital constraints and risk taking. Furthermore, Chourou et al. (2008) concludes a positive relation between determinants such as growth opportunities and firm size and the granting of XSO.

Lewellen et al. (1997) emphasize two additional reasons of constructing equity-based incentives; reducing differences between the owners and managers in their preferred investment time horizon and in their risk attitude. However Lam and Chng (2006) establish a convex relation between market value and granted stock options. They further conclude that issuing stock options signals future positive stock price development.

A stock options program makes the holders particularly sensitive to stock price, thereby XSO have a large impact on earnings management. (Cornett et al., 2008) In a research conducted by Bergstresser and Philippon (2006), the authors find a positive relation between manipulated earnings and executive compensation tied to the performance of accounting earnings. A study conducted by Cheng and Warfield (2005) states that managers with a high degree of equity incentives are more biased towards reporting earnings in line with market expectations, even though the earnings may have exceeded expectations. This action keeps market expectations low in order to avoid future earnings disappointments, hence the future stock price is less likely to experience a downfall implying a decrease of the value in executive´s stock options. Yermack (1997), Aboody and Kasznik (2000) also establish that management tend to consider the timing when releasing news which have a significant impact on stock price, and thereby an impact on their holdings in the firm.

According to DeFusco et al. (1990), subsequent to the firms´ implementation of management stock options, the majority of the firms showed a decline in return on assets and reduced investments in growth opportunities. Furthermore the ratio selling, general and administrative

costs to total assets increased, which the authors clearly point out that this is the quite contrary of the expected outcome of the pre-emptive actions against the principal-agent problem.

Several scholars have investigated what kind of impact equity based compensation schemes have on firm performance and the results are inconclusive. Authors like e.g. Morck et al. (1988), Jensen and Murphy (1990), Mehran (1995), Agrawal and Knoeber (1996) find that stock option incentives granted to management will lead to some form of improved firm performance. Contrary, authors like Core et al. (1999), Ittner et al. (2003), and Cornett et al. (2008) find that equity based compensation such as stock options have no such positive impact on firm performance.

Further implications of a stock option incentive systems are; a positive relationship with executive turnover (Balsam and Miharjo, 2007), an increasing risk of a fraudulent behavior in severely manipulating earnings (Denis et al., 2006), an increasing focus on short-term performance resulting in reduced investments and development (Dechow and Sloan, 1991).

Despite the rather extensive research on stock options and equity based compensation, there is no general accepted consensus concerning executive stock options' impact on firm performance. Furthermore, there is no conducted research to our knowledge that examines stock option incentive programs, and determinants of XSO, on the Swedish market and their relation to firm performance. Hence, a study on Swedish firms would contribute to the aggregated body of research.

1.3 Purpose

The aim of the study is to investigate the determinants of XSO and the impact of XSO incentive programs on Swedish firm performance. Hence, the thesis aims to clarify the motives behind the use of XSO and whether these executive holdings have a positive or negative impact on firm performance.

1.4 Delimitation

The research will be conducted examining Swedish companies listed on the OMXS30 with a sample period between year 1998 and 2007.

1.5 Thesis Outline

2. Theoretical Framework
- The second chapter presents a theoretical framework regarding stock options that will constitute the foundation and motivation of the hypothesiess in the cross-sectional analysis.

3. Hypothesis Development
- The third chapter presents the hypothesises that are tested for in the empirical section and discussed in the section of analysis.

4. Methodology
- The fourth chapter presents the applied methodology and the data collection. Furthermore we discuss our cross-sectional approach and the dependent and independent variables used in the same. Lastly, potential methodological problems are discussed

5. Empirical Findings
- The fifth chapter presents our empirical findings.

6. Analysis
- The sixth chapter comprises an analysis of the empirical findings.

7. Conclusions
- The seventh and final chapter concludes the thesis and summarizes the findings in relation to the purpose. Further research whithin this field of study is also suggested.

2 Theoretical Framework

T̶he theoretical framework provides the reader with basic agency theory, and various previous theories concerning equity based compensation impact on firm performance. Furthermore, a brief comparison between accounting standards in Sweden (the EU) and the USA is performed, concerning share based compensation.

2.1 Principal Agent and Agency Costs

The principal–agent (PA) relationship and agency costs are highly connected with the aligning of interests in a firm. Hence, there is a close connection between stock option compensation programs and the PA relationship and agency costs.

2.1.1 The Principal Agent Relationship

The problem of aligning managers' incentives in a firm with the owners' has been an issue discussed for a long period of time amongst scholars. An outcome of this discussion defined by authors Jensen and Meckling (1976) is the PA relationship which refers to the agents (managers) that perform a service on behalf of the owners (principals). If the managers and the owners both act in a value maximizing manor there are reason to believe that their interests not always will be aligned. If there are information asymmetries in this relationship one party, the agent, possess more information than the other party, the principal. This situation enhances the reason for the principals to monitor the agents. Information asymmetry relates to discussions about problems such as adverse selection (e.g. Akerlof, 1970) and moral hazard (e.g. Dobson and Soenen, 1993).

Jensen and Meckling (1976) argue that this incomplete alignment of the PA relationship conveys an incentive for the owners to contract or monitor the managers to ensure that they act in their interests. The monitoring or contracting of the managers introduces agency costs (e.g. Jensen and Meckling, 1976; Fama, 1980; Denis et al., 1997).

2.1.2 Agency Costs

If a firm was to be solely owned by managers, i.e. if the managers would posses 100 percent of the equity in the firm, there would be zero or very small agency costs. If management's

equity stake were to decrease then the agency costs would increase. (Jensen and Meckling, 1976) Ang et al (2000) postulate that these zero agency cost cases are hardly found in a publicly traded firm because of the fact of minimum number of shareholders, exchange regulations and personal wealth constraints. This fact suggests that agency costs are present, to some extent, in every publicly traded firm. Furthermore the authors argue, in line with Jensen and Meckling (1976), that the extent to which the agency costs are present depends on the ownership structure on the firm.

Granting stock options to executives can be a method to align their interests with the shareholders. The dominant motivation of stock option grants according to Lam and Chng (2006) are consistent with the signalling hypothesis and the agency theory. Following Spence's (1973) work on the signalling hypothesis, the granting of stock options could work as methods for the executives to signal to the shareholders that they indeed have the same interests as them. When the executives salary is linked to the equity of the firm they then signal to the shareholders that they seek to maximize long-term firm value, and stock price. Regardless of the signals the stock option incentive program sends, only the insiders of the firm will possess fully accurate information. An information asymmetry thereby still exists.

As discussed by Denis et al. (1997), diversification in a firm is associated with both benefits and costs. If the diversification in average conveys greater costs than benefits the question why firms diversifies themselves arises. The authors argue that one reason for firm diversification could be related to agency costs. The private benefit that managers derive from diversification succeeds their private costs. There are various potential benefits to the managers from firm diversification. Jensen and Murphy (1990) discuss the fact that managerial compensation is related to firm size, hence, if diversification contributes to a larger firm then management compensation rises. Managers would then be encouraged to engage in diversification activities, if they enlarge the size of the firm, even if they do not create long-term value for the shareholders.

In addition to shareholders´ monitoring of the executives there are several outside monitoring mechanisms. Agrawal and Knoeber (1996) mentions three of them which would motivate managers to improve performance; (i) when a firm uses debt as a way to finance its operations the managers' are monitored by the capital markets, (ii) the labour market could work as an incentive for managers to uphold their reputation in order to maintain attractive amongst

future employers, (iii) and lastly the market for corporate control which imposes a threat of displacement and thereby disciplines managers that are performing poor.

Another well-known agency problem is the "risk-shifting" problem. When a firm uses debt as a way to finance its operations, the shareholders' portion of investment in the firm represents a call option on the underlying assets of the firm. (Dobson and Soenen, 1993) As shown by Black and Scholes (1973), the value of a call option increases with increasing volatility on the underlying asset. In general, a high value on the underlying asset, e.g. stock price, conveys a high option value and if the underlying assets value is below the exercise prise the option will be useless. This fact could encourage managers to invest in projects with a volatile return, hence increasing the value of their options and enable an increase in personal wealth. This type of investment, as argued by Dobson and Soenen (1993), could lead to decisions by management that does not maximize firm value, hence misaligning the interest of the principals and agents.

2.1.3 Value Enhancement

As discussed in section 2.1.1, Jensen and Meckling (1976) suggest that the PA problem can be mitigated through alignment of managers' interest with the interest of the owners'. Holmstrom (1979) argues that the principals can establish contracts with the agents in order to reduce the agency costs, for example, firms can establish contracts that tie managers' compensation to firm performance. Haugen and Senbet (1981) extend these theories by including stock options. They postulate that stock options align managers' and shareholders' interest and hence, play a central role in resolving the agency problem. A more recent study by Lam and Chng (2006) also find that stock options can be used to alleviate the agency costs. Lam and Chng also argue that stock options are especially useful in large firms since they suffer from higher agency costs compared to smaller firms. Above discussion suggests that the use of executive stock option programs is one method in achieving greater alignment between managers and shareholders and hence, a way to reduce the agency costs. Furthermore, the authors argue that the PA model induces value enhancement amongst firms that adopt an equity based incentive program. The value enhancement should then have a link to the number of executive stock option grants.

2.2 Risk Taking

The risk distribution in a firm may be described, as by Shavell (1979), in relation to the PA relationship. As described in section 2.1, the PA relationship defines a situation where the owners contract the managers to perform a service on their behalf. Shavell (1979) emphasize that if the executive is risk neutral the salary would equal the results of his/her work less the owners share of the return. If the executive however would be risk averse, then he/she would be subject to the risk associated with the performance of the firm. Hence, a pay-for-performance situation arises in which the executives would need an extra incentive to bear the additional risk. Several previous researches have, however, shown that a pay-for-performance situation such as when executives are compensated with an equity based incentive scheme could lead to a non-optimizing firm behaviour. As argued by Marcus (1982), compensation schemes impose a constraint on the executives' portfolio diversification which in turn could lead to non-optimizing firm behaviour. The schemes induce the executives to invest in risky assets and in activities that reduce the variability in profits. However, the author postulates that when managerial effort is discretionary and the monitoring situation is costly an optimal distribution of executive ownership will constrain the executives´ choice of portfolio. Mishra et al. (2000) show that a high firm risk could reinforce negative effects caused by compensation risk. That is, when the firm risk is high, and the incentive pay increases, the CEO´s are exposed to a high level of risk which negatively affects firm performance.

