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ESOPs and Stock Market Valuation

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Abstract

This study contributes to the field of corporate finance by exploring the relationship between employee stock options (ESOPs) and value creation for shareholders. The theme is of interest because previous research has shown varying results and because ESOPs are an important tool in agency theory, with implications for management theories.

The relationship was explored through the creation of logarithmic-linear regression models that modeled the correlation between a dummy variable for ESOP use and stock market capitalization as well as stock price volatility. A dataset consisting of 279 non-financial, non-utility, public Swedish firms was collected spanning the years 2001-2021.

The results from the regression models showed a statistically significant positive correlation between adopting ESOPs and stock market capitalization but no significant correlation between ESOP use and stock price volatility. The most advanced model employing control variables, firm- and time-specific fixed effects found that firms employing ESOPs enjoyed a 13-14% higher stock market capitalization.

The results of our study implies that ESOPs are an effective tool in aligning employee-shareholder interests and that the value created by this is indeed captured by the stock market. It also implies that ESOPs avoid the pitfalls of self determination theory, possibly because ESOPs enable internalization of the firm's goals.

Keywords

Employee stock options, employee stock option plans (ESOPs), shareholder value, market valuation, agency theory, self determination theory

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Table of Contents

1. Introduction.....	3
1.1 Background Description.....	3
1.2 Problem Description and Problem Analysis.....	3
1.3 Aim of the Study.....	4
2. Theoretical Framework.....	5
3. Literature Review.....	9
4. Hypotheses.....	11
5. Data and Methodology.....	12
5.1 Data Collection and Processing.....	12
5.2 Methodology.....	13
Table 1 Hausman Test.....	14
Table 2 Variable Description.....	15
5.3 Data Description.....	17
Table 3 Summary Statistics.....	17
Table 4 Correlation Table.....	18
5.4 Model Specification.....	18
Table 5 Model Description.....	19
5.5 Industry Specification for Industry-fixed Effects.....	20
Table 6 Industry Grouping.....	21
Table 7 Industry ESOP Statistics.....	22
6. Empirical Results.....	24
6.1 ESOPs and Stock Market Capitalization.....	24
Table 8 Market Capitalization Regression Results.....	24
6.2 ESOPs and Stock Price Volatility.....	26
Table 9 Stock Volatility Regression Results.....	26
7. Discussion.....	29
7.2 Limitations.....	33
7.3 Further Research.....	34
8. Conclusion.....	36
References:.....	37

1. Introduction

1.1 Background Description

Firms can enhance the remuneration packages of their managerial staff by offering equity in the form of employee stock option plans (ESOPs). Commonly, ESOPs are call options which grant the employees the right to purchase a set number of stocks at a predetermined price within a certain period of time. When the market price exceeds the exercise price, employees can choose to exercise the option and thereby, obtain the stocks at a discounted rate, resulting in a personal financial benefit. Incorporating ESOPs into remuneration packages is a strategic method for firms to retain and attract employees, while also aligning their interest with those of shareholders. This alignment is partly often intended to motivate employees to work towards increasing the firm's stock value, thereby benefiting both the employees and the shareholders.

ESOPs are a relatively recent development in Swedish firms as according to Hansson & Jonung (1997), Sweden has a long tradition of utilizing banks as the primary source of funding for companies with limited access to capital markets. It is only in recent history that the liberalization of Swedish markets has led to a shift towards some firms pursuing capital markets as an alternate source of funding. The relative immaturity of Swedish capital markets, as compared to the United Kingdom and United States, translates to institutional differences that may affect the psychology and decision making of investors. For instance, there may be a public disapproval of high managerial conditional compensation or differences in accounting standards, as noted by Svahn (2023). This evolving financial landscape in Sweden provides a unique context for studying the impact of ESOPs.

1.2 Problem Description and Problem Analysis

The effectiveness of ESOPs has previously been explored in the context of agency theory and firm efficiency, but the relationship between ESOPs and shareholder value remains unclear. Since there might be cultural factors that affect the relationship between ESOPs and firm efficiency, it is particularly interesting to explore the relationship between ESOPs and value for shareholders in specific countries. Although capital is free to move internationally in liberal markets such as Sweden, one must also consider that individual companies operate in a local context that may differ in how a firm, their customers, or their investors reacts to ESOPs.

Additionally, exploring how potential value for shareholders is created and captured is crucial. This study will investigate whether the implementation of ESOPs leads to higher stock market capitalizations or lower stock price volatility, thereby providing a clearer view of how ESOPs might benefit shareholders. Understanding these dynamics could offer valuable insights into the broader implications of ESOPs, particularly within the Swedish market.

1.3 Aim of the Study

This study aims to explore the relationship between ESOPs and shareholder value for non-financial, non-utility, publicly traded Swedish firms by exploring the correlation between ESOPs and stock market capitalization as well as ESOPs and stock price volatility. The objective is to determine if potential value creation from ESOPs is captured by shareholders.

The study will be grounded in agency theory, stakeholder theory and self determination theory. By integrating these theoretical frameworks, our study seeks to provide a nuanced understanding of how ESOPs could influence shareholder value within the settings of publicly listed companies in Sweden.

2. Theoretical Framework

Agency theory, which originated in the 1970s with Mitnick (1975) and Jensen and Meckling (1976) being among the earliest contributors to the theory, describes the relationship between principals and agents.

The term “agency” is defined as an interdependent situation between two parties, such as adviser-client, employee-manager or manager/CEO-shareholders (Mitnick, 1975). The parties in an agency relationship are defined as such that the principal contractually delegates some decision-making authority to the agent, to perform services on their behalf (Jensen & Meckling, 1976). Furthermore, Mitnick differentiated between “self-interests” and “other-interests”. Self-interest represents the agent’s own goals and interests, such as private profit maximization, and other-interests represent the principal’s (1975). These misaligned interests laid the foundation for the principal-agent problem, which Mitnick (1975) identified two aspects of.

On one hand, “The Principal’s Problem” is described as motivating the agent to act in, and for, the principal’s interests and goals. This motivation can be achieved by financial incentives but also by supplying information which may align their previously misaligned interests. On the other hand, “The Agent’s Problem” is described as identifying and choosing the action or decision that best satisfies both their self-interest and the principal’s other-interests, whilst considering possible constraints due to the agency relationship.

Assuming that both parties aim to maximize their utility, it is likely that agents will not always act in the best interest of the principal. In an attempt to minimize the risk of such actions, as well as the succeeding agency costs which occur when agents prioritize their interest over the principal’s, different incentive systems and mechanisms were discussed (Jensen & Meckling, 1976). Positive incentive systems to align the interests in an agency relationship of manager-shareholder, such as a compensation system for the manager and stock options were proposed by Jensen & Meckling (1976). Mitnick (1975) instead exemplified several negative incentive systems whose goal was to restrict the agent’s set of discretionary choices or convince the agent of the extra expenses of pursuing its self-interests instead of the other-interests. This could for example be accomplished by programs of surveillance or threat of reduction in agent return.

Almost three decades later, Bebchuk and Fried (2003) published an article regarding the conflicting views on incentives in the form of executive compensation within the agency theory. On one hand the “Optimal contracting approach” views agents’ compensations as a part of the solution to the principal-agent problem. On the other hand, “Managerial power approach” views agents’ compensations as both a potential solution to the principal-agent problem, but also a part of the problem itself. The theory states that the greater the managers’ power, the greater is their ability to take advantage of their position to secure personal benefits. Furthermore, the authors continue to state that compensation will be less sensitive to performance in firms with a powerful manager and/or a large and distracted board of directors.

