Industrial and Financial Economics
Master Thesis No 2001:17

Ownership and Agency Cost
-
Empirical Tests
on
the Swedish Market

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Abstract

This thesis examines the existence of agency costs in firms due to the incomplete alignment of the agent's and owner's interest. Inspired by empirical evidence of Ang, Cole and Wuh Lin (2000) and the theoretical models of Jensen and Meckling (1976) on agency costs, I empirically explore how agency costs vary with a firm's management and ownership structure. The thesis provides measures of relative equity agency costs for firms under different ownership and management structures. I present direct empirical evidence on this topic by utilizing a sample of 173 firms from the Stockholm Stock Exchange (SSE). I estimate two proxies for agency cost: Tobin's Q and Sales to Total Assets. Results show that the latter is a better estimator of agency costs. First, I find that agency costs are higher when an outsider manages the firm. Second, I cannot find any evidence that agency costs vary inversely with the manager's ownership share. Third, I find no evidence that agency costs should be related to the ownership concentration of the firms. However, agency costs increase with the number of nonmanager shareholders. Fourth, firms with higher debt ratios have lower agency costs, due to external monitoring by banks.

Acknowledgments

I like to express my gratitude to the people within the program of Industrial and Financial Economics who have made the master program the most intellectually stimulating years of my life. First, I would like to express my gratitude to my advisor Dr. Gert Sandahl at the Department of Business Administration, for stimulating and insightful support. I am also very grateful to Professor Ted Lindblom and Dr. Jianhua Zhang for encouraging and brilliant comments on earlier drafts.

Göteborg, January 2002

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Contents

1. Introduction

In this section, a brief background will be presented in order to introduce the reader to the research area. Then, the problem will be described which will lead into the purpose. The assumptions and limitations that were necessary in order to conduct the research are also described. Finally, the structure of the thesis is presented.

1.1 Background

Agency problems arise within a firm whenever managers have incentives to pursue their own interests at shareholders' expense. Several mechanisms can reduce these agency problems. An obvious one is managerial shareholdings. In addition, concentrated shareholdings can increase managerial monitoring and so reduce agency costs. The use of debt financing can improve performance by inducing monitoring by lenders. In the past the owner or owners of a business also managed it. Businesses were primarily quite small and lent themselves to be operated as, partnerships, or small, closely held firms. The owners, who are the shareholders and number in the thousands or even hundreds of thousands, of course, cannot manage modern businesses, particularly medium-sized or large corporations. Many shareholders own only minute pieces of a firm. Further, shareholders tend to diversify their holdings, thus, they may hold small interests in many different corporations according to Fama and Jensen (1983).

The literature on corporate governance has traditionally concentrated on the conflict of interest between self-interested managers and dispersed small shareholders. Within this paradigm, the lack of monitoring due to the free-rider

problems[1] is a fundamental problem that a good governance structure must overcome. The costs of an agent's actions due to incomplete alignment of the agent's and owner's interests were addressed in a study of Jensen and Meckling (1976) on agency costs. Their study uses agency costs to explain how managerial ownership influences firm value. They argue that at higher levels of management ownership an alignment of interests is created between managers and outside owners.

Several parties in a firm, such as managers and active large investors, contribute to the creation of shareholder value. Consider a firm with a large shareholder and otherwise diffuse ownership. The firm has the prospect of a valuable project, which is realized with some probability only if the manager exerts effort. Given that the project is undertaken, the resulting proceeds can either be paid out to all shareholders or transformed into private benefits. This decision is taken by the manager, if the large shareholder remains uniformed. By contrast, when monitoring is successful, the large shareholder decides whether to pay out the proceeds or whether to divert resources to the firm's operations. Hence, the concentration of ownership could influence the agency costs in the firm. In order to analyse if control and ownership structure affect firms' agency costs, I intend to measure relative equity agency costs for corporations and furthermore the determinants of these. I use two alternative measures of agency costs. The first measure is a proxy for the loss in market value due to inefficient asset utilization (Tobin's Q). The second measure is a proxy for the loss in revenues attributable to inefficient asset utilization (sales to total assets).

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[1] A situation in which several different parties can use a resource for their individual benefit and property rights are not sufficiently well defined and enforced to ensure that individuals bear the full costs of the actions and receive the full benefits they create, (Milgrom and Roberts, 1992).