Previous studies show inconclusive results if risk taking increases or decreases in the presence of XSO. DeFusco et al. (1990) and Lam and Chng (2006) conclude that stock option holdings are positively correlated with risk taking. As argued by Chourou et al. (2008), agency theory predicts the presence of a trade-off between incentive programs, such as stock options, and risk. Their empirical findings demonstrate a statistically strong concave relation between specific risk and incentives, e.g. XSO. Further, Dee et al. (2005) proclaim that the managers in a firm gets compensated, as risk increases, with higher wages which then can reduce the presence of an incentive program. Hence, the results presented by Dee et al. support the trade-off hypothesis.

2.3 Capital Constraints

XSO as incentive programs do not require that the firm maintain a high level of liquidity in the firm as is the case when there are high fixed wage costs as compensation. Chourou et al.(2008) postulate that XSO compensation therefore should be more common in firms with a low level of liquidity. This inference is in line with Yermack (1995) who argue that stock options are a form of non-cash compensation since the holders of the options pay cash into the company on the time of the exercise. Furthermore, scholars like e.g. Ittner et al. (2003), and Yermack (1995) argue that companies tend to use alternate compensation such as stock options instead of salaries to the executives when the firm is short on cash.

Firms facing a scarcity of cash can instead of remunerating executives with a high fixed salary choose to compensate them with an equity based incentive program. Their salary is then disconnected and independent of the amount of cash in the firm. Furthermore, as previously discussed, their salary would then depend to some extent on their efforts (if the PA prediction is correct).

2.4 Executive Equity Holdings and Firm Performance

The use of equity incentive programs has a close connection to the agency theory and aligning the executives' interests with the owners of the firm. Furthermore, one of the equity incentive programs, e.g. stock options, main purposes are to improve firm performance. Several previous studies investigate equity compensation impact on firm performance. (e.g. Demsetz and Lehn (1985); Morck et al. (1988); Jensen and Murphy (1990); DeFusco et al. (1990); Mehran (1995); Agrawal and Knoeber (1996); Core et al. (1999); and Ittner et al. (2003).

Morck et al. (1988) discusses firm performance and the impact of managerial equity ownership in the firm in a cross-sectional analysis. The authors use the total market value of the firm in relation to the total asset value of the firm, Tobin´s Q, as a measure for firm performance. Their conclusion on managerial equity ownership and firm performance is that the performance of the firm rises on low levels of ownership, falls on ownership levels approximately between 5 and 25 percent, and thereafter increases with a slow paste. Furthermore the authors argue that the rise of firm performance could be explained as an alignment between the shareholders and managements interests and the fall as an

'entrenchment' of management holding a considerable amount of equity. Mehran (1995) also measures firm performance with Tobin´s Q, and deem that firm performance is positively correlated with the percentage of executive equity based compensation. Further, the author advocates that the form, rather than the size, of compensation is most important when motivating managers. This notion is in line with Jensen and Murphy (1990) who argue that a large percentage of equity compensation, such as stock options, will have a positive effect on firm performance. Agrawal and Knoeber (1996) further examine more explicitly, the relationship between firm performance and several different control mechanisms. One of these control mechanisms is insider shareholding by executives, in which the authors find a relationship with firm performance. When nonlinear effects are allowed for in the authors´ ordinary least square estimations, they find that inside shareholding leads to better firm performance.

Contrary to previous stated positive findings between management equity ownership and firm performance, Ittner et al. (2003) finds that management holding of options are associated with poor firm performance. Notable, is that firm performance in this research is measured as the variance on stock returns, not on Tobin´s Q, which might have an impact on final results. Furthermore, the authors find a negative relation between equity holdings amongst the top five executives in the firm and both return on assets and stock returns. These findings are somewhat consistent with Core et al. (1999) who also find an overall negative relationship between board ownership and stock return performance. The authors argue that this result is due to that a firm with greater executive ownership suffers from greater agency problems. Hence, the impact on firm performance will be negative. Cornett et al. (2008) claim that performance enhancements, derived from compensation schemes, are a result of pure cosmetic earnings management rather than real performance improvements. DeFusco et al. (1990) concludes that executives will undertake more risky investment opportunities when they are compensated with stock options, which could have a negative impact on firm performance.

2.5 Attracting, Sorting and Retention

The literature discusses that stock options can improve the attraction, sorting, and retention of key personnel. In this context, the authors consider sorting to be the process in which a firm is able to attract proficient employees (Oyer and Schaefer, 2005). Thus, attraction and sorting

can be used interchangeably. The retention hypothesis is verified by Ittner et al. (2003) and Balsam and Miharjo (2007) who present results which show that stock options give executive incentives to remain in the firm for many years. Moreover, Fee and Hadlock (2003) determine that firm use stock options to attract new executive employees and that the size of these options grants are correlated with the option/restricted stock position the manager held at his or her prior position. Thus, the hiring grants are correlated with the option/restricted stock the manager forfeits at his or her prior employer. Ittner et al. (2003), however, do not find any evidence that stock options have a positive relation with the attraction of new employees.

2.6 Standards for Share Based Compensation

With regards to that our sample consists of firms noted on the OMXS30, Sweden, and that a vast majority of the previous researches performed within the area of executive stock options effect on firm performance is conducted with reference to US firms, a comparison between accounting standards in Sweden and the US is in order.

2.6.1 Financial Accounting Statement 123

The financial Accounting Standards Board (FASB) creates accounting standards in the US. It is the most influential accounting organization in the world. The accounting standards are created through the Financial Accounting Standards (FAS).

The Statement of Financial Accounting Standards No. 123 (2004) concerning share-based payment is a revised version of the previous FASB statement No. 123, Accounting for Stock Based Compensations (FAS No.123, 2004). The statement "establishes standards for the accounting for transactions in which an entity exchanges its equity instruments for goods or services. It also addresses transactions in which an entity incurs liabilities in exchange for goods or services that are based on the fair value of the entity´s equity instruments or that may be settled by the issuance of those equity instruments." (FASB, 2004, p. i) The focus of the statement is to account for share-based payment transactions as a compensation for employee services. The provisions of the statement are that public companies are to measure the cost of services received from employees that are awarded with equity instruments. This concerns non-public companies as well, except in certain circumstances. The statement became effective during the year 2005.

The statement does not explicitly clarify a proper option pricing model, however, the statement requires that the model or valuation technique meets specified requirements in §A8 and §16. Examples of these requirements are that the fair values of a company´s equity and liability instruments rewarded in a share-based payment must be estimated using a pricing model or valuation technique, and that regardless of what technique the company chooses to apply the assumptions in the model must be "reasonable and supportable".

2.6.2 International Financial Reporting Standard 2

The purpose with the International Financial Reporting Standards 2 (IFRS 2) is to specify how the financial reports should be formulated with regards to a company´s share-based compensation. Especially important is that the effects of share-based compensation are to be accounted for explicitly in a company´s income statement and reflected in the company´s financial status. Furthermore, IFRS provides accounting standards adopted by the European Union. (IFRS/IAS, 2008)

IFRS 2 has been applied by Swedish companies listed on the stock exchange since 2005. Previous to IFRS 2 there were no explicit rules on the market concerning accounting for share-based compensation, e.g. stock-option incentive programs. Companies listed on the stock exchange are to apply the standard in their accounting of all share-based compensation which comprehends e.g. share-based compensations which are regulated with equity instrument, and share-based compensations regulated with cash. Because of difficulties in valuing the extra result that a company expects from their employees when compensated with shares, stock-options, and other equity-based compensation instruments, the company must calculate the actual value of the employees' services on a basis of the real value of the awarded equity based instruments. When calculating the value of the equity based instruments, e.g. an option, the company is advised to use an option valuation model that where to be applied by "proficient" and "interested" parties. The option valuation model that are to be used must at least regard the following factors; exercise price, time to expiration, current stock price on the underlying, expected volatility, expected stock return, and risk free rate of return. (IFRS/IAS, 2008)

2.6.3 FAS No.123 and IFRS 2

The FAS No. 123 and the IFRS 2 contains overall similar standards concerning share based compensation to employees. This is a necessity with regards to the global environment that many non-small firms are engaged in. Standards for firms that are not listed on stock exchange and/or are considered small have different standards to follow. Neither of the sets of regulation describes an explicit valuation model for the options, although they implement a similar framework in which accepted and proficient models are to be used.

The standards in the IFRS 2 are slightly less detailed then the ones set by FAS No.123 which in the former case creates some space for interpretation whereas the latter allows less free interpretation. As previously argued, the standards are very similar which is a necessity due to the fact of the global environment companies are situated in and they must be able to attract investors from all over the world. Hence, a common standard is used to standardize the information given to investors and governments.

3 Hypothesis Development

*I*n the hypothesis development we present the reader with XSO determinants such as value enhancement, risk taking, and capital constraints. We construct hypothesises for each of the determinants and their proxies. Lastly, we briefly discuss XSO impact on firm performance and construct a hypothesis for the same. A summary of the hypothesises and definitions of the variables for the cross-sectional data concludes this chapter.

3.1 Stock Option Incentive Programs and Hypothesis Development

In order to evaluate how stock options affect firm performance, it is important to look at the incentives behind the use of stock options. Therefore, a discussion concerning three major determinants that may affect executive stock option programs is conducted. The determinants include value enhancement, risk taking, and capital constraints. For each of the determinants we use a set of proxies to control for which variables, and to what extent, they have an impact on the use of stock options. This procedure is consistent with previous research conducted by e.g. Lam & Chng (2006) and Himmelberg et al. (1999) where the authors discuss, and test for, various stock option motivations.

3.2 Value Enhancement

As argued in section 2.1.3, the PA model induces value enhancement in firms who adopt an equity incentive program. The presence of value enhancement has, in this case, a connection to the number of granted XSO. Following Himmelberg et al. (1999) and Lam and Chng (2006), we adopt capital intensity, growth opportunities, market power, and firm size as proxies for the level of value enhancement.