There is also a negative correlation between compensation and the equity ownership of the largest shareholder. A higher shareholder concentration is associated with specifically fewer stock options to managers (Bebchuk & Fried, 2003).

In contrast to agency theory, Gagné and Deci (2005) describe motivation as a spectrum in self determination theory (SDT), ranging from amotivation, to degrees of extrinsic motivation, to intrinsic motivation. Amotivation, in SDT, is lack of motivation. Extrinsic motivation comes from external sources such as rewards, rules or performance targets. Intrinsic motivation comes from finding the task interesting and satisfying psychological needs. According to Deci et al (2017), the psychological needs that drive intrinsic motivation are the feelings of competence, belonging and autonomy. When the workplace and work activities support the satisfaction of those basic needs, greater work performance can be achieved without the use of extrinsic motivators.

Gagné and Deci (2005) challenge the notion that extrinsic motivators like monetary incentives are effective in aligning agents with the principal's interest in all situations, but recognize the need for extrinsic motivators in uninteresting tasks that require discipline. However, SDT proposes that in order for extrinsic motivation to have any positive long-term effect the extrinsic motivation must be internalized. Internalization is primarily driven by social factors, leading into the field of sociology.

In their study of performance measures, Groen et al (2015) found that one way of achieving internalization of extrinsic motivation is by co-developing job performance measures as they showed that using such co-developed performance measures for evaluation lead to increased productivity. The co-developed performance measures had no positive effect on productivity

when used as a basis for monetary or non-monetary rewards. However, validating that it was the internalization of the performance measure that was beneficial and not the extrinsic motivators in the form of performance measures or monetary rewards.

Gagné and Deci (2005) suggest that uninternalized extrinsic motivators, which they refer to as controlled motivation, have dubious to no long-term benefits for work performance as they lead to decreased feelings of autonomy and well-being. In a single-firm study by Lourenço (2016) it was shown that the performance increasing effect of monetary rewards and recognition (private or public praise by a superior) were in direct competition, with one reducing the effect of the other.

This is further supported by the theory of Gneezy et al (2011) that states that there are psychological effects to monetary incentives that work in the opposite direction of the price effect: Large monetary incentives might cause reputational damage if receivers appear greedy, social situations might turn into distasteful monetary exchanges, or there could be intrinsic image motivation that is crowded out such as dedication or charitability.

Gneezy et al (2011) also argue that there are psychological effects that make monetary incentives not only crowd out intrinsic motivators but potentially harmful: Large monetary incentives might make the receiver think there is a hidden drawback, choke under pressure, or harm trust between parties if perceived as monitoring or controlling. Furthermore, the crowding out effect is permanent. Once monetary incentives have been implemented, autonomous motivation can not be restored by removing them.

Stakeholder theory clashes with conventional shareholder theory in that it promotes maximizing value for all stakeholders, not just shareholder value. Maximizing value for stakeholders instead of shareholders means a shift in decision making, from maximizing market capitalization to considering the varying needs and wants of different stakeholders. Employees, for instance, might value job security and a pleasant work environment highly while suppliers and creditors might value excess liquidity higher than a high market capitalization.

Stakeholder theory sometimes faces criticism for its ambiguity and lack of normative guidelines. As argued by Jensen (2010), it is impossible to maximize multiple objectives at the same time unless the objectives are perfectly aligned. A manager who is told to maximize profits, financial stability and employee satisfaction simultaneously is therefore given an

impossible objective. An impossible objective is de facto no objective. Therefore, unless stakeholder theorists were to specify a model for how these competing interests should be balanced, the theory is in its current form proposing that managers should not have an objective and be free to do what they want.

Donaldson and Preston (1995) defend stakeholder theory, although obviously not addressing Jensens' criticism directly, claiming that stakeholder theory has high descriptive accuracy and is to some extent normative. Their conclusion on the theory's normative quality is, however, exactly the point Jensen argues against: that managers should maximize all stakeholders' interests.

3. Literature Review

In 2016, O'Boyle, Patel and Gonzalez-Mulé conducted a meta-analysis on 102 studies on the relationship between employee stock ownership/ESOPs and firm performance encompassing 56 984 firms globally. The authors did not differentiate between employee stock ownership and ESOPs, treating them as interchangeable and including them both in the same variable. When including regression coefficients which controlled for other relevant variables, such as firm size, a correlation of 4% was found between employee stock ownership/ESOPs and firm performance. When not controlling for other relevant variables as well the authors found that firms with employee stock ownership/ESOPs on average had a 35% higher performance score than other firms.

Similarly, a firm that implemented employee stock ownership/ESOPs would in general see a 32% increase in performance - showing there was not a significant difference between firms regarding when the plan was introduced. Furthermore, the effect has been shown to increase over time, contradicting the previous notion that the positive effects of employee stock ownership/ESOPs should decline based on the belief that it was implemented as a "management fad" instead of as a strategic decision. Lastly, O'Boyle, Patel and Gonzalez-Mulé (2016) argue that even though the correlation of 4% shows only a small, yet significant, effect it could still have a monetary effect on the firm. The example presented was a firm with \$1 000 000 in profits which could realize an increase of \$40 000 by implementing employee stock ownership/ESOPs.

In contrast to O'Boyle et al, Sanders (2001) argued that there were noteworthy differences between employee stock ownership and stock options. Because stock options participate fully in the upside risk of stock development while ignoring downside risk, at least below their call value, they incentivize risk taking behavior. Stock option compensation for CEOs in a sample of 250 publicly traded US firms on the S&P 500 was shown to have a significant effect on the firm's risk taking and short-long term orientation by increasing acquisition and divestiture activities.

Stock ownership, on the other hand, had the opposite effect of reducing these activities. The risk seeking effect of stock option compensation was reduced by firm performance. These findings suggest that lower performance or volatile firms engaging in stock option

compensation for their CEOs would take on more risk, increasing their beta, increasing the market's return expectations which led to heavier discounting of future profits.

Another study by Pugh, Oswald & Sahera Jr (2000) supported the study by Sanders, finding at most a small short-term increase in firm performance as a result of ESOP implementation in 183 publicly traded US firms from a mix of indexes, but noting that firms implementing ESOPs were prone to take on more risk by increasing their debt-to-asset leverage. The increased leverage led to higher return on equity and, notably, return on assets in the year of ESOP adoption but subsequent stock returns were lower compared to competitors who did not increase leverage. This supports the idea that the increased risk leads to increased return expectations by investors and therefore heavier discounting of the firm's profits. It should be noted that many of the firms that combined ESOPs with increased leverage did so as a defense against hostile takeovers, which could be a factor in their poor subsequent stock performance.

In a follow-up study, Pugh, Oswald & Sahera Jr (2005) revisited the topic, dividing 161 publicly traded US firms from a mix of indexes into ESOP-issuing firms under threat of hostile takeover and ESOP-issuing firms under no threat of hostile takeover. They looked at their efficiency and financial performance in subsequent periods. Their findings partially contradict their previous conclusion, showing that firms who increased leverage suffered decreased return on assets while firms who did not enjoyed increased return. In accordance with their previous findings, this effect was partially short-term.

A 2010 study by Ikäheimo et al. focusing on ESOP adoption by Finnish publicly traded companies found that the stock market reaction varied depending on whom the ESOP targeted. When targeting solely management or key personnel, its announcement did not lead to a statistically significant effect on stock market reaction. However, including all employees resulted in a significant negative stock market reaction, as evidenced by a decrease in stock returns in the days following the announcement. Ikäheimo et al (2010) argued that the negative reaction could be based on the combination of a dilution effect and a “free rider problem”. This phenomenon suggests that within large target groups, such as all employees, it is plausible that some employees may benefit from the firm's success in terms of stock return without necessarily contributing to its success.