1.2 Problem Discussion

This research will address two main problems. Intense previous research has been conducted in the area of demonstrating empirically the role of agency costs in financial decision-making, i.e. different choices of capital structure, dividend policy and executive compensation. Nevertheless, the actual measurement of the principal variable of interest, agency costs, has not been very common (Ang, Cole and Wuh Lin, 2000).

In order to measure absolute agency costs, a zero agency cost base case must be observed to serve as the reference point of comparison for all other cases of ownership and management structures. In Jensen and Meckling (1976), the zero agency cost base is, by definition, the firm owned solely by a single owner-manager. Because of limitations imposed by exchange regulations on the minimum numbers of shareholders, and other considerations, no publicly traded firm is entirely owned by management. Thus, Jensen and Meckling's zero agency cost base case cannot be found among the usual sample of publicly traded firms for which information is available.

Hence, the first problem focuses on whether it is possible to identify and quantify differences in relative agency costs among firms: those managed by owners (aligned with shareholders) and those managed by an outsider (not aligned with shareholders). This first issue relates to the principal-agent theory. According to Jensen and Meckling (1976) an agency relationship is one in which one person (the agent) acts on behalf of another (the principal). The theory deals with how problems can occur in firms where the principal and the agent have different objectives. What are the objectives of the firm? Does the firm seek profit maximization, or would the firm sacrifice some current profitability for an enlarged market share? Does the firm wish to maximize its rate of growth, or is management content to attain profit, market share and growth, while maximizing their own benefits and the quality of their lives?

Different goals can lead to very different managerial decisions given the same limited amount of resources (Milgrom and Roberts, 1992). For example, if the main goal of the firm is to maximize market share rather than profit, the firm might decide to reduce its prices. If the main goal is to provide the most technologically advanced products, the firm might well decide to allocate more resources to research and development.

It is well supported in the literature that the decision maker's objective is to maximize the net worth[2] of the firm over its time horizon, subject to considerations of risk and uncertainty (Crook and Reekie, 1987). The theoretical paper of Jensen and Meckling (1976) uses agency costs to explain how managerial ownership influences firm value. They argue that at higher levels of management ownership an alignment of interest is created between managers and outside owners. Mork, Shleifer and Vishny (1987) investigate the relationship between management ownership and market values (Tobin's Q) of the firms. They found a positive non-linear result between Tobin's Q and management ownership. McConnell and Servaes (1990) found similar results to those of Mork, Shleifer and Vishny (1987).

The second problem that I focus on in this study is to what extent the concentration of share ownership can affect a firm's agency costs. Firms' agency costs arise because of management exerting less than the maximum effort (known as "shirking") and take nonmonentary benefits (known as perquisite consumption). Consider those firms where a single owner controls 100 per cent of the stock but hires an outsider to manage the firm. On the one hand, agency costs may be small because the sole owner can internalise all monitoring costs and has the right to hire and fire the manager. More specifically, such an owner incurs 100 per cent of the monitoring costs and

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[2] Definition: Net worth, also known as owner's equity, is measured as the excess of the firm's assets (cash, securities, land, buildings, plant and equipment, etc.) over its liabilities (amounts owed to creditors, short-term and long-term loans, etc.). Thus, maximization of the net worth of the firm requires maximizing the difference between assets and liabilities.

receives 100 per cent of the resulting benefits. Agency costs attributable to the divergence of interests vary inversely with the manager's ownership stake. As the number of shareholders increases from one, the ownership of the owner/manager falls to α, where $0 \le \alpha < 1$. Because the manager gains 100 per cent of each dollar spent on perks, but only α per cent of each dollar in firm profit, the manager who owns less than 100 per cent of the firm has the incentive to consume perks rather than to maximize the value of the firm to all shareholders. At the extreme is the manager with zero ownership ($\alpha = 0$), who gains 100 per cent of perquisite consumption, but zero per cent of firm profits (in the case when salary is independent of firm performance). Aggregate expenditure on monitoring by the non-managing shareholders decreases as their individual ownership shares decline. This is due to the well-known free-rider-problem in spending for common goods, such as monitoring effort. Each monitoring shareholder, with ownership π_i must incur 100 per cent of the monitoring costs, but realizes only π_i per cent of the monitoring benefits (in the form of reduced agency costs). A non-monitoring shareholder, however, enjoys the full benefits of a monitoring shareholder's activity without incurring any monitoring cost.