Hypothesis 1. There is a positive relationship between value enhancement and stock option incentive programs.

3.2.1 Capital Intensity

Investments in tangible assets are more easily measured and observed than investments in intangible assets. According to Himmelberg et al. (1999), firm spending on other then tangible assets is discretionary and less easily monitored than investments in "hard" capital. A high level of intangible investments, conversely a low level of capital intensity, conveys a high desired level of executive ownership. As the desired level of managerial ownership rises, and the monitoring of the same gets more difficult, the PA relationship proposes an incentive to align their motives. As argued by Lam and Chng (2006), in line with previous discussion, when the degree of investments in intangible assets rises, the authors suggest that a high level of executive stock option ownership is necessary to align the interests between the owners and managers.

Hypothesis 1a. There is a positive relationship between a low level of capital intensity and stock option programs.

3.2.2 Growth Opportunities

A firm that has a high variety of different growth opportunities is presented with discretionary powers. Management in a firm which holds considerable growth opportunities therefore has greater options in making tactical and strategic decisions then in a firm which has less growth opportunities. (Lam and Chng, 2006 and Yermack, 1995) According to Chourou (2008), monitoring of firms which are presented with considerable growth opportunities are a difficult task, especially if there is information asymmetry between the owners and managers. Furthermore, the authors argue that the managers are likely to withhold inside information about the value of the growth opportunities. Considering the above discussion, the more potential growth opportunities a firm possess the more incentives the owners have in attempting to align their interests with the managers.

Hypothesis 1b. There is a positive relationship between high growth opportunities and stock option programs.

3.2.3 Market Power

Himmelberg et al. (1999) use the operating margins, i.e. the ratio of operating income to sales to measure a firm's market power. Furthermore, the authors suggest that the higher the market power in a firm, the higher are the will amongst the owners for managerial ownership. A high level of market power in a firm gives the management more opportunities for discretionary spending why the owners of the firm would have greater incentives in monitoring and ensuring that the management does not act in a short-term value creating manor. The possibility for executives to use discretionary spending increases the risk that they invest in short-term value creating projects, increasing the value of the underlying. Hence, potentially destroying long-term value for the owners.

Hypothesis 1c. There is a positive relationship between market power and stock option incentive programs.

3.2.4 Firm Size

As argued by Himmelberg et al. (1999), Lam and Chng (2006), and Chourou et al. (2008) the size of the firm introduces different difficulties in monitoring, depending on the size, and may present different levels of moral hazard. Lam and Chng (2006) argues that since the agency costs and monitoring in a large firm are expected to be higher then in a smaller one, stock option programs could be an answer to ensure good performance in the firm. Chourou et al. (2008) argues that since monitoring becomes harder in larger firms the managers would therefore need more incentives to act in a long-term value maximizing behaviour. Following the above arguments, the hypothesis follows.

Hypothesis 1d. There is a positive relationship between firm size and stock option programs.

3.3 Risk Taking

As argued in section 2.2, there are several previous performed studies on the effect of risk taking in the presence of XSO. Chourou et al.(2008) argues that the agency theory predict a presence of trade-offs between incentive programs and risk. Dee et al. (2005) proclaimed that as the risk increases in a firm the executives gets compensated with a higher fixed salary

rather than granted with XSO. We adopt total risk and research and development intensity as proxies for risk taking in a firm. As argued in section 2.2 the results on whether risk increases or decrease in the presence of XSO are inconclusive. Thus, we construct the following null hypothesis and allow for a double-sided alternative hypothesis.

Hypothesis 2. There is no relationship between risk taking and stock option incentive programs.

3.3.1 Total Risk

The risk variable suggests, in line with Black and Scholes (1973), that the value of the option will increase with firm risk or volatility. This suggests that management are encouraged to take additional risk in their investments because this could prove to increase the value of their options, hence increasing their personal wealth. Since the risky investments are performed mainly to increase the value of the underlying, in the short-term, they are not considered to be in the interest of the owners. (Lam and Chng, 2006)

Hypothesis 2a. There is a positive relation between firm total risk and stock option incentive programs.

3.3.2 Research and Development

According to Lam and Chng (2006), risk taking is highly associated with spending in research and development (R&D), hence, higher R&D expenditures imply a higher risk. Therefore, executives with stock options are likely to increase R&D expenditures since this would increase the value of their options. Dechow and Sloan (1991) find the executives owning XSO are less likely to decrease R&D spending during their final year in office, this in order to maintain a high risk level. The R&D variable is measured as the R&D expenditures divided by the firm's property, plant and equipment for each year. We construct the following hypothesis to test for R&D expenditures relation with XSO.

Hypothesis 2b. There is a positive relationship between a high level of R&D spending and stock option incentive programs.

3.4 Capital Constraints

As discussed in 2.3, XSO are a form of compensation that does not require that the firm maintain a high level of liquidity. Scholars like Yermack (1995), Ittner et al. (2003), and Chourou et al. (2008) argue that XSO incentive programs as an alternative to high fixed salaries are common in firms that maintain a low level of liquidity. Following previous research we expect firms that face a scarcity of cash to have a high level of stock option incentive programs.

Hypothesis 3. There is a negative relationship between capital constraints and executive stock option incentive programs.

3.5 Firm Performance

As discussed in section 2.4, one of the main incentives of using executive stock option programs is to improve firm performance. Scholars are not unified on the relation between XSO and firm performance. There are several previous studies (see section 2.4) that infers various implications of the use of executive stock options. Some studies indicate that there is a positive relationship between firm performance and executive stock options whereas others conclude there is a negative relation. To test for the relation we construct our hypothesis.

Hypothesis 4. There is no relationship between executive stock option holdings and firm performance.

Table 3.1 Summary of hypothesises

Hypothesis 1. There is a positive relationship between value enhancement and stock option incentive programs

Hypothesis 1a. There is a positive relationship between a low level of capital intensity and stock option programs.

Hypothesis 1b. There is a positive relationship between high growth opportunities and stock option programs.

Hypothesis 1c. There is a positive relationship between market power and stock option incentive programs.

Hypothesis 1d. There is a positive relationship between firm size and stock option programs.

Hypothesis 2. *There is no relationship between risk taking and stock option incentive programs.*

Hypothesis 2a. *There is a positive relationship between firm total risk and stock option incentive programs.*

Hypothesis 2b. *There is a positive relationship between a high level of R&D spending and stock option incentive programs.*

Hypothesis 3. *There is a negative relationship between capital constraints and executive stock option incentive programs.*

Hypothesis 4. *There is no relationship between executive stock option holdings and firm performance.*

Table 3.2 Definitions of variables for the cross-sectional data

Variables	Measures	Definitions
ESO	Executive stock options	Incentive ratio
EBIT/Assets	Performance	Earnings before interest and tax / Assets
EBIT/Assets - %DA	Adjusted performance	Earnings before interest and tax / Assets - Discretionary accruals / Assets
Ln(S)	Firm size	Natural logarithm of sales
$[Ln(S)]^2$	Square of firm size	Square of Ln(S)
K/S	Capital intensity	Property, plant and equipment / Sales
K/S2	Square of capital intensity	Square of PPE/ Sales
I/K	Growth opportunities	Capital expenditures / PPE
$(I/K)^2$	Square of growth opportunities	Square of (I/K)
EBIT /S	Market Power	Earnings before interest and tax / Sales
$(EBIT/S)^2$	Square of EBIT/S	Square of Earnings before interest and / Sales
SIG	Total Risk	The variance of daily stock returns
SIG^2	Square of total risk	Square of the variance of daily stock returns
RD/K	R&D intensity	R&D expenditures / PPE
$(RD/K)^2$	Square of RD/K	Square of R&D intensity
FCF/Assets	Capital constraints	Free cash flow / Assets
$(FCF/Assets)^2$	Square of FCF/Assets	Square of Free cash flow/Assets

4 Methodology

This chapter presents and motivates our choice of research approach, sample, and data. Furthermore, the reader is presented with our choice of analysis, in which the regressions and belonging variables are presented. The chapter is concluded with a discussion regarding methodological problems.

4.1 Research Approach

This thesis aims to investigate the determinants and impact of executive stock options. Thus, a deductive approach is used to derive a result from existing theories (Bryman and Bell, 2005). A quantitative method is applied to the research. This approach allows for an objective view on gathered data and the results regarding stock option incentive programs impact on firm performance.

4.2 The Sample

The sample consists of firms listed on the Stockholm Stock Exchange's OMXS30 index. This sample is chosen because of the poor information availability regarding XSO for smaller firms. Cornett et al. (2008) stress one advantage of using large firms - large firms are relatively stable which makes the discretionary accruals models more valid since they are sensitive to extreme performance. The sample is analysed between the years 1998 through 2007. An even longer period would drastically increase the falling of and hence, have a negative affect on the validity of the empirical findings. After, for each year, sorting for firms which not have XSO, the final sample consists of 177 observations.

4.3 Regression

The regression analysis and is conducted on secondary data based on accounting data. Such data is gathered from the firms' annual reports and from the database Thomson DataStream.

4.3.1 Cross Sectional Analysis

Similar to several past studies concerning the relationship between equity incentive packages and the performance of the firm (see e.g. Lam and Chng, 2006; Morck et al., 1988; Demsetz and Lehn, 1985) we also choose to base our analysis on the ordinary least square (OLS) regression model using cross-sectional data.