4. Hypotheses

Since several studies have explored the relationship between ESOPs and firm efficiency and found a positive, albeit small or short-term, impact on select key performance indicators (KPIs), we expect that firms implementing ESOPs will exhibit improved internal performance. This expectation aligns with the dominant view in agency theory, which expects that aligning the interest of managers with those of shareholders through equity-based compensation in this case, could enhance firm efficiency.

However, whether this increased efficiency through the implementation of ESOPs translates into shareholder value through higher market capitalization is dubious. Previous studies conducted in other markets have demonstrated a weak correlation between ESOPs and stock market returns, with some even indicating a negative correlation. Despite these mixed findings, the theoretical background suggests that ESOPs should be beneficial for firm efficiency. Therefore, we hypothesize that ESOPs will have a positive impact on market capitalization.

Hypothesis 1: There is a positive correlation between ESOPs and stock market capitalization.

Beyond stock return, another valuable characteristic of a stock is its volatility. Stocks with lower volatility are considered less risky, which should make them more attractive to investors. This preference would be reflected in a lower yield requirement by investors, which typically results in lower returns over time. Since the theoretical framework supports the notion that ESOPs are an effective tool in principal-agent relationships, we theorize that ESOPs contribute to value creation for shareholders by reducing stock price volatility. This hypothesis stands despite the lack of empirical support for such an outcome in previous research. The reasoning behind this hypothesis is that by aligning the interests of employees and shareholders, ESOPs can lead to more stable and predictable firm performance, which in turn should reduce the volatility of the company's stock price.

Hypothesis 2: There is a negative correlation between ESOPs and stock price volatility.

5. Data and Methodology

5.1 Data Collection and Processing

The data collection process for this study was thorough and comprehensive, involving a substantial dataset from various reliable sources. Annual reports from 317 non-financial, non-utility, publicly traded Swedish companies, listed as of end of year 2023, were collected and aggregated using the Eikon database. Additionally, end-of-year stock market capitalization and daily stock price data for these companies, spanning from 2001 to 2021, were collected from the Swedish House of Finance. This extensive timeframe was chosen to ensure a robust sample size and to encompass significant economic events, such as the 2008 financial crisis and the COVID-19 pandemic.

Given that several of the 2023 publicly traded companies were not listed as of 2021, the dataset was reduced to 279 companies. This adjustment was necessary to maintain consistency and accuracy in the analysis period. For firms that had undergone ticker changes or mergers during the specific period, data was aggregated under their most recent ticker to ensure continuity. In cases where firms issued multiple types of stocks, the stock with the highest trading volume was selected to represent the firm in the dataset, ensuring that the most representative data was used.

The scope of this study was intentionally limited to publicly traded Swedish firms. This decision was made to limit the scope of the study and because Sweden has the largest stock market among the Nordic countries. By concentrating on publicly traded firms, the study benefited from the higher reporting standards in the European Union adoption of the International Financial Reporting Standards (IFRS). These standards provide more comprehensive financial data compared to the K2 and K3 reporting standards, applicable to private firms in Sweden. Financial firms were excluded as they are subject to unique accounting standards from the Swedish financial supervisory authority and their business models and risks are different from non-financial firms. Utility firms were also excluded as their business models are similarly different.

The scope of the study was limited to 2001-2021 as this produces an adequate sample size to draw from and avoids skewing the data due to the financial deregulation and financial market development during the late 1980s, while still covering interesting time periods such as the financial crisis of 2008 and the COVID-pandemic.

For the analysis, selected control variables from the firms annual reports, as well as their end-of-year stock market capitalization, were transformed into their natural logarithms. This logarithmic transformation was applied to standardize the data, making it easier to interpret. Ratios, such as return on assets, were not logarithmized. Daily stock returns were calculated as the logarithmic change in day-to-day closing prices, providing a consistent measure of stock performance. The annual population standard deviation of logarithmic growth was calculated for each firm to assess stock price volatility.

A few firms publish their financial statements in different currencies such as Euro, NOK or DKK, in which case they were converted to SEK at the daily closing exchange rate at the time of reporting. Daily stock prices were not converted as the variable used in regression was standard deviation of logarithmic change. This means that gains and losses from changes in the exchange rate is not reflected in the dataset.

A dummy variable for the existence of ESOPs was derived by examining whether the reporting firm reported any stock-based compensation or ESOP debt guarantee costs. Firms that reported costs in any of these categories were assumed to have employee stock options and were assigned a value of 1 for the dummy variable. This method, although transparent, has a potential weakness. A firm could theoretically incur stock-based compensation costs through other, less common schemes such as restricted stock units, performance share or stock appreciation rights without actually employing ESOPs. However, this issue is expected to be minimal since financial firms, which are more likely to use such creative compensation schemes, were excluded from the sample.

5.2 Methodology

The study aimed to explore the correlation between ESOPs and stock market capitalization as well as ESOPs and stock price volatility to see if potential value creation from ESOPs was captured by shareholders. To accomplish this, several regression analyses were performed in Stata with stock market capitalization and yearly standard deviation of logarithmic stock price change as the dependent variables in their respective regressions and a dummy variable for the existence of ESOPs as the independent variable in both regressions.

A Hausman test was conducted to determine whether a fixed-effects model or a random-effects model would be more appropriate, given the potential presence of endogenous regressors in the regression analysis. The Hausman test aimed to identify if there

was a correlation between the unique errors, which are unobserved individual effects, and the regressors in the model.

Table 1 Hausman Test

Variables	Fixed (I)	Random (II)	Difference (I-II)	S.E
ESOP dummy	0.0384	0.1135	-0.0751	-
Total assets	0.9409	0.8632	0.0777	0.0052
Capex/total assets	1.0292	0.9229	0.1063	-
Free cash flow	0.0063	0.0064	-0.0001	-
Return on assets	0.6170	0.6368	-0.0198	-
Chi-square	158.98			
Prob > Chi-square	0.0000			

Table 1 shows the results from the Hausman test.

Given that the significance level was set at $\alpha = 0.05$, the resulting p-value of 0.00 rejected the null hypothesis of the Hausman test, which asserted that the random-effects estimators were consistent. This rejection indicated that there was a significant difference between the fixed-effects and random-effects estimators, suggesting that the assumption of no correlation between the regressors and the individual-specific effects in the random-effects model was violated.

Therefore, it could not be stated with statistical certainty that the random-effects model would provide reliable results. Thus, the fixed-effects model was deemed more appropriate for this analysis, since it accounts for the potential endogeneity and provides more consistent and unbiased estimates of the regression coefficients.

Following the Hausman test further analyses were performed to achieve higher accuracy and reliability of our results by first including several lagged control variables followed by the inclusion of additional fixed effects, after the Hausman test determined it more appropriate than random effects, in each regression. The first fixed effect controlled for was firm-specific, second time-specific, third combining firm- and time-specific and finally combining time- and industry-specific fixed effects. This approach aimed to determine the impact on both the adjusted R-squared of the models and the ESOP dummy slope coefficient.

Firm-, time- and industry-specific fixed effects were chosen to control for unobserved heterogeneity outside of our dataset that could impact firms uniformly within the effect-category. These included: Variables that differ between firms that do not change over time, such as management quality and corporate culture for firm-specific fixed effects. Variables that change over time but do not differ between firms, such as regulatory changes, macroeconomic conditions and shocks for time-specific fixed effects. Variables unique to an industry that do not change over time, such as industry-specific regulation, practices and technological trends for industry-specific fixed effects.