Thus, as the number of nonmanager shareholders increases, aggregate expenditure on monitoring declines, and the magnitude of owner-manager agency cost problems increases. Ultimately, someone with an ownership interest is needed to ensure that the management does not misuse the shareholders' investments. One check on management is provided by the board of directors. Shareholders elect the board to act on their behalf, and the board in turn monitors top management. In principle, the board has a very important role to play, but there are some reasons to doubt its effectiveness in practice (Hart, 1995). The board consists of executive directors (who are members of the management team) and nonexecutive directors, who are outsiders. It would hardly be reasonable to expect the executive directors to monitor themselves.

On the other hand, the nonexecutive directors may not do a very good job of monitoring for several reasons. Hart (1985) argues that they may not have a significant financial interest in the company, and they may therefore have little to gain personally from improvements in company performance. In addition, nonexecutive directors are busy people (often they sit on many boards) and have little time to collect information about the company.

Demsetz and Lehn (1985) find no cross-sectional relation between accounting rates of return and the concentration of shareholdings. In contrast, Morck, Shleifer, and Vishny (1988) find a non-linear relation between the fraction of stock held by members of the board and firm performance, as measured by Tobin's Q, and less significant relation when performance is measured by accounting rate of return. Also Steiner (1986) presents results showing that ownership structure significantly influences firm value. The occurrence of the free-rider-problem leads to investors with only a relatively large stake being inclined to do significant amounts of monitoring. Hence, the concentration of share ownership can affect firms' agency costs. Ang, Cole and Wuh Lin (2000) present results on that agency costs (i) are significantly higher when an outsider rather than an insider manages the firm, (ii) are inversely related to the manager's ownership share, (iii) increases with the number of nonmanager shareholders, and (iv) to a lesser extent, are lower with greater monitoring by banks.

According to Shleifer and Vishny (1997) most advanced market economies have solved the problem of corporate governance at least reasonably well. However, this does not imply that they have solved the corporate governance problem perfectly. There is a great deal of disagreement on how good or bad the existing governance mechanisms are (Shleifer and Vishny, 1997). In accordance with what has been written about the problem in previous research, this study will focus on the Swedish evidence concerning agency

costs. An area where the research has been scarce, according to my study on research in Sweden.

To summarize, against the null hypothesis that agency costs are independent of the control and ownership structure[3], I claim the following hypotheses derived from agency theory: (i) agency costs are higher at firms whose managers own zero of the firm's equity, (ii) agency costs are an inverse function of the manager's ownership stake, and (iii) agency costs increase as the free-rider-problem worsens, i.e. the concentration of ownership decreases.

1.3 Purpose

Based upon the problem discussion, the purpose of this study is to determine whether it is possible to identify relative equity agency costs in firms on the Stockholm Stock Exchange (SSE) that are dependent on the control and ownership structure of the firms.

1.4 Assumptions and Limitations

In order to develop some structure for the analysis to follow I need to make some assumptions and limitations concerning the ownership and management variables included in the analysis. The assumptions will carry through all of the analysis. Some of the following assumptions (*) are from the famous article by Jensen and Meckling (1976) on agency costs.

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[3] Theoretical support for the null hypothesis is due to Demsetz (1983), who suggests that the sum for amenities for on-the-job consumption and take-home pay for similar quality managers is the same for both high-cost and low-cost monitoring organisations. Demsetz argues in his paper that agency relationships do not reduce the value of the firm to its owners. Demsetz does not believe that on-the-job consumption is necessarily, or even probably, greater with professional management than with management by owners. The cost of agency is borne by the firm, not by the agents writes Demsetz.

Assumption 1. No complex financial claims such as stock option programs or other incentive contracts for management can be issued. A solution to the agency problem is to grant a manager a highly contingent, long term incentive contract in order to align his interests with those of investors. Incentive contracts can take a variety of forms. A popular incentive contract is to introduce stock options to the management of the firm. This scheme has become very common in practice, and it is most likely that several of the firms in the sample utilize stock options as incentive programs. However, this study does not take into account the alignment effect that stock options will have on management. Hence, the validity of the study will be reduced as a consequence of not taking into account the possible effects of stock options.