The first regression is carried out in purpose to assess the determinants of XSO, which we argue for in the previous chapter. We estimate the following equation between executive stock options and the different proxies for its unobserved determinants:

$$XSO_{it} = \beta_o + \beta_1 Value\_enhancement_{it} + \beta_2 Risk\_taking_{it}$$
$$+ \beta_3 Captial\_constraints_{it} + \varepsilon_{it} \qquad (4.1)$$

Furthermore, to analyse the cross-sectional relation between performance and executive stock options we estimate executive stock options as the regressor and performance as the regressand in the following equation for the same time period as above:

$$Performance_i = \gamma_0 + \gamma_1 XSO_{it} + u_{it} \qquad (4.2)$$

Adapting the method in Lam and Chng (2006), we estimate equation 4.2 including the same explanatory variables which are entered into equation 4.1. According to Chng and Lam this is due to the possibility that one or more of the control variables in equation 4.1 can have implications on both granting of stock options and the performance of the firm. Another reason for this is avoid a spurious relation when only one explanatory variable is included in the regression. The equation follows:

$$Performance_{it} = \rho_o + \rho_1 XSO_{it} + \rho_2 Value\_enhancement_{it} + \rho_3 Risk\_taking_{it}$$
$$+ \rho_4 Captial\_constraints_{it} + v_{it} \qquad (4.3)$$

Since the shape of the relationship between performance and stock options and between stock options and its potential determinants, to our knowledge, is unknown for firms on the Swedish market, we also test for a nonlinear relation and if necessarily regress above equations by transforming the explanatory variable with power of two.

4.3.2 Valuing Executive Stock Options

Mehran (1995) values new stock option grants by using the Black-Scholes formula, he then calculates the percentage of total executive compensation that is composed by the option values. A different approach to measure stock option based compensation is presented by Bergstresser and Philippion (2006), they calculate the 'incentive ratio':

Incentive ratio = ONEPCT_{it} / (ONEPCT_{it} + SALARY_{it} + BONUS_{it}). (4.4)

ONEPCT is the change in option value coming from one percent increase in firm's stock price, and is calculated as follows:

ONEPCT_{it} = 0,01 * PRICE_{it} *(SHARES_{it} + OPTIONS_{it}) (4.5)

Where PRICE is the stock price, SHARES is the number of shares owned by management, and OPTIONS is the number of options held by the management. The model assumes that option delta is equal to one, i.e. the value of the option will increase with one krona if the stock price increases with one krona. The incentive ratio is a simplification of the one-year-approximation (OA) method developed by Core and Guay (2002), which does not make the assumption that delta is equal to one. Bergstresser and Phlippion (2006) argue that the delta-equals-one-assumption is true for option in-the-money, whereas it can cause an estimation error for options that are out-of-the-money. The estimation error, however, is fairly small and we therefore choose to use the incentive ratio. This is corroborated by Cornett et al. (2008) who use both the incentive ratio and Mehran's (1995) annual option grant method, discussed above, to calculate the compensation structure. Cornett et al. conclude that both methods yield nearly identical result. Thus, the incentive ratio can be considered to be a valid method when calculating a firm's compensation structure.

Ittner et al. (2003) use an even more simplified approach – the discounted expected gain approach. This approach values the stock options by using an annual stock price growth rate of 15 percent, the time-to-maturity is assumed to be five years and the risk-free rate of 5 percent. Ittner et al. claim that is it questionable that methods based on Black-Scholes is more applicable when valuing options. They find that the discounted expected gain approach values options to an average of 79 percent of the exercise price, while the Black-Scholes method

values options to an average of 55 percent of the exercise price. They further mean that their approach is applicable since most firms use simple approaches to value their option grants. We, however, consider this approach to be overly simplified since it wholly disregards the volatility. We regard the difference between the discounted expected gain approach and Black-Scholes to be too considerable to ignore.

Both the incentive ratio and the OA method are derived from Black-Scholes (1973) model, and the modified Black-Scholes model (Merton, 1973) which accounts for dividend payouts[2]. In accordance to above discussion, the choice of method to value stock option is the incentive ratio throughout this thesis.

4.3.3 Discretionary accruals

Accruals and its estimation have a significant role in the studies about how to detect earnings management, since it can be used to increase or decrease the reported income (see Hribar and Collins, 2002; Kothari et al., 2005; Weber, 2006; Pae, 2005; Cornett et al., 2008). Bergstresser and Philippon (2006) deem that the use of discretional accruals in manipulating accounting numbers is particularly frequent when management has stock option based compensation. The essential outcome is that one should be cautious when using accounting earnings as a proxy for economic profitability. Bernard and Skinner (1996) pinpoint that while working capital investments depend on sales, the depreciation of working capital depends on property plant and equipment which allows for a great deal of flexibility and variety when the depreciation is carried out to get the desired accounting performance. Jones (1991) states that by increasing reported earnings, the company can improve its conditions against the debt holders. Furthermore, Fields et al. (2001) argue that the choice of reducing R&D costs may have as its only purpose to improve earnings. The authors state that accounting measures can be chosen upon their impact on stock price, which increase the managerial motives with stock option incentive packages to interfere with the accounting system. These issues stress the importance to take into account, and correct, for the discretionary accruals when analyzing companies´ performance, since it is the discretionary accruals that are associated with and used to measure the manipulation of earnings (Cornett et al., 2008; Dechow et al., 1995). In accordance to above argument, we adjust our performance

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[2] See appendix 1 for a derivation of Black-Scholes model.

measure from discretionary accruals in order to better analyze stock option grants real impact on firm performance.

According to Jones (1991), total accruals (TA) can be decomposed into expected or normal accruals (NA) and unexpected or discretionary accruals (DA). Hence, we can write the following equation:

$$DA_{jt} = TA_{jt} - NA_{jt} \qquad (4.6)$$

i.e. discretionary accrual for firm j in year t is the difference between total accruals and normal accruals, in the same year.

Based on a balance sheet approach for estimation of the total accruals (TA_{it}) Pae (2005) gives the following explanation of total accruals of the firm i in year t:

$$TA_{jt} = (\Delta CA_{jt} - \Delta CASH_{jt}) - (\Delta CL_{jt} - \Delta CD_{jt}) - DEP_{jt}$$

where;

ΔCA_{jt} is the change in current assets

$\Delta CASH_{jt}$ is the change in cash and cash equivalents

ΔCL_{jt} is change in current liabilities

ΔCD_{jt} is change in debt in current liabilities

DEP_{jt} is depreciation and amortization expenses

However, Bahnson et al. (1996) highlight a pitfall when analyzing firms´ balance sheets and cash flow statements. This is due to, as they advocate, when non-operating actions as e.g. merger and acquisitions with impact on the current assets and liabilities are reported at different amounts on the cash flow statement and the balance sheet. An alternative to the model presented by Pae (2005) is the cash flow approach, suggested by Hribar and Collins (2002). This mode of procedure only focuses on the operating cash flow and therefore is supposed to not be affected by any accounts of the non-operating cash flow. The definition follows:

$$TA_{jt} = -(\Delta AR_{jt} + \Delta INV_{jt} + \Delta AP_{jt} + \Delta TAX_{jt} + \Delta OTCA_{jt} + DEP_{jt}) \quad (4.7)$$

where;

ΔAR_{jt} is the decrease (increase) in accounts receivable

ΔINV_{jt} is the decrease (increase) in inventory

ΔAP_{jt} is the increase (decrease) in accounts payable

ΔTAX_{jt} is the increase (decrease) in taxes payable

$\Delta OTCA_{jt}$ is the net change in other current assets

DEP_{jt} is depreciation expense

Furthermore, the normal accruals, as suggested by Cornett et al. (2008), can be calculated by the so called Jones model (Jones, 1991):

$$\frac{TA_{jt}}{Assets_{jt-1}} = \alpha_0 \frac{1}{Assets_{jt-1}} + \beta_1 \frac{\Delta Sales_{jt}}{Assets_{jt-1}} + \beta_2 \frac{PPE_{jt}}{Assets_{jt-1}} \quad (4.8)$$

where;
$Assets_{jt-1}$ is total assets
$\Delta Sales_{jt}$ is change in sales
PPE_{jt} is property, plant and equipment

Now, when the definitions for total accruals (eq.4.7) and normal accruals (eq.4.8) are established, discretional accruals can be estimated. The main purpose is to filter out the reported performance for any discretional accruals to isolate the economic performance. Since one way to measure performance is EBIT/Assets it is appropriate also to calculate and subtract discretional accruals from performance as a percentage of total assets, denoted as %DA. According to Cornett et al., (2008) and Bergstresser and Philippon (2006), by rewriting equation 4.6 with respect to equations 4.7 and 4.8, %DA can be estimated as:

$$\%DA_{jt} = \frac{TA_{jt}}{Assets_{jt-1}}$$
$$- \left(\hat{\alpha}_0 \frac{1}{Assets_{jt-1}} + \hat{\beta}_1 \frac{\Delta Sales_{jt} - \Delta Receivables_{jt}}{Assets_{jt-1}} + \hat{\beta}_2 \frac{PPE_{jt}}{Assets_{jt-1}} \right) (4.9)$$

After estimation of equation 4.8 with the ordinary least square (OSL) regression model, the point estimates of that equation $[\alpha_0, \beta_1, \beta_2]$ are referred to with $[\hat{\alpha}_0, \hat{\beta}_1, \hat{\beta}_2]$ in equation 4.9. The variable ΔReceivable is included to adjust for any abnormal change in ΔSales (Cornett et al., 2008).

4.4 Measurement of Firm Performance

Several studies investigating firm performance and insider ownership have measured performance by using Tobin's Q (e.g. Morck et al., 1988; McConnell and Servaes, 1990; Mehran, 1995; Lam and Chng; 2006). The Tobin's Q ratio as a firm performance measure is calculated as the market value of the firm divided by the replacement value of the firms' tangible assets (Ibid). According to Mehran (1995), detractors to Tobin's Q as performance measure claim that Tobin's Q is a proxy for a firm's growth opportunities rather than its performance. Further, Tobin's Q is not adjusted for earnings management and can therefore yield a deceptive result, especially when used to measure a firm's performance in relation to stock options due to stock option compensation creates incentives for earnings management (see above discussion). In regards to the drawbacks associated with Tobin's Q, we consider EBIT/Assets to be superior measures of performance. This method of measuring performance is also implemented by Ittner et a. (2003) and Cornett et al. (2008) in studies concerning executive stock options and firm performance. Measuring performance using EBIT/Assets - %DA also allows us to account for discretionary accruals when adjusted performance is computed.

4.5 Methodological Problems

In order to evaluate the method used and determine the contribution to the specific field of research two main aspects are considered. The validity of the research concerns whether the applied method measures the correct things. The Reliability concerns whether the method provides us with a reliable result given from the data.