The significance level was set at $\alpha = 0.05$ and table 2 describes the control variables included in our regressions. Control variables were chosen so as to have at least one variable each representing the three financial statements; income statement, balance sheet and cash flow statement.

Table 2 Variable Description

Variable	Variable Description	Calculation	Collected via
market capitalization	End-of-year stock market capitalization.		SHoF
stock volatility	Yearly population standard deviation of logarithmic stock price change.	$=STDEV.P(LN(p1/p0)...LN(p365/p364))$	SHoF
ESOP dummy	Dummy variable for the existence of ESOPs.	$=IF(OR(Stock-Based Compensation cost; ESOP Debt Guarantee cost);1;0)$	Eikon
total assets	Book value of total assets. Used as a proxy for firm size.		Eikon
capex/total assets	Income statement capital expenditures divided by book value of total assets. Used as a proxy for investments relative to firm size.	$=Capital Expenditures/Total Assets$	Eikon
free cash flow	Cash flow statement free cash flow. Used as a proxy for cash flow available to investors		Eikon
return on assets	Eikon supplemental pre tax return on assets. Used as a proxy for efficiency and profitability.	$=(Operating Income + Interest Income)/Total Assets$	Eikon

Table 2 shows the variables used in Stata, their descriptions, how they are calculated and from where they were collected. *SHoF stands for Swedish House of Finance.

Total assets was chosen as a proxy for firm size over total revenue as using total revenue would leave us with no representation from the balance sheet. The capital expenditures to total assets and return on assets ratios, grounded in the income statement, were chosen to proxy investments and profitability respectively. Free cash flow was chosen as the variable to represent the cash flow statement because of its high interest to shareholders and low degree of bias, since it is less of a matter of judgment than many posts in the income statement and balance sheet.

It was deemed necessary to include a control variable for investments because total assets were included. Since goodwill is a significant asset for many firms, but the IFRS IAS 38 only allows goodwill to be activated in the balance sheet during acquisitions, it would skew the statistics for firms that grow naturally and through investments if no variable for investments was included as IAS 38 §48 specifically forbids internally generated goodwill from being recognised as an asset. In this regard, total revenue is a better proxy for firm size since the regulatory framework for reporting revenue is stronger and more up-to-date under the European Union adaptation of the IFRS. Nevertheless, total assets were chosen because of its long standing tradition and widespread usage as a proxy for firm size. There were also multicollinearity issues with the total revenue variable and the model would not have balance sheet representation without the total assets variable.

Return on assets also faces the same issue with internally generated goodwill because total assets is the denominator and the ratio therefore has different reporting standards depending on if the firm grows through acquisitions or naturally. Still it was deemed preferable over return on equity as a profitability proxy due to being less sensitive to goodwill reporting variation, as equity grows more than total assets if goodwill is reported, and the issue that equity is not market valued in financial statements.

The control variables were all lagged by one year to capture the effects of past events as the numbers reported in the financial statements are received by the market several months after the end-of-year market capitalization and volatility metric are gathered. This is important in a semi-strong efficient market as investors do not have full information about the firm and insiders are not allowed to trade on their information meaning that the end of year stock market capitalization will not reflect economic events and value in the firm that has not been publicly disclosed.

5.3 Data Description

Table 2 describes the dataset through summary statistics. The table shows a large variation in market capitalization as a result of our dataset including firms from both the OMX Stockholm and Nordic Spotlight markets. The large variations in control variables are explained by our dataset including firms from many different industries as well as of different maturity and varying success.

Table 3 Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
market capitalization*	3,561	23,360.9	77,084.2	7.3	1,290,774.4
stock volatility	3,534	0.0281	0.0250	0.0068	0.5340
total assets*	3,581	20,500	56,800	3.7	572,000
return on assets	3,493	0.0219	0.2274	-2.562	1.11
free cash flow*	3,582	998	4,210	-20,800	73,200
capex/total assets	3,323	0.0437	0.0527	-0.1855	0.5984
ESOP dummy	3,582	0.1041	0.3055	0	1

Table 3 shows the descriptive statistics for the variables used in Stata. *Values in millions SEK

The table shows that roughly 10% of observations include ESOPs as the mean is 10.41%. Standard deviation was included for ESOP dummy despite it being a dummy variable and having little interpretative value.

The relatively large numbers for the total assets and free cash flow variables when compared to the ratio variables return on assets and capital expenditures to total assets demonstrate the need for logarithmizing them. When logarithmized, the total assets variable varies between 0 and 27.07 and the free cash flow variable between -24 and 25. Although the variation remains large when compared to the ratio-variables return on assets and capital expenditures to total assets, the numbers are much more manageable.

As shown by the number of observations, the largest limiting factor in regression is the capital expenditures to total assets ratio which drops roughly 250 observations, primarily due to capital expenditures being unregulated and voluntary to disclose. The Eikon database supplements capital expenditures for firms with no self reported figure but does not do so for all firms.

Table 4 Correlation Table

Variables	total assets	return on assets	free cash flow	capex/total assets	ESOP dummy
total assets	1				
return on assets	0.3666	1			
free cash flow	0.4087	0.5384	1		
capex/total assets	-0.0736	-0.0156	-0.2614	1	
ESOP dummy	0.1066	-0.0045	-0.0241	0.0254	1

Table 4 shows the correlation matrix of the independent variables.

Table 4 shows the correlation table for the dataset. The table shows some multicollinearities between variables but none greater than 60%, which was chosen as the lower limit. Specifically, free cash flow shows a moderately high correlation with both total assets and return on assets but it was included anyways due to its high relevance for shareholders and to include at least one variable from the cash flow statement. Of greater interest, the main variable for the existence of ESOPs does not show any high correlation with any of our chosen control variables.

5.4 Model Specification

The model utilized in this study was based on panel data and constructed in the form of a logarithmic-linear model. This approach involves transforming the dependent variables into their natural logarithmic form, while keeping the variable of interest, ESOP dummy, in its original binary form. This enables the interpretation of the approximate percentage change in the dependent variables when the ESOP dummy shifts from 0 to 1, holding other factors constant.

The model is specified as such that:

$$Y_{it} = \beta_0 + \beta_1 dESOP_{it} + \beta_2 X2_{it-1} + \beta_3 X3_{it-1} + \beta_4 X4_{it-1} + \beta_5 X5_{it-1} + \mu_i + \gamma_j + \delta_t + \varepsilon_{it}$$

Where:

Y_{it} : represents the dependent variable (either market capitalization or stock volatility)

$dESOP_{it}$: represents an ESOP dummy variable that takes the value 1 if the firm has reported any stock-based compensation or ESOP debt guarantee costs, and 0 if not.

Xk_{it-1} : includes the natural logarithm of control variables such as total assets, return on assets, free cash flow and capital expenditures/total assets-ratio, all lagged by one year.

β_1 : represents the slope coefficient of dESOP.

β_k : represents the slope coefficients of each respective control variable.

μ_i : captures the firm-specific fixed effect

γ_j : captures the industry-specific fixed effect

δ_t : captures the time fixed effect

ε_{it} : represents the error term.

This specification allows for the incorporation of different fixed effects, providing a robust model to control for unobserved heterogeneity. While the model specification includes terms for firm-specific, industry-specific and time-specific fixed effects, a regression that simultaneously includes all three types of fixed effects will not be immediately performed. Instead, a strategic approach regarding the different regression was used to ensure clear and meaningful outcomes in the following way:

Table 5 Model Description

Model #	Title	Description
Model 1	Baseline model	This model includes only the ESOP dummy as an independent variable. It serves as the baseline model to assess the direct impact of ESOPs on the dependent variables without any control variables.
Model 2	Control variables model	This model adds control variables with a one year lag. Variables with large absolute numbers are transformed to their logarithmic form to standardize the scale and improve the interpretability of the coefficients.
Model 3	Time-specific fixed effects model	This model incorporates time-specific fixed effects to control for time-related factors that may influence the dependent variables across different periods. This helps in isolation the effect of ESOPs over time.