Assumption 2. No outside owner gains utility from ownership in a firm in any way other than through its effect on his wealth of cash flows.* This implies that the only variable that can induce shareholders to monitor management is the share of equity they control. Hence, non-economic factors (e.g. private-, political-, and control- issues) cannot affect the magnitude of monitoring. This holds since none of these factors, according to the assumption, can affect the utility of the outside owner. It can be argued that this assumption affects the validity of the study in a negative mode, various of the large shareholders in the sample may have other incentives to induce monitoring than those that affect the wealth of cash flows.

Assumption 3. The entrepreneur-manager's money wages are held constant throughout the analysis.* Since this study does not use panel data, it can be argued that the validity is not affected. If the study was performed over time, it could be argued that the validity was affected.

Assumption 4. Managerial ownership is restricted to CEOs, directors and chairmen having personal or family wealth invested directly or indirectly in the firm according to the rules of insider supervision by the Swedish Financial Supervisory Authority[4]. It can be discussed whether this data serves as the best proxy when estimating the ownership share of management. It can be argued that some of the shareholders that are defined as insiders by the Authority, in general do not participate in the daily operations of management. Hence, the validity of the study could be affected in a negative mode.

Assumption 5. Management who owns < 0.1 per cent of the firm's equity is assumed to control zero of the firm's equity. In approximately 10 per cent of the data, management ownership is very close to zero. In order to construct a statistically meaningful sub group where management per definition are outsiders, this procedure is necessary. Since only a minor amount of data are subject to this constraint, I claim that this proceed has no significant effect on the validity of the study.

Assumption 6. All ownership variables are calculated using the firms' B-shares (share of equity) rather than the firms' A-shares (voting rights). Shareholders investing in shares with high voting rights (A-shares) are assumed to receive personal utility in other forms than only from the effects on cash flows. I conclude that the best proxy for equity ownership is the firms' B-shares. Since it can be assumed that the correlation between ownership of A-shares and B-shares are quite high, I claim that the affect on validity is moderate.

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[4] Finansinspektionen (the Swedish Financial Supervisory Authority) is a public authority that is responsible for supervising companies in the insurance, credit and securities markets.

1.5 Structure of the thesis

The thesis is organised as follows. In the next section, I present the data and variables used in the analysis; section 3 will introduce the reader to the theoretical framework that is associated with the empirical research. I present results and analysis in section 4, followed by a summary and concluding remarks in section 5.

2. Data and Methodology

This section will discuss the methods that have been used in order to collect the necessary data and how the study has been performed.

2.1 Data

The firms elected in order to conduct the study are all chosen from the O-list[5] on SSE (Appendix 2). These firms make it possible to estimate the relative agency costs for the publicly traded firms on the O-list. This is due to the fact that the O-list includes firms with a wide range of ownership and management structures, including firms where management has major ownership share as firms managed by outsiders with no equity stake. As a consequence, firms

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[5] According to SSE the O-List is intended for companies which lack the requisite operating history for listing on the A-list. SSE has the following requirements.

The company must:
- meet the requirements of SSE concerning management, composition of the Board of Directors, financial controls and ability to provide information to the stock market;
- have at least 300 shareholders each of whom owns shares corresponding in value to not less than one-quarter of the statutory base amount (trading lot);
- possess an ownership structure under which at least 10% of the shares in the company and 10% of the votes are owned by the general public. Ownership by the general public means direct or indirect ownership of less than 10% of the share capital or the voting capital;
- prepare a prospectus. The company is exempted from such a requirement if the company has been moved from the A-list.

listed on the O-list appear well suited for a study of equity related agency costs as to firms listed on the SSE's A-list where management ownership is close to zero. Because of time restraints concerning the study, it has unfortunately not been possible to use panel data, which would have included more years in the study. All data concerning the study and the included corporations are from the 31st December 2000. After corrections due to missing data concerning some firms. The total number of firms analysed in the study is 173. All data are from Affärsvärldens marknadsbevakning (AMB) and SIS Ägarservice AB (SIS). Data from AMB and SIS makes it possible to analyse the relationship between agency costs and ownership/management structure. AMB provides data from the firms' balance sheets and income statements that make it possible to calculate the two agency cost proxies used in the study. Data regarding the ownership and management structure for the corporations chosen in the sample is from both AMB and SIS. AMB provides data regarding the hundred principal owners[6] for each corporation and also data on management ownership. SIS provides information on the number of shareholders in each firm.