4.5.1 Validity

In our applied method we gather data from the Thomson Datastream and from the companies in our sample´s annual reports. The annual reports contain accounting data that could display

a biased reality, due to manipulations. However, due to accounting standards that the companies are expected to follow, we must trust the accounting data. Gathering data from annual reports has been done in a cautious and thorough manner. However, our method of choice is not rarely used in this field of research why the method is judged to be valid.

4.5.2 Reliability

The data structure encountered and applied in this study refers to information about firms taken at a given point in time, across a ten year period, why a cross-section regression is appropriate. All regressions performed in the analysis are conducted consistent with the assumptions of OLS. To account for a nonlinear relation, we perform a Reset-test, and when required a nonlinear regression is applied. The models are robust against heteroscedasticity, serial-correlation and multicollinearity. In purpose to obtain non-spurious relation when a univariate analysis is conducted, a multivariate analysis is performed as complementary.

The data in our analysis is collected from firm´s annual reports and the database Thomson DataStream. Random controls is been made against annual reports to secure the authenticity of the information obtained from the database and to ensure that no inconsistencies are present. Thus, the overall reliability of the data is considered to be satisfactory.

The number of observations is 177. Hence the assumption of normality is considered to be fulfilled. The falling off in the population of observed companies is negligible and unsystematic.

All regressions are carried out with the statistical package EViews, used mainly within the field of econometric analyses such as for cross-section analysis. The results from the EViews are therefore considered to be reliable.

4.5.3 Methodological Issues

In purpose to analyse executive stock option (explanatory variable) impact on performance (dependent variable) a regression is conducted to examine if any relation exists. Nevertheless it can be argued that the explanatory variable is jointly determined with the dependent variable, this is called the simultaneity or endogeneity problem (Wooldridge, 2003). In this study the economic interpretation of endogeneity is the possibility that in our suggested model

for the relationship between performance and executive stock options, the latter variable is in fact predetermined endogenously with the level of the firm´s performance, and at the same time is an explanatory variable for firm performance, i.e. a relationship that runs in both directions. To detect and account for this problem implementation of instrumental variable is suggested by the literature (see e.g. Wooldridge, 2003 and Verbeek, 2004). An instrumental variable is a proxy for the potential endogenous variable. In this study we have not been able to account for the simultaneity problem since no appropriate proxy for executive stock option could be found.

As mentioned in section 4.4.2, our estimate for XSO – the incentive ratio – assumes a delta of one. This simplification naturally affects the reliability of our model, but the incentive ratio's appropriateness has been discussed by Cornett et al. (2008) who deem that the method is eligible when examining the determinants and impact of XSO.

Due to the limited number of firms no classification based on industry has been carried out. Thus, no industry effect is accounted for.

5 Empirical Findings

The empirical findings from the cross-sectional regression are presented in this chapter. First, we outline the results from the regressions examining the determinants of stock option programs. Next, we examine the hypothesis if executive stock option grants have any impact on performance respectively adjusted performance. The chapter is concluded by a t-test comparing firms granting executive stock options with firms which do not have stock option incentive programs.

5.1 Determinants of stock option programs

As discussed in the hypothesis development section, we test tree major hypothesis: value enhancement, risk taking, and capital constraints. The following measures are used to test each hypothesis:

- Value enhancement – firm size, capital intensity, growth opportunities, and market power.
- Risk taking – total risk and research and development intensity.
- Capital constraints – liquidity constraints.

The construction of three hypothesis and the variables[3] applied to test them are consistent with Lam and Chng (2006) and Himmelberg et al. (1999). Firm size is calculated with the natural logarithm of sales due to the high variance among the sample. The variables relation with XSO is examined by employing a cross-sectional regression. Equation 5.1 tests for the determinants of XSO.

$$XSO_{it} = \alpha_0 + \beta_1 \ln(S)_{it} + \beta_2 (K/S)_{it} + \beta_3 (I/K)_{it} + \beta_4 (EBIT/S)_{it} + \beta_5 SIG_{it} + \beta_6 (RD/K)_{it}$$
$$+ \beta_7 (FCF/Assets)_{it} + \varepsilon_{it} \tag{5.1}$$

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[3] See table 3.2, chapter 3 for definitions of the variables.

The result of the regression is presented in below table.

Table 5.1 – Dependent variable: Executive stock option

Measure	Variable	Coefficient	Std. Error	P-value
Firm Size	Ln(S)	-0.044015	0.019314	0.0240*
Cap Int	K/S	-0.000197	0.000408	0.6298
Grow Opp	I/K	0.055909	0.095096	0.5574
Mark Pow	EBIT/S	0.264201	0.077107	0.0008***
Tot Risk	SIG	56.53695	18.88679	0.0032**
R&D Int	RD/K	0.102963	0.026254	0.0001***
Liq Con	FCF/Assets	0.071842	0.303946	0.8135

Adjusted R-squared = 0.116623. * significant at 5 %, ** significant at 1 %, *** significant at 0.1%

Firm size, market power, total risk, and R&D intensity show a significant relation with executive stock options. Market power, total risk and R&D intensity are highly significant with p-values 0.0008, 0.0032 and 0.0001 respectively. Market power, total risk and R&D intensity have positive coefficients. Accordingly, stock option based compensation increases as the market power, total risk and R&D intensity increases. Firm size, significant at a 5 percent level, has a negative coefficient indicating that the smaller the firm, the higher degree of XSO based compensation is used. The remaining three variables have not a significant impact on XSO. To summarize, two of the value enhancement variables are significant, both risk taking variables are significant, and the capital constraints variable is not significant.

The validity of the model is evaluated by testing for autocorrelation, heteroscedasticity, multicollinearity, and nonlinearity. The results from these tests are presented in tables 5.2-5. Table 5.2 depicts a correlation matrix between the variables. As seen, there exists no high correlation between the different variables. White´s test is used when testing for heteroscedasticity and, as table 5.3 shows, no heteroscedasticity is detected. The model, however, did suffer from autocorrelation. We use White heteroscedasticity and covariance-consistent standard errors to solve for this problem. The results in table 5.1 are after this adjustment. Lastly, nonlinearity, tested with the Ramsey RESET test, is not present.

Table 5.2 – Correlation matrix

	Cap Int	Firm Size	Grow Opp	Liq Con	Mark Pow	Tot Risk	R&D Int
Cap Int	1	-0.57	-0.02	-0.11	-0.08	-0.05	-0.03
Firm Size	-0.57	1	0.18	0.18	-0.29	0.13	0.32
Grow Opp	-0.02	0.18	1	-0.08	-0.09	-0.05	0.10
Liq Con	-0.11	0.18	-0.08	1	-0.06	0.13	0.27
Mark Pow	-0.08	-0.29	-0.09	-0.06	1	-0.13	-0.08
Tot Risk	-0.05	0.13	-0.05	0.13	-0.13	1	0.24
R&D Int	-0.03	0.32	0.10	0.27	-0.08	0.23	1

Table 5.3 - Heteroscedasticity Test

F-statistic	0.964303	Prob. F	0.5328
Obs*R-squared	34.21996	Prob. Chi-Square	0.5056

Table 5.4 - Autocorrelation Test

F-statistic	6.055830	Prob. F	0.0029
Obs^R-squared	11.95769	Prob. Chi-Square	0.0025

Table 5.5 - Ramsey RESET Test

F-statistic	0.946773	Prob. F	0.3321
Log likelihood ratio	0.998700	Prob. Chi-Square	0.3276

5.2 Performance

XSO impacts on performance are initially tested in an univariate regression, thereafter firm performance is regressed against XSO and other variables in a multivariate regression.

5.2.1 Univariate regression

In order to test if executive stock option grants have any value implication for firm performance we first run the following regression:

$$\text{EBIT/Assets}_{it} = \alpha_0 + \beta_1 \text{ XSO}_{it} + \varepsilon_{it} \tag{5.2}$$

Table 5.6 – Dependent variable: Performance

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO	19.30643	7.055961	0.0069**

Adjusted R-squared=0.056340. * significant at 5 %, ** significant at 1 %, *** significant at 0,1%

The model suffers from heteroscedasticity (see table 5.7) and is therefore estimated by White´s robust heteroscedasticity standard errors. The result in table 5.6 is after adjustment for heteroscedasticity. The variable XSO has a positive coefficient and is significant. We test the model for nonlinearity using the Ramsey Reset test with the fitted value one[4] (see table 5.8). The Reset test shows a p-value lower than 5 percent indicating nonlinearity.

Table 5.7 - Heteroscedasticity Test

F-statistic	5.204804	Prob. F	0.0064
Obs*R-squared	9.989067	Prob. Chi-Square	0.0068

Table 5.8 - Ramsey RESET Test

F-statistic	10.45199	Prob. F	0.0015
Log likelihood ratio	10.32440	Prob. Chi-Square	0.0013

Due to the outcome from the Reset test, the XSO is transformed by in power of two, i.e. XSO^2, and is regressed against performance in the following regression:

$$EBIT/Assets_{it} = \alpha_0 + \beta_1(XSO)^2_{it} + \varepsilon_{it} \tag{5.3}$$

Table 5.9 – Dependent variable: Performance

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO^2	18.75482	6.720314	0.0058**

Adjusted R-squared=0.071840. *significant at 5 %, ** significant at 1 %, *** significant at 0,1%

The model is heteroscedastic (see table 5.10) and is therefore estimated using White´s robust standard errors. The adjusted R-square is improved in comparison to the linear regression, but still small. The result in table 5.9 shows that XSO^2 is significant with a positive coefficient, indicating a positive relation between firm granting stock option and firm performance.

Table 5.10 - Heteroscedasticity Test

F-statistic	6.964519	Prob. F	0.0012
Obs*R-squared	13.11466	Prob. Chi-Square	0.0014

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[4] Fitted value "one" test if the model is better explained transforming the explanatory variable with power of two (EViews user guide).