Model 4	Firm-specific fixed effects model	This model includes firm-specific fixed effects, accounting for unique characteristics of each firm that do not vary over time, such as management quality or employee engagement.
Model 5	Combined time and firm-specific fixed effects model	This model combines both time-specific and firm-specific fixed effects. This approach controls for both time-related and firm-specific unobserved heterogeneity, providing a more comprehensive analysis.
Model 6	Combined time and industry-specific fixed effects model	This model replaces firm-specific with industry-specific fixed effects, while still including the time-specific fixed effects. This approach is used to examine the impact of industry-specific factors alongside time-related effects.
Model 7	Combined time, firm and industry-specific fixed effects model	This model will combine all three fixed effects.

Table 5 shows the different regression models used.

5.5 Industry Specification for Industry-fixed Effects

Table 6 describes the industry grouping used for industry-fixed effects using the first two letters of each firm's respective SIC-code and the different industry sizes. Table 7 provides statistics about ESOP dummy observation distribution throughout the industries when aggregated by the first letter of the SIC-codes.

Table 6 Industry Grouping

Industry Code	Industry	Firms in Industry	Industry Code	Industry	Firms in Industry
10	Metal mining	2	47	Transportation Services	1
13	Oil & Gas Extraction	2	48	Communications	4
15	Construction	6	49	Electric, Gas & Sanitary Services	2
16	Heavy Construction	3	50	Wholesale Durable	12
17	Construction Services	4	51	Wholesale Nondurable	2
20	Food & Kindred Prod	4	52	Building Mat, Hardware etc	1
22	Textile Mill Prod	1	53	General Merchandise Stores	1
23	Apparel, Fabrics Prod	2	54	Food Stores	1
24	Lumber & Wood Prod	4	55	Auto Dealers & Gas Stations	4
25	Furniture & Fixtures	2	56	Apparel & Acc Stores	1
26	Paper & Allied Prod	6	59	Misc Retail	6
28	Chemicals & Allied Prod	30	60	Depository Institutions	1
30	Rubber & Misc Plastic Prod	5	65	Real Estate	30
33	Primary Metal	3	67	Holding & Investment Offices	4
34	Fabricated Metal Prod	8	70	Hotels, Rooming & Lodging	2
35	Machinery & Computer Equipment	19	73	Business Services	40
36	Electronic & Electrical Equipment	21	79	Amusement & Recreation Services	4
37	Transportation Equipment	7	80	Health Services	3
38	Measuring, Photographic etc	16	82	Educational Services	1
39	Misc Manufacturing	2	87	Engineering, Accounting etc	7
40	Railroad Transportation	2	99	Nonclassifiable	2
45	Transportation by Air	1			

Table 6 shows grouping used for industry fixed effects and number of firms in industry. The industry codes are the first two digits from the firm's respective SIC-codes.

The industry specification in Table 6 reveals a diverse array of firms within the sample, though it is evident that the distribution across different sectors is highly uneven. Certain large sectors seem to dominate the sample, with the three largest sectors accounting for more than one third of the total number of firms. This concentration suggests that the dataset may be skewed towards industries with a higher representation, potentially influencing the overall analysis and results.

Specifically, this uneven distribution highlights the importance of considering industry-specific fixed effects in the regression to ensure that the findings are not disproportionately influenced by these heavily represented sectors. The sparse representation in other sectors, such as Textile Mill Products or Food Stores, could also lead to underestimation of the effects and characteristics unique to these industries/sectors, thereby potentially limiting the generalizability of the results across all industries. By considering including the industry-fixed effects in the regressions, the risk for bias to arise from the highly uneven distribution would be minimized, ensuring a more balanced and accurate interpretation of the data.

Table 7 Industry ESOP Statistics

Sector	Obs	% obs of total obs	Firms	ESOP obs	% ESOP obs	% of total ESOP obs
Mining	185	5.2%	17	63	34.1%	16.9%
Construction	612	17.1%	49	81	13.2%	21.7%
Manufacturing	1,145	32.0%	81	100	8.7%	26.8%
Infrastructure Services*	146	4.1%	10	9	6.2%	2.4%
Wholesale Trade	362	10.1%	28	42	11.6%	11.3%
Retail Trade	348	9.7%	35	13	3.7%	3.5%
Insurance & Real Estate**	624	17.4%	46	56	9.0%	15.0%
Services	138	3.9%	11	9	6.5%	2.4%
Public Administration	22	0.6%	2	0	0.0%	0.0%

Table 7 shows the number of observations per industry, each industry's percentage share of total observations, number of firms per industry, ESOP-flagging observations per industry, percentage of observations flagging for ESOPs per industry and each industry's percentage share of total ESOP-flagging observations when industries are aggregated under their 1-digit SIC-codes. *Includes transportation, communication, electric, gas and sanitary services. **Excluding financial firms.

The industry ESOP statistics in Table 7 show a more detailed view of the distribution of observations and ESOPs when industries are aggregated under their 1-digit SIC-codes. The statistics show that ESOP distribution is relatively even for most industries with most

industries ranging between 5% to 15% ESOP employment, as shown by the % ESOP obs columns. This is further illustrated by comparing the % obs of total obs and % ESOP obs of total ESOP obs columns, which show how many of the total number of observations are found in each industry and how many of the total number of ESOP observations are found in each industry respectively. For most industries, these two percentages are within a couple of percentage points with a perfect match meaning perfectly even distribution of ESOP observations.

A few sectors stand out in the data. The mining sector lies on the extreme upper end of employing ESOPs with more than 30% of observations flagging for ESOPs. Despite only making up roughly 5% of observations, mining companies make up almost 17% of total ESOP observations. On the other end of the spectrum lies the retail trade industry with slightly less than 4% ESOP employment. Despite being a relatively large industry with almost 10% of observations the industry only makes up 3.5% of total ESOP observations. Additionally, the public administration industry stands out with its 0% ESOP employment but due to its tiny sample size of 2 firms and 22 observations one should take caution when analyzing the data.

6. Empirical Results

6.1 ESOPs and Stock Market Capitalization

The market capitalization models explored the correlation between ESOP employment and market capitalization and found strong explanatory power for several models as well as a statistically significant relationship.

Table 8 Market Capitalization Regression Results

Dependent Variable: Market Capitalization							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
ESOP dummy	1.6008*** (14.13)	0.1252*** (14.51)	1.0096*** (14.67)	0.1617** (2.6)	0.1280* (2.25)	1.0069*** (15.12)	0.1280* (2.25)
return on assets		0.0539 (0.42)	0.1398 (1.12)	0.3401*** (3.79)	0.5086*** (6.19)	0.5483*** (4.82)	0.5086*** (6.19)
free cash flow		0.1806*** (10.39)	0.0169*** (10.05)	0.0095*** (8.61)	0.0078*** (7.86)	0.0184*** (11.81)	0.0078*** (7.86)
capex/total assets		1.9761*** (4.38)	2.2736*** (5.20)	0.8052* (2.4)	1.2677*** (4.19)	2.1646*** (5.38)	1.2677*** (4.19)
total assets		0.5812*** (60.44)	0.5765*** (61.84)	0.8187*** (45.25)	0.6689*** (32.51)	0.5396*** (57.24)	0.6689*** (32.51)
Number of obs	3,540	2,947	2,947	2,941	2,941	2,947	2,941
Adj R-squared	0.053	0.667	0.690	0.910	0.928	0.760	0.928
Time FE	No	No	Yes	No	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	No	Yes
Industry FE	No	No	No	No	No	Yes	Yes
t-values in parentheses							
* p<0.05 ** p<0.01 *** p<0.001							

Table 8 shows the results of 6 different regression models with market capitalization as the dependent variable, ESOP dummy as the main independent variable, and increasing levels of complexity.