The literature review is based on secondary data (books and articles). Most of the information has been collected through a comprehensive study of the various databases supplied by the Economics Library at the School of Economics and Commercial Law. Search criteria that have been applied are "corporate governance", "agency costs", and "ownership structure". According to Yin (1994), it is important that the results are sufficiently free of bias. The reader must be satisfied that the goal and objectives of the study represent useful and relevant information. Two ways to measure the quality of the thesis are to look at validity and reliability. The validity and reliability of this study depends both on the nature of the data and how the data is used in the analysis.

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[6] The mean value of the one hundred largest owners' share of the firm's equity is 81 per cent. This implies that the data is sufficiently large when it comes to drawing statistically reliable conclusions based on the material.

Validity is concerned with whether or not the developed framework is a relevant representation of reality and if it measures what it is supposed to measure. The data that has been used in this study has been collected through secondary sources. The sources that provide the data for the empirical study are of high quality and thereby of high reliability. Both AMB and SIS use Värdepapperscentralen (VPC), Finansinspektionen (FI) and annual reports from the firms as their sources. The models that are used to analyse the data are standard statistical models, e.g. multiple regression models. This will contribute to the high validity of the study. Also, because of the high quality of the sources and combined with the same assumptions carried out in this study I argue that any future analysis on Swedish O-list data will lead to the same results. Therefore the reliability of the thesis is high.

2.2 Statistical Methods

In order to conduct this study and test the different hypotheses presented in the problem discussion I will divide the analysis into three parts. The first part (section 4.2) will provide some first results on the separation of ownership and control. The second part (section 4.3) will present descriptive statistics for the variables hypothesized to explain agency costs and also some first results on the importance of ownership structure as an explanation factor for differences in agency costs. Finally, I will conclude the analysis with results obtained from estimating a multiple regression model (section 4.4) that aims to explain the determinants of the two proxies for agency costs.

In order to test the different results obtained in the two first parts of the analysis I will use the *t*-test to determine whether the results are statistically significant or not. In the first analysis concerning separation of ownership and control, the statistical significance of the differences in the mean ratios is based

on the *t*-statistic from a parametric test (based on the assumption of unequal variances).

$$(2.1) \qquad t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_2^2}{n_2}}}$$

This test will determine whether the difference in the mean ratios of the two groups of firms is significantly different from zero. This is the most common test for the difference between two population means, μ_1 and μ_2 (Aczel, 1996). The null hypothesis states that the two means are equal (their difference is 0), while the two-tailed alternative states that the two population means are not equal.

$$H_0 : \mu_1 - \mu_2 = 0$$
$$H_1 : \mu_1 - \mu_2 \neq 0$$

This test will also be functional when examining the results from the second analysis (section 4.3) concerning the ownership variables hypothesised to explain the differences in agency costs among the corporations in the sample. Finally, the third analysis will use a multiple regression model to explain the determinants of the two proxies for agency costs. Each proxy is regressed against the management, ownership, external monitoring and control variables introduced later in this study. Regression analysis serves three major purposes: (1) description, (2) control, and (3) prediction (Neter, Kutner, Nachtsheim & Wasserman, 1996). Throughout this study on agency costs I will concentrate on the two first purposes. During the rest of this thesis I, unless otherwise stated, assume that the normal error regression model is applicable in section 4.4. The

following assumptions of the simple linear regression model is from Neter, Kutner, Nachtsheim, and Wasserman (1996).

(2.2) $\qquad Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$

Where:

Y_i is the value of the response variable in the ith trial

β_0 and β_1 are parameters

X_i is a known constant, namely, the value of the predictor variable in the ith trial

ε_i is a random error term with mean $E\{\varepsilon_i\} = 0$ and variance σ^2; ε_i and ε_j are uncorrelated so that their covariance is zero (i.e., $\sigma\{\varepsilon_i, \varepsilon_j\} = 0$ for all $i, j; i \neq j$)

$i = 1, ..., n$

Important Features of the Model

1. The response y_i in the ith trial is the sum of two components: (1) the constant term $\beta_0 + \beta_1 X_i$ and (2) the random term ε_i. Hence, y_i is a random variable.