5.2.2 Multivariate regression

In purpose to avoid spurious relation between executive stock options and performance, we take into account the possibility that other factors simultaneously can affect performance. Hence, the determinant variables included in regression for establishing the determinants of XSO are also included jointly with XSO. The result is presented in table below.

$$\text{EBIT/Assets}_{it} = \alpha_0 + \beta_1 XSO_{it} + \beta_2 \ln(S)_{it} + \beta_3(K/S)_{it} + \beta_4(I/K)_{it} + \beta_5(EBIT/S)_{it}$$
$$+ \beta_6 SIG_{it} + \beta_7(RD/K)_{it} + \beta_8(FCF/Assets)_{it} + \varepsilon_{it} \qquad (5.4)$$

Table 5.11 - Performance, Multivariate regression

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO	-0.083251	0.051380	0.1072
Firm Size	Ln(S)	0.015700	0.012503	0.2111
Cap Int	K/S	0.000211	0.000421	0.6160
Grow Opp	I/K	-0.017104	0.046904	0.7159
Mark Pow	EBIT/S	0.340660	0.075895	0.0000***
Tot Risk	SIG	0.014212	0.022436	0.5274
R&D Int	RD/K	-6.747197	16.67064	0.6862
Liq Con	FCF/Assets	0.885368	0.215389	0.0001***

Adjusted R-squared = 0.116623. * significant at 5 %, ** significant at 1 %, *** significant at 0.1%

For this regression a Ramsey Reset test is performed, showing no indication for nonlinearity (see table 5.12). The LM test for serial correlation proves no problem with autocorrelation (see table 5.13), nor is the model heteroscedastic (see table 5.14). The result from the multivariate regression presents no evidence for XSO to have any value implication for performance. While a positive significant relation is found for EBIT/S and FCF/Assets.

Table 5.12 - Ramsey RESET Test

F-statistic	0.110937	Prob. F	0.7395
Log likelihood ratio	0.118145	Prob. Chi-Square	0.7311

Table 5.13 - Autocorrelation Test

F-statistic	0.291828	Prob. F	0.7473
Obs*R-squared	0.595210	Prob. Chi-Square	0.7426

Table 5.14 - Heteroscedasticity Test

F-statistic	1.023405	Prob. F	0.4481
Obs*R-squared	45.02159	Prob. Chi-Square	0.4289

5.3 Adjusted performance

5.3.1 Univariate regression

As argued in previous chapter it is important to lay stress on the possibility that firm performance can be inflated by discretionary accruals in purpose to obtain a higher payoff from options. For that reason, normal accruals are calculated and subtracted from total accruals to receive discretionary accruals. Next step in order to correct firm performance for discretionary accruals is to deducting discretionary accruals as a percentage of total assets from performance, i.e. EBIT/Assets - %DA, henceforth called adjusted performance.

The procedure is similar to regressions performed in previous section, with the only difference that the dependant variable is now adjusted performance.

$$(\text{EBIT/Assets - \%DA})_{it} = \alpha_0 + \beta_1 \, \text{XSO}_{it} + \varepsilon_{it} \qquad\qquad (5.5)$$

Table 5.15 – Dependent variable: Adjusted performance, Univariate regression

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO	147.8451	100.1469	0.1418

Adjusted R-squared=0.012413. * significant at 5 %, ** significant at 1 % , *** significant at 0,1%

The regression is estimated by White´s standard errors due to heteroscedasticity (see table 5.16). The explanatory variable XSO is not significant. Furthermore the Reset test does not show any indication of nonlinearity (see table 5.17)

Table 5.16 - Heteroscedasticity Test

F-statistic	4.023649	Prob. F	0.0197
Obs*R-squared	7.804151	Prob. Chi-Square	0.0202

Table 5.17 - Ramsey RESET Test

F-statistic	2.514471	Prob. F	0.1148
Log likelihood ratio	2.541867	Prob. Chi-Square	0.1109

5.3.2 Multivariate regression

As before a multivariate regression is performed to avoid any spurious relation.

$$(EBIT/Assets - \%DA)_{it} = \alpha_0 + \beta_1 XSO_{it} + \beta_2 \ln(S)_{it} + \beta_3 (K/S)_{it} + \beta_4 (I/K)_{it} + \beta_5 (EBIT/S)_{it}$$
$$+ \beta_6 SIG_{it} + \beta_7 (RD/K)_{it} + \beta_8 (FCF/Assets)_{it} + \varepsilon_{it} \qquad (5.6)$$

Table 5.18 – Dependent variable: Adjusted performance, Multivariate regression

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO	-0.210830	0.495261	0.6710
Firm Size	Ln(S)	0.105119	0.110697	0.3439
Cap Int	K/S	0.001248	0.145646	0.9932
Grow Opp	I/K	-0.116900	0.165142	0.4802
Mark Pow	EBIT/S	2.525284	2.046367	0.2193
Tot Risk	SIG	88.54223	91.95207	0.3372
R&D Int	RD/K	-0.057818	0.056764	0.3102
Liq Con	FCF/Assets	-0.264672	1.033779	0.7983

Adjusted R-squared = -0.011339. * significant at 5 %, ** significant at 1 %, *** significant at 0.1%

The result suggests that neither of the tested variables are significant. The regression is estimated with White´s standard errors due to serial correlation (see table 5.19). But the Reset test do not present any evidence against the nonexistence of nonlinearity (see table 5.20).

Table 5.19 - Autocorrelation Test

F-statistic	4.684803	Prob. F	0.0108
Obs*R-squared	9.473265	Prob. Chi-Square	0.0088

Table 5.20 - Ramsey RESET Test

F-statistic	5.370443	Prob. F	0.0219
Log likelihood ratio	5.648379	Prob. Chi-Square	0.0175

Thus, as a direct consequence of the Reset test, which suggests a nonlinear function, the variables in regression 5.6 are transformed by in power of two. The result is presented in table 5.21.

$$(EBIT/Assets - \%DA)_{it} = \alpha_0 + \beta 1(XSO)^2_{it} + \beta 2[\ln(S)]^2_{it} + \beta_3 (K/S)^2_{it} + \beta_4 (I/K)^2_{it} + \beta_5 (EBIT/S)^2_{it}$$
$$+ \beta_6 (SIG)^2_{it} + \beta_7 (RD/K)^2_{it} + \beta_8 (FCF/Assets)^2_{it} + \varepsilon_{it} \qquad (5.7)$$

Table 5.21 – Adjusted performance, Multivariate regression

Measure	Variable	Coefficient	Std. Error	P-value
Ex. Stock option	XSO^2	-0.014783	0.375407	0.9686
Firm Size	$[Ln(S)]^2$	0.003459	0.003595	0.3376
Cap Int	$(K/S)^2$	-0.107902	0.076898	0.1628
Grow Opp	$(I/K)^2$	-0.074289	0.051568	0.1519
Mark Pow	$(EBIT/S)^2$	7.647296	7.637607	0.3184
Tot Risk	SIG^2	-3301.057	5799.196	0.5701
R&D Int	$(RD/K)^2$	-0.055380	0.026427	0.0379*
Liq Con	$(FCF/Assets)^2$	-1.084005	4.362251	0.8041

Adjusted R-squared = -0.011339. * significant at 5 %, ** significant at 1 %, *** significant at 0.1%

The model is regressed with White´s heteroscedasticy-consistent standard errors, due to heteroscedasticity (see table 5.22). The regression proves only a negative significance between adjusted performance and RD/K, while XSO^2 turns out insignificant.

Table 5.22 - Heteroscedasticity Test

F-statistic	1.716022	Prob. F	0.0131
Obs*R-squared	62.74478	Prob. Chi-Square	0.0330

5.4 T – tests

We use a t-test to control for whether in average the discretionary accruals and adjusted performance differs between the firms holding XSO (denoted "XSO firms") and those not implementing this method of remuneration (denoted "Others").

Discretionary accruals are calculated as presented is section (4.4.3). The t-test presented in table 5.23 shows that the use of discretionary accruals is larger in "XSO firms". However, as the test`s p-value indicates, the difference is not statistically significant.

Table 5.23 – t-test of Discretionary Accruals

Firm	Count	Mean	t-statistic	P-value
XSO firms	177	0.064064	1.096987	0.2740
Others	89	-0.415569		

In the next t-test the mean of adjusted performance is compared across the two groups of firms. As before performance is computed as EBIT relative to total assets. Adjusted performance is thus estimated as performance minus discretionary accruals relative to total

assets. The results depict "Others" to have in average superior adjusted performance. Here, the difference is statistically significant at five percent level (see table 5.24).

Table 5.24 – t-test of Adjusted performance

Firm	Count	Mean	t-statistic	P-value
XSO firms	177	0.042310	-1.992945	0.0476*
Others	89	0.115911		

5.5 Summary of firms using XSO

As displayed in table 5.25, executive stock option programs drastically rose in popularity between the years 1998 and 2003. Firms with XSO as incentive programs amounted to 8 (excluding the firms falling off) in 1998, and to 17 in 2007. The falling off is due to that some of the firms, during the sample period, did not explicitly account for the relevant information needed for our cross sectional analysis. However, the falling off decreased, and as from the year 2002 ABB is the only company that does not explicitly account for the executives salary, separated from the other employees. Following the increase in firm usage of stock options, the ratio increases from 35 percent in 1998, to 61 percent in 2007. There is a peak in the years 2000 to 2003/2004, which is simply due to the fact that executives exercised their options, and that some of the companies incentive programs had their expiration date at the end of this period.

Table 5.25 – Summary of the sample

Year	Firms with XSO	Firms without XSO	Ratio of XSO usage	Falling off
1998	8	15	35 %	6
1999	13	10	57 %	6
2000	19	6	76 %	4
2001	20	7	74 %	2
2002	23	5	82 %	1
2003	23	5	82 %	1
2004	20	8	71 %	1
2005	18	10	64 %	1
2006	16	12	57 %	1
2007	17	11	61 %	1
Total Observations	177	89	67 %	24

6 Analysis

*T**he empirical findings from the cross-sectional regression results will in this chapter be analysed. First, we perform a discussion regarding the determinants of XSO on a basis of our empirical findings. Each of the determinants including their proxies will be analysed in turn. Secondly, XSO impact on firm performance is discussed by analysing our univariate and multivariate regression findings. Both sections are summarized with concluding remarks.*

6.1 Stock Option Program Determinants

A discussion regarding the determinants of executive stock option incentive programs will be performed by analysing the three major hypothesises concerning the determinants of XSO in a firm; value enhancement, risk taking, and capital constraints. This analysis is further extended to a discussion of each of the variables separately.