During the initial Model 1 regression, only the main variable of interest was used as an independent variable. With a high t-value of 14.13 and simultaneously low p-value below 0.001, the variable is statistically significant with a slope coefficient of 1.6008. However, the adjusted R-squared indicates that the variable ESOP dummy only explains approximately 5.3% of the total variation in market capitalization when excluding other control variables.

In Model 2, additional lagged control variables were included, resulting in an increase in the proportion of variation in market capitalization that can be explained by the model increased from 5.3% to approximately 66.7%, although this resulted in a reduction of roughly 600

observations. In this regression, the proxy for efficiency and profitability, return on assets, is statistically insignificant and should not be included in any interpretation. The correlation between market capitalization and the main variable of interest, ESOP dummy, decreased significantly from 1.6008 to 0.1252 when including control variables to the regression but remained statistically significant with a high t-value of 14.51 and a low p-value below 0.001.

Model 3 incorporated time-specific fixed effects, resulting in a slightly higher adjusted R-squared of 68.96%. The proxy for profitability, return on assets, remained statistically insignificant and should not be included in any interpretation. The correlation between market capitalization and the main variable of interest, ESOP dummy, increased significantly from 0.1252 to 1.0096 when including time-specific fixed effects in the regression and remained statistically significant with a high t-value of 14.67 and a low p-value below 0.001.

After performing a regression analysis with only the time-specific fixed effect, another regression was performed including only the firm-specific fixed effect, as seen in Model 4. The adjusted R-squared, representing the proportion of variation in market capitalization that can be explained by the model, increased from 68.96% to approximately 91% when including the firm-specific fixed effect. Unlike the previous regression, all control variables were now statistically significant when $\alpha = 0.05$. The t-value for the main variable of interest, ESOP dummy, decreased from 14.5 to 2.6 but the variable remained statistically significant with a p-value below 0.01. The correlation between ESOP dummy and market capitalization decreased as the slope coefficient decreased from 1.0096 to 0.1617.

Previous regressions had included the firm and time-specific fixed effects separately. During the Model 5 regression, the fixed effects were combined. The adjusted R-squared increased slightly from 91% to 92.8%. The p-value for ESOP dummy continued to increase, from below 0.01 in the Model 4 regression to below 0.05, simultaneously as the t-value decreased from 2.6 to 2.25. However, since the level of significance has been set to 5%, the variable was still statistically significant. The correlation between ESOP dummy and market capitalization decreased when including the time-specific fixed effect as the slope coefficient for ESOP dummy decreased from 0.1617 to 0.1279. After adding the time-specific fixed effects, all other control variables were statistically significant with t-values greater than 2.5 and p-values of consistently below 0.001. The capital expenditures to total assets-ratio was shown to have the highest slope coefficient at 1.2677 but its impact is limited due to being a ratio with a maximum observation of roughly 0.6.

In Model 6 the firm-specific fixed effect was changed to industry-specific fixed effect, whilst still including the time-specific fixed effect. There was a large drop in the adjusted R-squared value from 92.8% to 75.98%. All control variables were now statistically significant when $\alpha = 0.05$. The t-value for the main variable of interest, ESOP dummy, increased from 2.25 to 15.12 showing a narrower spread when controlling for industry than for firm-specific fixed effect. The correlation between ESOP dummy and market capitalization increased significantly as well, seeing as the slope coefficient increased from 0.1279 to 1.0069.

In the final regression for market capitalization, as seen in Model 7, all fixed effects were combined. The model had identical output as Model 5 with an adjusted R-squared of 92.8%, a slope coefficient for ESOP dummy at 0.1279 and a p-value below 0.05.

6.2 ESOPs and Stock Price Volatility

The stock volatility models explored the correlation between ESOP employment and stock price volatility through 6 different regression models but found no significant relationship.

Table 9 Stock Volatility Regression Results

	Dependent Variable: Stock Return Volatility						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
ESOP dummy	-0.0017 (-1.57)	0.0001 (0.17)	0.0004 (0.64)	0.0005 (0.47)	0.0002 (0.16)	0.0002 (0.17)	0.0002 (0.16)
return on assets		-0.0176*** (-12.83)	-0.0162*** (-12.39)	-0.0180*** (-10.86)	-0.0149*** (-9.65)	-0.0166*** (-12.42)	-0.0149*** (-9.65)
free cash flow		-0.0001*** (-5.43)	-0.0001*** (-6.08)	-0.0001** (-2.7)	-0.0001** (-3.32)	-0.0001*** (-5.84)	-0.0001** (-3.32)
capex/total assets		0.0080 (1.63)	0.0029 (0.64)	-0.1060 (-1.66)	-0.0160** (-3.36)	-0.0024 (-0.50)	-0.0160** (-3.36)
total assets		-0.0018*** (-17.89)	-0.0019*** (-19.52)	-0.0048*** (-14.17)	-0.0061*** (-15.61)	-0.0019*** (-17.05)	-0.0061*** (-15.61)
Number of obs	3,534	2,940	2,940	2,934	2,934	2,940	2,934
Adj R-squared	0.0004	0.285	0.369	0.428	0.528	0.385	0.528
Time FE	No	No	Yes	No	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	No	Yes
Industry FE	No	No	No	No	No	Yes	Yes
t-values in parentheses							
* p<0.05 ** p<0.01 *** p<0.001							

Table 9 shows the results of the 6 different regression models with standard deviation of logarithmic stock price growth as the dependent variable, ESOP dummy as the main independent variable, and increasing levels of complexity.

The initial Model 1 regression with standard deviation of stock price logarithmic growth as the dependent variable and ESOP dummy as the independent variable showed that the variable was not statistically significant at $\alpha = 0.05$ and the model had close to zero explanatory power. Furthermore, the wide variation in the 95% confidence interval and consequently low t-value showed high uncertainty in the correlation between the two variables.

Including control variables in the Model 2 regression decreased the number of observations by roughly 600 but increased the explanatory power of the model, although it remained low with an adjusted R-squared of 28.47%. The main variable of interest ESOP dummy remained statistically insignificant with a wide confidence interval and low t-value. Although the explanatory power of the model was low, the control variables were all statistically significant with high t-values except for the capital expenditures to total assets ratio.

Including time-specific fixed effects in the Model 3 regression increased the explanatory power of the model to an R-squared of 36,9%. The main independent variable ESOP dummy and the capex to total assets control variable were statistically insignificant at $\alpha = 0.05$, with wide confidence intervals and low t-values. Other control variables were statistically significant with high absolute t-values.

Including firm-specific fixed effects in the Model 4 regression increased the explanatory power of the model further with an adjusted R-squared of 42.77%. The main variable of interest remained statistically insignificant at $\alpha = 0.05$, with a wide confidence and low t-value. Like in the previous regression, the control variables were statistically significant with high t-values except for the capital expenditures to total assets ratio.