2. Since $E\{\varepsilon_i\} = 0$, it follows that:

$E\{Y_i\} = E\{\beta_0 + \beta_1 X_i + \varepsilon_i\} = \beta_0 + \beta_1 X_i + E\{\varepsilon_i\} = \beta_0 + \beta_1 X_i$

Thus, the response Y_i, when the level of X in the ith trial is X_i, comes from a probability distribution whose mean is:

(2.3) $\qquad E\{Y_i\} = \beta_0 + \beta_1 X_i$

Hence, the regression model function for the model (2.2) is:

(2.4) $\qquad E\{Y\} = \beta_0 + \beta_1 X$

since the regression function relates the means of the probability distributions of Y for given X to the level of X.

3. The response Y_i in the ith trial exceeds or falls short of the value of the regression function by the error term amount ε_i.

4. The error terms ε_i are assumed to have constant variance σ^2. It therefore follows that the responses Y_i have the same constant variance:

(2.5) $\qquad \sigma^2\{Y_i\} = \sigma^2$

Thus, regression model (2.2) assumes that the probability distributions of Y have the same variance σ^2, regardless of the level of the predictor variable X.

5. The error terms are assumed to be uncorrelated. Hence, the outcome in any one trial has no effect on the error term for any other trial. Since the error terms ε_i and ε_j are uncorrelated, so are the responses Y_i and Y_j.

6. In summary, the regression model (2.2) implies that the responses Y_i come from probability distributions whose means are $E\{Y_i\} = \beta_0 + \beta_1 X_i$ and whose variances are σ^2, the same for all levels of X. Further, any two responses Y_i and Y_j are uncorrelated.

The models in section 4.4 will contain several predictor variables. The above formal statements also hold for the multiple regression model. The multiple regression model can be stated as follows:

(2.6) $\qquad Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + ... + \beta_{p-1} X_{i,p-1} + \varepsilon_i$

Where:

$\beta_0, \beta_1, ..., \beta_{p-1}$ are parameters

$X_{i1}, ..., X_{i,p-1}$ are known constants

ε_i are independent $N(0, \sigma^2)$

$i = 1, ..., n$

All inference concerning the parameters of the models will be tested through the use of the *t*-test. Since $(b_1 - \beta_1)/s\{b_1\}$ is distributed as *t* with $n - 2$ degrees of freedom, tests concerning β_1 can be set up in ordinary fashion using the *t* distribution. I will use two-sided tests in my analysis. The hypotheses to be stated regarding the coefficients are the following:

$$H_0 : \beta_1 = 0$$
$$H_1 : \beta_1 \neq 0$$

An explicit test of the alternatives is based on the test statistic:

(2.7) $$t^* = \frac{b_1}{s\{b_1\}}$$

The decision rule with this test statistic when controlling the level of significance at α is:

$$If \ |t^*| \leq t(1 - \alpha/2; n - 2), conclude \ H_0$$
$$If \ |t^*| > t(1 - \alpha/2; n - 2), conclude \ H_1$$

2.3 Model Specifications

The multiple regression models that will be used in the third part (section 4.4) of the analysis will also contain qualitative variables to control for differences across industries in the analysis of agency costs. Each specification of the model will include a set of dummy variables indicating the industrial classification. The industry classification that will be used in the study is based on Affärsvärldens AFGX index[7]. In order to solve for differences in the variables due to the different industry classifications, I introduce a more complex model involving qualitative (dummy/binary) predictor variables that take into account the industry specification. If a qualitative predictor variable has more than two classes, it is necessary to use additional indicator variables in the regression model. Consider the model to be used in this study. The model must be able to control for nine industry branches, in order to do this, eight indicator variables will be included in each specification of the regression model.