6.1.1 Value Enhancement

Value enhancement, as discussed in 3.2, is induced in firms that adopt an equity based incentive program. This is due to e.g. PA problems and misalignments of interests in the firm. The variables used to test for this hypothesis are firm size, capital intensity, growth opportunities, and market power.

As argued by several scholars, e.g. Himmelberg et al. (1999), Lam and Chng (2006), and Chourou et al. (2008), executive stock options tend to be more present in larger firms than in smaller ones. Hence, the implementation of stock option incentive programs increases with firm size. Surprisingly, our empirical findings suggest the opposite. These results imply that there are less requirements to monitor executives in large firms contrary to less large firms. Executives in large listed firms are monitored by several stakeholders such as creditors, institutional holders, media and others. The pressure applied from the stakeholders could convey that executives are forced to act in the interest of the owners and stakeholders. This pressure could result in making the XSO incentive programs somewhat obsolete. More likely, the difference between our findings and previous research can be explained by our choice of sample. Our sample exclusively consists of exceptionally large firms which distorts our

findings. Since all the firms in our sample are exceptionally large, it can be argued that all firms are subject to great misalignment of managers' and owners' interest. Thus, the firm variable is rather difficult to interpret. Previous research has been conducted using a larger sample including firms of different sizes, hence, a more diversified sample would enable a more thorough analysis concerning the importance of the firm size.

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As the operating margin in a firm rises, the firm's market power increases. We use the operating income in relation to sales as a measure for market power in a firm. Our empirical findings show that as the market power in a firm increases, the degree of XSO increases. In line with executive equity based compensation theory, e.g. Himmelberg et al. (1999), this result imply that as the market power in a firm increases there are greater room for discretionary spending which increases the will from the owners to align the executives' incentives with their own. Hence, granting stock options as pay-for-performance to ensure that the executives act in a long-term value maximizing manor. In addition, a high operating margin could encourage executives to influence the level of XSO because of the scope for discretionary spending and the possibility to increase their personal wealth. The executives could be tempted to invest in short-term value creating projects to increase the value of the stock price just in time to the options´ expiration date.

The remaining two variables – capital intensity and growth opportunities –have no significant relation with XSO. Therefore, we cannot further analyze their impact on XSO. Our findings show an ambiguous result regarding the value enhancement hypothesis. Two variables, firm size and market power, show a high statistical significance with the use of XSO while the others do not. However, since two of the variables show a significant correlation with the use of XSO, we find support for the value enhancement hypothesis.

6.1.2 Risk Taking

As argued in the hypothesis development, there exists no consensus on how XSO affect the risk taking within a firm. The scholars who claim that there is a positive relation with XSO and risk taking, base their arguments on the fact that option value increases as volatility increases. Others, however, postulate that executives' compensation's sensitivity to performance fall when risk increases. Hence, XSO have a negative correlation with risk taking. Total risk and R&D intensity measures the risk taking.

Total risk measured by the daily variance of stock return, implies that the value of the option increases as firm risk increases. Therefore, executives could be encouraged to take additional risk to increase the value of their options. We find statistically significant evidence that total risk is positive correlated with XSO. Accordingly, we can corroborate with Defusco et al. (1990) and Lam and Chng (2006) results that XSO increases the total risk. The result indicates that managers with XSO are, indeed, encouraged to take additional risk in order to increase the value on their options. An increase of the variance of daily stock returns implies a higher risk setting for the owners. This additional risk must be associated with higher returns in order to be value creating.

Following Lam and Chng (2006), a positive relation between R&D intensity and XSO is to be expected. Our empirical findings show that R&D intensity exhibits a significant positive correlation with XSO and hence, confirm the thesis outlined by Lam and Chng (2006). Thus, Swedish managers holding stock option spend more resources on R&D than managers who do not have any options. Consequently, higher R&D expenditures imply higher risk which has a positive impact on stock option values.

The results are conclusive, XSO have a positive correlation with risk taking. Both the total risk- and R&D intensity variable suggest that executives with stock option act in order to increase the volatility of the firm's stock option returns, which have a direct impact on the options' value. It should be pointed out that not all managers have the opportunity to receive cash compensation for their option implying that there is no personal gain for these managers to increase the firm risk. One can therefore argue that the risk coefficients would be higher if all executives were entitled to cash compensation for options. Furthermore, it can be argued that high firm risk environments encourages managers to affect the level of granted stock options, since the value of the options increases with higher risk.

6.1.3 Capital Constraints

Stock option incentive programs tend to be present when firms face a capital constraint. Chourou (2008) and Yermack (1995) argue that executive stock option compensation therefore should be more common in firms with a low level of liquidity. The capital constraint proxy variable is liquidity constraints. The cross-sectional results for capital constraints are

statistically weak. Therefore, we cannot reject our null hypothesis. That is, the firm's liquidity position is not a determinant for XSO.

6.1.4 Concluding Remarks

Four out of the seven tested variables have proven to be statistically significant with the use of XSO. This allows us to suggest support for the value enhancement and risk taking, but not for the capital constraints hypothesis. The low adjusted R-squared value (0.116623) indicates that the XSO is weakly explained by the model. Thus, there exists other variables which also have explanatory powers over XSO, for example the attraction, sorting, and retention theories presented in section 2.5.

6.2 Executive Stock Options Impact on Firm Performance

A discussion regarding the impact on firm performance by XSO is conducted by analyzing the univariate and multivariate regression results. First, the relationship between performance and XSO is examined, secondly a multivariate relationship in which stock option determinants are included in the regression is analyzed. We perform the same procedure with adjusted performance as the dependent variable.

6.2.1 Performance

One of the main purposes with equity incentive programs is to improve firm performance. Firm performance is measured as, in line with Ittner et al. (2003) and Cornett et al. (2008), the firms EBIT relative to total assets.

Previous research, such as Mehran (1995), Morck et al. (1998), and Lam and Chng (2006), conclude a positive relationship between the use of XSO and firm performance. Our univariate regression displays the same result. The univariate regression shows a statistical positive significant relationship between XSO and firm performance. This result indicate that the use of XSO indeed align the interest of the owners and the executives. The value of the XSO depends on the underlying stock prices, why executives strive for overall improved firm performance. Furthermore, previous research display that the granting of XSO has a close connection to value enhancement in order to reduce agency costs and improve firm

performance. Since we find support for the value enhancement hypothesis, in 5.1.1, our empirical result is coherent with previous findings – XSO induces value enhancement and thereby improve firm performance.

In order to avoid any spurious relation between XSO and performance, we also perform a multivariate regression where the determinant variables included in the motivation analysis, simultaneously with XSO, are regressed against performance. The result differs from the univariate analysis by that XSO no longer is significant. This result indicates, contrary to the univariate finding, that there is no relationship between granting XSO and firm performance. Even though we find support for the value enhancement hypothesis, the multivariate test shows no relation between XSO and performance. Neither does the granting of stock options prove to be value deteriorating, nor does it enhance the value of the firm. Furthermore, the findings from the multivariate regression stress the importance of including other control variables, in purpose to avoid misleading conclusions when XSO solely is regressed against performance.

Although no relation between XSO and firm performance can be established, the multivariate regression display two independent variables that show a high statistical significance with firm performance. Not surprisingly, these variables are market power and liquidity constraints. Greater market power and a strong cash flow are according to financial theory synonymous with healthy firm performance. Furthermore, market power, as discussed in 5.1.1, is positively correlated with granting XSO which further confirms the aims of using equity based incentive programs.

In section 5.1, we establish that a high firm risk environment motivate the granting of stock options, however the empirical results indicate that XSO do not have any impact on firm performance. Therefore, the high risk is unjustified as a means to grant stock options.

6.2.2 Adjusted performance

In this section we have considered the possibility of managers´ use of discretionary accruals in purpose of receiving a higher option pay-off. Therefore, we adjust the performance measure by subtracting discretionary accruals.

When adjusting for discretionary accruals, the empirical result in the univariate model contradicts the result from the unadjusted performance measure. Thus, the result does not support the hypothesis that XSO have a value implication on firm performance. The multivariate regression yields the same result; that XSO does not have an impact on firm performance. The results from the univariate regression highlight the importance of accounting for discretionary accruals in firm performance, in line with Cornett et al. (2008). The t-test suggests that discretionary accruals are in average larger in firms granting stock options in comparison to firms with no executive stock option program. Yet, the difference is not statistically significant. Furthermore the t-test of adjusted performance shows that the former group de facto in average have a lower adjusted performance with a statistic significant reference. These results indicate that remunerating Swedish executives using XSO programs does not improve performance compared to companies that does not use the incentive programs. Previous research e.g. Morck et al. (1988), Mehran (1995), and Lam and Chng (2006) all neglect to account for discretionary accruals and find a positive significant relationship between XSO and firm performance. Our empirical result, in line with Cornett et al. (2008), emphasizes the importance of discretionary accruals. Thereby, their findings can be merely due to cosmetic earnings in the firm.

6.2.3 Concluding Remarks

The univariate regression display a statistical positive relationship between XSO and firm performance which indicates that the executives and the owners interests indeed are aligned by the equity incentive program. However, the multivariate regression does not conclude a significant relationship between XSO and firm performance indicating a spurious relation in the univariate regression. The multivariate regression does contain two independent variables, market power and liquidity constraints, which show a significant relationship with firm performance.

When adjusting performance for discretionary accruals, both the univariate and the multivariate regression display a non-significant relationship between XSO and firm performance. These results stress the importance of accounting for the presence of discretionary accruals. The t-tests indicate that compensating executives with stock options does not improve firm performance compared to companies not granting XSO.

7 Conclusions and Suggestions for Further Research

*I*n this final chapter we present our conclusions from the empirical results. The executive stock option determinants and their impact on firm performance are first discussed. Subsequently, we comment on the limitations with this study. The thesis is then concluded with a discussion on relevant further research within this field of study.

7.1 Conclusions

The purpose of this thesis is to investigate what the determinants for executive stock options (XSO) are. Further, the thesis aims to analyse how XSO affect firm performance.