The Model 5 regression results showed that the main variable of interest remained statistically insignificant, with a wide confidence interval and low t-value, when controlling for firm- and time-specific fixed effects but the explanatory power of the model increased with an adjusted R-squared of 52.8%. All control variables were statistically significant with t-values greater than 2.5. Interestingly, the capital expenditures to total assets ratio which had been statistically insignificant in previous models was shown to potentially have a high correlation with volatility of daily logarithmic growth together with return on assets. Total assets had a lower coefficient but with the highest t-value. Seeing as total assets had the highest max value of the control variables, it would have the highest total impact on the standard deviation of logarithmic growth variable.

Replacing the firm-specific fixed effect with industry-specific in Model 6 did little to improve the model. The explanatory power of the model dropped by a significant amount and the main variable of interest remained statistically insignificant with a wide confidence interval and low t-value. Return on assets and free cash flow both had a slightly higher coefficient with total assets having a significantly lower when compared to the firm-specific fixed effect model. The capex to total assets ratio was once again statistically insignificant.

In the final regression for stock volatility, as seen in Model 7, all fixed effects were combined. In every sense, the model had the identical output as Model 5 with an adjusted R-squared of 52.8% and the ESOP dummy remained statistically insignificant.

7. Discussion

The initial regression in Table 8, Model 1 shows a strong, statistically significant relationship between ESOP dummy and market capitalization. However, the remarkably low adjusted R-squared of 5.32% indicated a limited explanatory power, suggesting that other factors influencing market capitalization were not yet accounted for. This is further supported by the relatively large standard error of the coefficient, reflecting high uncertainty. Although statistically significant, the estimate lacked precision and needed additional control variables to improve.

In the second regression described in Table 8, Model 2, different control variables were included which substantially altered both the slope coefficient for ESOP dummy and the adjusted R-squared. This change implies that the initial strong positive relationship may have been inflated due to omitted variable bias. When controlling for other relevant factors, the effect of ESOPs on market capitalization was much smaller.

When firm-specific fixed effects were introduced in Model 4 in Table 8, the adjusted R-squared increased significantly to the exceedingly high 91.03%. This suggests that firm-specific characteristics indeed play a crucial role in explaining the variation in market capitalization. The standard error of ESOP dummy continued to decrease, reflecting improved precision in estimating the variable's slope coefficient.

In Model 5 of Table 8, we included both time-specific and firm-specific fixed effects. This resulted in the highest adjusted R-squared of 92.8%, showing that this model captures a significant portion of the variation in market capitalization. It also offered the most precise estimate of the ESOP dummy coefficient, with a t-value of 2.25 and coefficient of 0.1280 giving a standard deviation of roughly 0.0569. The high precision indicates a robust estimate, providing strong evidence for the positive impact of ESOPs on market capitalization while minimizing potential biases from omitted variables.

Models 3 and 6 in Table 8 describe the effects on market capitalization when firm-specific fixed effects were either removed completely (Model 3) or replaced by industry-specific fixed effects (Model 6). The high t-values and low p-values in both regressions indicate that ESOP dummy remains statistically significant. However, caution is advised when interpreting its slope coefficient, which is greater than 1 in both regressions. The absence of firm-specific fixed effects may have resulted in a biased and unreliable slope coefficient. Neither industry-

nor time-specific fixed effects account for unique firm-specific characteristics such as management quality, employee engagement or other characteristics that could influence ESOPs impact on market capitalization. When the model fails to capture these characteristics, the slope coefficient may be inflated, which is most likely what has occurred in models 3 and 6. Thus the considerable slope coefficient observed in these two regressions could likely have been driven by underlying firm-specific factors rather than the actual relationship between ESOPs and market capitalization.

Model 7 in Table 8 has identical output as Model 4. This is because adding industry-specific fixed effects does not supply any additional information when firm-specific fixed effects are already applied. The firm-specific fixed effects seem to overpower the industry-specific fixed effects since every firm only belongs to one industry. Therefore, a regression with this combination evidently does not contribute any additional explanatory power and could even obscure the interpretation. Therefore, any discussion regarding the industry-specific fixed effects should be limited to Model 4 since the effects there are not overpowered by firm-specific ones.

Therefore, we believe that Model 5 provides the most reliable output, including both time- and firm-specific fixed effects instead of industry-specific. This is further supported by the high adjusted R-squared value of 92.8% compared to the 75.98% in Model 6 which instead included time- and industry-specific fixed effects. An adjusted R-squared of 92.8% indicates that our model explains a significant portion of the variation in market capitalization, suggesting that unique firm-specific characteristics are essential when attempting to understand the impact of ESOPs. Although an adjusted R-squared of 75.98% as found in Model 6 is still relatively high, it is considerably lower than 92.8%. This indicates that although industry-specific characteristics such as industry-specific regulation, practices, technological trends, competitive dynamics and labor availability explain some variation in market capitalization, they have less explanatory power than firm-specific factors.

To enable a more precise interpretation of ESOP dummy's slope coefficient from Model 5, due to the model being logarithmic linear (log-lin), the percentage change in market capitalization when turning ESOP dummy from 0 to 1 can be calculated as such that:

$$e^{0.1279} \approx 1.1364$$

$$(1.1364 - 1) \times 100 = 13.64\%$$

An example from our dataset is an observation from H&M in 2015, with a market capitalization of approximately 502 billion SEK. By implementing ESOPs, based on our regressions and calculations, it would be possible for H&M to increase their market capitalization by 13.64%. In other words approximately 68.5 billion SEK. Although far from all companies have a market capitalization close to H&M's and would be able to increase their market capitalization by billions of SEK, it is mainly an example based on real data to illustrate what a difference of 13.64% can actually accomplish.

The positive relationship between ESOPs and market capitalization, as shown by our example and regression tables above, is supported by the theories of Jensen & Meckling (1976) which describe stock options as a positive incentive system used to align the interests of agents with principals. Since our results show a positive correlation between stock market capitalization and ESOPs and previous research by O'Boyle, Patel and Gonzalez-Mulé (2016) show a positive correlation between firm performance and ESOPs, our results support the notion that during the time period 2001-2021 ESOPs have been an effective tool in managing principal-agent-problem and aligning their interests.

Furthermore, the market has recognized that value and value has been created for shareholders in the form of increased stock market capitalizations. The 20-year timespan of the study directly contradicts the findings of Pugh, Oswald & Sahera Jr (2000 & 2005) who found only short term increases in firm efficiency and no effect on stock market capitalizations.

One could argue that our findings do not fully contradict the findings of Sanders (2001), who found that firms employing ESOPs for their managers were more risk-seeking with higher frequency of acquisitions and divestitures. Since acquisitions enable the activation of goodwill in the balance sheet, it is possible that the market favors firms engaging in such behavior as it leads to less guesswork and use of judgment by outside analysts if a firm has its goodwill audited. It could also be that the market on average was risk-seeking during the period and didn't discount the earnings of risk-seeking firms as heavily, although the period encompassing three major financial crashes does not support the notion.

Our data is also insufficient to determine whether ESOPs were employed for managers or for a wider group of employees. Since we were not able to determine the recipients of the ESOPs, it is fruitless to speculate if there were dilution effects or free rider problems when

ESOPs were offered to a wider group of recipients in line with the findings of Ikäheimo et al (2010).

Another possibility is that firms employing ESOPs are able to reduce their contractually obligated payments in the form of salaries as employees could accept lower contractual wages when combined with stock option compensation. This would allow firms to better compensate for the effects of fluctuating demand during business downturns as employee remuneration becomes more of a variable cost and decreases when the firm performs poorly. This would reduce business risk, a valuable trait during business valuation.