Thus, the models are expressed as follows when then two agency costs proxies (Tobin's Q and sales to total assets), respectively, are regressed against the explanatory variables. All subsequent relations are assumed to be linear, on the left-hand side I denote agency costs as $PROXY_i$. A control variable (LN_SALES_i) is also included in each of the specifications below in order to detect whether there are economies of scale in the data sample. The measure of size is the logarithm of annual sales. Dummy variables ($D_{1i}...D_{8i}$) are also included in each specification of the models in order to adjust for industries.

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[7] Affärsvärlden introduced these indices The 1st February 2000. The new indices provide a sound basis for comparisons of companies and sectors with other markets. The nine industry classifications are: Consumer, Entertainment, Financials, Health Care, Industrials, Information Technology, Materials, Services and Telecommunication Service.

(2.8) $PROXY_i = \beta_0 + \beta_1 MGMT_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$

To test whether differences in agency costs can be explained by management ownership, I compute a variable (MGMT) that indicates existence of management ownership in the firm. The variable can take the numbers 0 (no ownership by management) or 1 (ownership by management). Agency costs should be higher at firms managed by an outsider according to the theory. This variable is expected to capture the alignment of interest effect which managerial ownership is supposed to create. This relationship follows directly from the agency theory of Jensen and Meckling (1976).

(2.9) $PROXY_i = \beta_0 + \beta_1 MGMT\_SHARE_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$

Also, the ownership share of management (MGMT_SHARE) is inversely related to agency costs in the firm according to a study by Steiner (1996). This is tested in model 2.9. However, Steiner argues that management increases value for low levels of ownership and decreases value for high levels of ownership. This phenomenon is also supported by a study by Stulz (1988). Stulz shows that at high levels of managerial ownership, the probability of a takeover may be diminished and, therefore, the value of the firms falls. This is sometimes referred to as the entrenchment effect. However, this phenomenon is beyond the scope of this study and will consequently not be further described[8].

(2.10) $PROXY_i = \beta_0 + \beta_1 A1\_SHARE_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$

Variables that are included in the study in order to capture various effects of ownership concentration are: the percentage of a firm's outstanding equity owned by the primary shareholder (A1_SHARE) in model 2.10, the percentage

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[8] The interested reader will find more on this issue in a study by McConnel and Servaes (1990).

of shares owned by the five largest shareholders (A5_SHARE) in model 2.11, the percentage of shares owned by the 20 largest shareholders (A20_SHARE) in model 2.12. These variables concerning ownership structure are all applied in a study on corporate ownership by Demsetz and Lehn (1985). Due to the free-rider-problem, agency costs should be inversely related to the ownership share of the primary owner. For a primary owner who is also the firm's manager, the incentive to consume perquisites declines as his ownership share rises, because his share of the firm's profits rises with ownership while his benefits from perquisite consumption are constant. For a primary owner who employs an outside manager, the gains from monitoring in the form of reduced agency costs increase with his ownership stake (model 2.10).

$$(2.11) \ PROXY_i = \beta_0 + \beta_1 A5\_SHARE_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

$$(2.12) \ PROXY_i = \beta_0 + \beta_1 A20\_SHARE_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

Reduced agency costs also follow with an increased ownership share by A5_SHARE and A20_SHARE. These variables are tested in models 2.11 and 2.12. As these shareholders increase their ownership share of the firm's equity, their incentives to increase monitoring will also be higher since the free-rider-problem reduces with increased ownership concentration.

$$(2.13) \ PROXY_i = \beta_0 + \beta_1 HHI_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

Herfindahl-Hirschman index (HII)[9] (Hirschman, 1964) is also to be used in the analysis in order to measure the effects of ownership concentration on agency

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[9] $HHI = \sum_{i=1}^{n} S_i^2$

Where: S_i^2 = the square of the ownership share of the ith owner, measured as that owner's equity divided by total equity.

n = the number of owners in the firm

costs (model 2.13). The index is very common when describing the situation on a market. It is a measure of industry concentration. The value of the index HII, is the sum of the squares of the market shares of all firms in an industry. However, this variable is very convenient to apply to ownership structure (Demsetz and Lehn, 1985). HII provides an index for the ownership concentration related to each firm. The index would be close to zero when there are a large number of equal-sized owners; and 1 when there exist one single owner. Hence, it is hypothesized that agency costs should be negatively related to the ownership concentration index (HHI) for the firms in the study.