In order to establish the impact of XSO on firm performance the determinants behind the use of these equity incentive programs are investigated. Previous research (e.g. Himmelberg, 1999; and Lam and Chng, 2006) concludes that XSO determinants can be explained in ways consistent with the predictions of the PA theory, such as value enhancement. Other determinants consistent with previous studies within the field are risk taking and capital constraints.

Our findings show that firm size, market power, total risk, and R&D intensity act as determinants for XSO. This provides support for the value enhancement thesis. The risk taking proved to be positively correlated with the use of XSO. However, we find no support for the capital constraints thesis, thus a firm's liquidity position is not a determinant for the use of XSO. It appears that firms grant XSO as a means to enhance the firm value by aligning executives' interests with the ones of the owners'. That is, firms use XSO in an attempt to provide executives with incentives to act in the best of the firm's interests instead of pursuing personal gain. We can also show statistically strong evidence that the risk taking within a firm increases in the presence of XSO. The executives invest in risky assets to increase the value of the underlying. This increased risk taking becomes value destroying since XSO do not have a positive effect on firm performance. Risk is a fundamental part of business, rewarding and unrewarding, and a high unrewarding risk is obviously not the favourable one since it in the long run can act as value deteriorating.

In a perfect market the owners decide to what extent and in what way the managers should be paid for their effort. Given a perfect market with strong owners, the issue of importance become what method of remuneration is more profitable for the owners. Due to the medial attention and the complexity of executive stock options, the second aim of this thesis is to examine if executive stock options have any value implication on firm performance.

Previous conclusions on this subject have been ambiguous. Our empirical findings on firms listed on the OMXS30 show that executive stock options have no influence on firm performance, after adjusting performance for discretionary accruals. This finding can be apprehended to some degree as contradictory after establishing that one of the main purposes of granting stock options is value enhancement. This result suggests that it is not only the executives or how they are remunerated that should receive the credit for how well the firm performs. This may also explain why the association Aktiespararna lobby towards a broader option incentive program that would include a larger part of the personnel within the firm. Furthermore, the occurrence of discretionary accruals among firms adapting executive stock options in comparison with those not having this remuneration method is established, but the difference in use of discretionary accruals is not statistically significant. However, we find a statistically significant difference in adjusted performance, with firms not having option incentive programs performing by far better in average.

We may also, from the discretionary accruals analysis, draw a conclusion concerning the occurrence of earnings management amongst firms with executive stock option incentive programs. These findings are in line with earlier studies such as Bergstresser and Philippon (2006), which suggest that highly incentivized executives lead companies with a higher degree of earnings management. This emphasize the importance of the monitoring of executives when granting executive stock options and imply higher agency costs, which again contradicts the main purpose of why stock options are used, that is to obstruct the PA incentive conflict and lower the agency costs.

Moreover our empirical result in collaboration with prior studies such as Cornette et al. (2008), rise doubt about previous conclusions when a relation between granting of executive stock options and firm performance has been confirmed without considering the possibility of earnings management (see e.g. Morck et al. 1988; Mehran, 1995; Lam and Chng, 2006)

The findings in this thesis should be interpreted with cautiousness, due to a number of limitations. First, due to the information limitation caused by the annual reports fragmentary presentation of the executive stock option holdings. Second, although the theories and models applied in this study commensurate with previous studies on the subject, the small coefficient of determinations from the regressions suggest that other factors also affect the motivations for granting executive stock options. Above all this is the case when the executive stock option´s impact on firm performance is investigated. Lastly, also due to the information limitation, e.g. on duration, it would have been more preferable to measure the firm performance prior and subsequent of granting stock options.

7.2 Suggestions for Further Research

The overall small coefficient of determination suggests that other explanatory variables and/or different proxies should be used to test the theories surrounding determinants for the granting of stock options and their impact on firm performance. Below, we suggest some alternate explanations on determinants of stock options and their impact on firm performance which could constitute the foundation for further research.

One fundamental element that may have a conclusive part in what method of remuneration is implemented in the firm is the ownership structure. It can be argued that the stronger the owners are, the less leverage can be provided by the CEOs in order to influence the choice of remuneration. With further focus on the CEOs´ and the shareholders´ value it is of interest to investigate the dividend policies. If the dividend payments are reduced only in purpose to prevent a decrease of the share price and consequently persist or increase the option value it will be value deteriorating for the owners.

The main reason for granting executive stock options seems to be to obstruct the conflict of interests between the principal and the agent by aligning the executive´s wealth with the stockholder´s return. Since the corporate governance theory suggests lower agency costs with increased financial leverage, highly leveraged firms should have less incentivized executives. As argued by Yermack (1995) the method of remuneration can also be related to within what industry the firm is operating. This is due to the observed inverse relation between the degree of regulation and value of incentives from stock options.

We look forward to future research to shed more light on the determinants of executive stock option and its impact on shareholder value.

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Appendix 1

Derivation of Black-Scholes Option Pricing Model

Black-Scholes option pricing model provides a theoretical valuation formula for options. This model is valid under the assumptions that "if options are correctly priced in the market, it should not be possible to make sure profits by creating portfolios of long and short positions in options and their underlying stocks" (Black and Scholes, 1973, p.637). The option relevant for this thesis is the *call option*. In general, a high value on the underlying asset, e.g. stock price, conveys a high option value and if the underlying assets value is below the exercise prise the option will be useless.

The Black-Scholes valuation formula is derived under the assumption that "ideal conditions" prevails. According to Black-Scholes (1973), this assumption conveys that the value of the option depends on known variables, time, and the price of the underlying asset. The derivation[5] of the Black-Scholes option pricing formula can be divided into thirteen steps and follows;

(1) Under the assumptions mentioned above, it is possible to create a hedged position against the price of the stock in which the value of the stock option will depend only on time and the known variables, by taking a long position in the stock and a short position on the option. The value of the option, w, can then be expressed as a function of stock price, x, and time, t.

$$w(x,t)$$

Following this function, the number of options that must be sold short in order to create a hedged position against one share of long stock can be displayed in the following equation:

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[5] This derivation follows Black-Scholes (1973) *The Pricing of Options and Corporate Liabilities* and is held brief. For a complete derivation of the valuation model see the article.

$$1 \div w_1(x, t)$$

As variables x and t change the number of options required to be sold short to create the hedged position changes. The risk in this hedged position, with x number of options sold short against one share of stock, will be zero under the prerequisite that the short position is changed continuously. If the short position is not changed continuously, the risk can be diversified away by creating a large portfolio thus diminishing the risk close to zero.

(2) If the hedged position contains 1 share of stock long, and $1 \div w_1$ options short the value of the equity equals:

$$x - \left(\frac{w}{w_1} \right)$$

(3) Expressing a change in the value of equity, in a short period of time, Δt, as follows:

$$\Delta x - \Delta w \div w_1$$

(4) If this short position was to be changed continuously, the authors use a stochastic calculus to expand Δw, creating the following formula:

$$\Delta w = w_1 \Delta x + \frac{1}{2} w_{11} v^2 x^2 \Delta t + w_2 \Delta t$$

In the expression above the subscript refers to partial derivatives and v^2 to the variance rate of return on the stock.

(5) Integrating equation (3) with (4) the change in value of equity, in the hedged position, becomes:

$$-\left(\frac{1}{2}w_{11}v^2x^2 + w_2\right)\Delta t \div w_1$$

(6) Because of the fact that ROE (return on equity) is certain, the return becomes $r\Delta t$. The expected return on the hedged position is equal to the short term interest rate since the risk is either small, or can be diversified away completely. Under this assumption, the change in equity (5) equals the value of equity (2) multiplied by the return ($r\Delta t$).

$$-\left(\frac{1}{2}w_{11}v^2x^2 + w_2\right)\Delta t \div w_1 = \left(x - \left(\frac{w}{w_1}\right)\right)r\Delta t$$

(7) Adjusting for Δt on both sides of the equation, the authors create a differential equation for the value of the option.

$$w_2 = rw - rxw_1 - \frac{1}{2}v^2x^2w_{11}$$

(8) Boundary conditions are created by setting t^* as the maturity date of the option and c as the exercise prise.

$$w(x,t^*) = x - c, \quad x \geq c$$

$$w(x,t^*) = 0, \quad x < c$$

(9) The option valuation formula is presented as the only formula of $w(x,t)$ that can satisfy the differential equation (7) in subject to the boundary conditions presented above. To solve for the differential equation, the authors make substitutions as follows below.

$$w(x,t) = e^{r(t-t^*)} y \left[\frac{(2 \div v^2)\left(r - \frac{1}{2}v^2\right)\left[\ln x \div c - \left(r - \frac{1}{2}v^2\right)(t - t^*)\right], -(2 \div v^2)}{(r - \frac{1}{2}v^2)^2(t - t^*)} \right]$$

(10) Using this substitution, the differential equation becomes:

$$y_2 = y_{11}$$

(11) The boundary condition can then be expressed as:

$$y(u, 0) = 0, \quad u < 0$$

$$y(u, 0) = c \left[e^{u\left(\frac{1}{2}v^2\right) \div \left(r - \frac{1}{2}v^2\right)} - 1 \right], \quad u \geq 0$$

(12) The equation given in (10) is the *heat-transfer equation* of physics. Black-Scholes notation of the solution follows:

$$y(u, s) = 1 \div \sqrt{2\pi} \int_{-u \div \sqrt{2s}}^{\infty} c \left[e^{(u + q\sqrt{2s})\left(\frac{1}{2}v^2\right) \div \left(r - \frac{1}{2}v^2\right)} - 1 \right] e^{-q^2 \div 2} \, dq$$

(13) Substituting from equation (12) into the option valuation formula in (9) the authors conclude the derivation.

$$w(x,t) = xN(d_1) - ce^{r(t-t^*)}N(d_2)$$

Where $d_1 = \dfrac{\ln x + c + \left(r + \frac{1}{2}v^2\right)(t^*-t)}{v\sqrt{t^*-t}}$ and $d_2 = \dfrac{\ln x + c + \left(r - \frac{1}{2}v^2\right)(t^*-t)}{v\sqrt{t^*-t}}$

N(d): Cumulative normal density function   *r: interest rate*

$(t^* - t)$*: maturity* v^2*: variance rate*