In contrast to agency theory which is easily reconciled with our findings and indeed supports them, it is harder to reconcile self determination theory with our results. At first glance, self determination theory would discard ESOPs as useless extrinsic motivation. However, the findings of Gagné and Deci (2005) and Groen et al (2015) show that extrinsic rewards can be effective either as a motivator for uninteresting tasks or when internalized through social factors or co-development. Unfortunately, our data is insufficient to determine if ESOPs have been employed in a manner as to motivate workers with uninteresting tasks but one could argue that ESOPs are an effective extrinsic motivator since they are easy to internalize.

One could theorize that employees in firms employing ESOPs enjoy a team spirit since they participate in the success of the company or that, since the employees financial rewards are directly tied to the valuation of the company, they would internalize the goal of maximizing the company's stock market valuation. This in turn could allow managers to allow their subordinates greater degrees of freedom and self-leadership if they are confident that their interests are aligned, which would be beneficial to job performance according to self determination theory.

The adaptation of ESOPs could additionally be a step in the direction of taking into consideration a larger number of stakeholders as championed by stakeholder theory. Since ESOPs tie the payoff of the receiver to the success of the company, implementing ESOPs for a wider range of employees is a method of not only aligning the interests of the agent employees with the principal owners, but also of allowing employees to do their own tradeoff. Should I work hard and try my best to maximize value creation for me as a shareholder or do I value time off and a lower pace higher? Although this exacerbates the free rider problem when ESOPs are employed for a larger group than just managers.

On the other hand, as observed in Table 9, our results do not support the interpretation that a relationship between ESOPs and stock price volatility exists. The regressions described in table 9, models 1 through 6, consistently show a statistically insignificant correlation between ESOPs and stock price volatility with p-values consistently above 0.05, even in the model with the strongest explanatory power. However, the explanatory power of the models are also comparatively low, peaking at just above 50% in Model 5 when incorporating time- and firm-specific fixed effects. This indicates that even the most comprehensive model fails to establish a significant relationship between ESOPs and stock price volatility.

Overall, the analysis across all models consistently demonstrates that ESOPs do not have a statistically significant impact on stock price volatility. The low explanatory power of the models indicates that other important variables that are not included in the regressions might be influencing stock price volatility.

Among the included variables, total assets would seem to have the largest absolute effect even though it does not have the largest coefficient. This is because logarithmized total assets have much larger absolute values than other variables such as return on assets. Thus, even a small coefficient can result in a significant impact when multiplied by the observed values. This underscores the importance of firm size in influencing stock price stability, aligning with the intuitive understanding that larger firms would typically have less volatile stocks due to less growth potential, fewer available options, greater maturity and better routines for disclosure.

7.2 Limitations

When considering possible limitations of this study, one of the most important ones to mention is that our independent variable is a dummy variable. It was derived by reviewing firms income statements to see whether any stock-based compensation or ESOP debt guarantee costs were reported or not. A decision was made to transform the reported compensation and/or guarantee costs into a dummy variable, mainly due to our limited timespan of writing the study. Although, by doing so there were quite a bit of analysis opportunities that were lost. When utilizing the data as a dummy variable there is no consideration for the magnitude of the compensation or debt guarantee costs and therefore not possible to analyze that aspect or the aspect of the optimal amount of ESOPs. We are under the impression that the decision was made on reasonable grounds when trying to explore if potential value creation from ESOPs is captured by shareholders in a satisfactory

way within the available timespan, even though it has an impact on the data quality and the accuracy of our analysis. Nevertheless, acknowledging this limitation is crucial, since it both highlights a need for caution when interpreting our results and emphasizes the potential for future research to explore these aspects further.

Another limitation of this study is the nonlinearity and interplay between variables. It is a weakness of this study that even when a positive result is discovered, it is precarious to take the leap to the normative statement that a company should or should not implement ESOPs. While it is interesting to reduce the process of market valuation to singular variables and study the relationship between them and market capitalization, the reality is that the process of market valuation can not be reduced to the sum of a number of variables. Rather it is the synergies and interplay between an impossibly large amount of variables in a firm's unique environment that is the basis for market valuation. Seeing as this environment is dynamic and uncertain, what is valued today might not be valued tomorrow. For instance, a large inventory might appear valuable in times of production chain disruptions but in the next period appear like an unwarranted drain on working capital in times of stability. These types of irregularities in attitude can not be captured in simple linear regression with a finite amount of variables. Therefore, we wish to caution against interpreting our result as ESOPs increasing market valuation.

A final limitation of the study to mention is the geographical limitation, arising from the exclusive focus on the Swedish stock market. There are several aspects to consider when reviewing a geographical limitation. Firstly, the Swedish stock market represents only approximately 1% of the global stock market, resulting in an extremely small sample if one were to attempt to apply these results to global contexts. Secondly, significant cultural and political differences including variations in regulatory frameworks, market structures and investor behaviors also influence the extent to which our findings can be generalized to other markets.

7.3 Further Research

This study shows that there is a positive correlation between ESOPs and market capitalization but since the dataset was insufficient for constructing more than a dummy variable for the existence of ESOPs, future research could aim to further quantify the effect by gathering data on stock-based compensation and/or ESOP debt guarantee costs. One could theorize that if ESOPs positively impacts market capitalization, there would exist an optimal level of ESOPs

in relation to salaries or some other metric. This would require a more detailed study of the financial statements of each company as well as gathering supplemental data as the size of ESOPs is not uniformly reported.

Furthermore, it would be interesting to explore the relationship in other markets to see if country specific factors such as local customers, employees or investors attitudes and legal environment impacts the relationship, as this study is limited to the Swedish stock market. This ties into financial integration and capital mobility theory as financial integration and complete capital mobility should eradicate such local differences unless the preferences and environment of the local market impacts the ability of the firm to do business in that market. For instance, if the local market is skeptical of alternative remunerations to the point of public sentiment turning against a company employing ESOPs, a company only operating in that market could face difficulties doing business as customer preferences shift towards competitors. Therefore, it would also be interesting to explore if there is a difference in correlation between ESOPs and market capitalization between publicly traded companies operating on a global versus local market, if a market is discovered to deviate in its reaction to ESOPs.

8. Conclusion

The aim of this study was to explore correlation between ESOPs and stock market capitalization as well as ESOPs and stock price volatility, to see if potential value creation from ESOPS was captured by shareholders. To conceptualize this aim we hypothesized that there would be a positive correlation between ESOPs and stock market valuation and a negative correlation between ESOPs and stock price volatility.

To explore these potential correlations, data was collected from 317 publicly listed Swedish companies, which after cleaning the data turned into 279 companies, over the timespan of 2001-2021. Then, multiple regressions based on a logarithmic-linear model were performed.

Regarding the hypothesized negative correlation between ESOPs and stock price volatility, unfortunately no such definitive statement can be made. Our results do not support the interpretation that a statistically significant relationship between ESOPs and stock price volatility exists, with a low explanatory power for the model as a whole. Therefore, it is not possible to draw a conclusion whether ESOPs create value for shareholders by lowering volatility or not and our second hypothesis has to be rejected.

However, regarding the relationship between ESOPs and stock market valuation, as proxied by stock market capitalization, the regressions show a robust and statistically significant positive relationship. Specifically, the results indicate that firms employing ESOPs benefited from a 13.64% increase in market capitalization when controlling for firm- and time-specific fixed effects. This is a substantially stronger correlation than discovered in previous studies of the topic and could be attributed to differences in methodology, corporate climate, or ESOP effect in the Swedish market. This confirms our first hypothesis that ESOP has a positive correlation with market capitalization.

Our results call for further study of the benefits of ESOP use seeing as similar studies in different markets have found either a weak or negative correlation with value creation for shareholders.

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