$$(2.14) \quad PROXY_i = \beta_0 + \beta_1 A1_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

$$(2.15) \quad PROXY_i = \beta_0 + \beta_1 A5_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

$$(2.16) \quad PROXY_i = \beta_0 + \beta_1 A20_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

An indicator of whether the primary owner (A1) controls > 33% is included in model 2.14. If yes, the variable takes the value 1. If otherwise, it takes the value 0. Similar variables are constructed for A5 > 50% and A20 > 66% in models 1.15 and 1.16[10]. Similar methods are also applied by Demsetz and Lehn (1985) and Ang, Cole and Wuh Lin (2000). Agency costs should be lower at firms whose indicator variables take the value 1.

$$(2.17) \quad PROXY_i = \beta_0 + \beta_1 OWNERS_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

Furthermore, a variable that indicates the number of nonmanager shareholders (OWNERS) is included in model 2.17. Agency costs should increase with the number of nonmanager shareholders. As the number of shareholders increases, the free-rider-problem reduces the incentives for limited-liability shareholders

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[10] The percentage limits come from the rules of disclosure, Lagen om handeln med finansiella instrument (LHF). Sundin and Sundqvist (2001) cover this topic in their book on owners.

to monitor. With less monitoring, agency costs increase. Consequently, it follows that the correlation between the number of nonmanager shareholders and the two proxies for agency costs should be negative.

$$(2.18) \quad PROXY_i = \beta_0 + \beta_1 DEBTtoASSET_i + \beta_2 LN\_SALES_i + \beta_3 D_{1i} + ... + \beta_{11} D_{8i} + \varepsilon_i$$

Also to be included in the analysis is an external monitoring variable (DEBTtoASSET) in model 2.18, it is believed that this variable captures the effects from banks' monitoring of firms. The bank's incentive to monitor is proxied by the firm's debt to total asset ratio[11]. As leverage increases, so does the risk of default by the firm, hence the incentive for the lender to monitor the firm increases.

3. Theoretical Framework

This section will introduce the reader to the theories that are associated with the research topic. Hence, the reader will after this section have gained a more solid understanding of the topic. First, the theory of the firm is introduced, second, the principal agent theory is presented, and finally, a concise introduction to agency costs is given.

3.1 Theory of the Firm

The traditional (neoclassical) theory of economics defined the firm as a collection of resources that is transformed into products demanded by consumers (Milgrom and Roberts, 1992). The costs at which the firm produces

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[11] The bank's incentive to monitor could also be proxied by the number of banks from which the firms obtain financial services. The incentive for each bank to monitor may decrease as the number of banks with which the firm deals increases (Diamond, 1984).

are governed by the available technology, and the amount it produces and the prices at which it sells are influenced by the structure of the markets in which it operates. The difference between the revenue it receives and the costs it incurs is profit. It is the aim of the firm to maximize its profits. Why does a firm perform certain functions internally while it conducts other actions through the market? Answer to the preceding questions began to appear in 1937 when Ronald Coase claimed that a company compares costs of organizing an activity internally with the cost of using the market system for its transactions. If there were no costs of dealing with the outside market, a firm would be organized so that all of its transactions would be with the outside.

However, it is incorrect to assume that the marketplace does not involve any costs. In dealing through the market, the firm incurs transaction costs. Transaction costs can be summarized as, "search and information costs, bargaining and decision costs, policing and enforcement costs." Firms bear costs in entering into contracts with others. While executing short-term contracts may be costly, there are other costs incurred in entering into longer-term contracts (changes in prices, market conditions, technology). But carrying on operations within the firm has its own costs. Hiring people to produce products within the firm entails cost of supervision and monitoring to assure that workers and management perform efficiently. One way to decrease this monitoring activity is to provide incentives to encourage employee efficiency. Incentives such as bonuses, benefits, and stock ownership are instrumental in minimizing monitoring costs. On the other hand, incentive also comes with a price tag attached. This phenomenon leads us in to the next section where I present the principal agent theory. A theory that Jensen and Meckling (1976) profoundly relate their results on corporate governance to.

3.2 The Principal Agent Theory

In the previous section on *theory of the firm* it is stated that the objective of the firm is to maximize its profits. By the firm I really mean the owners or shareholders of the firm, whose interests presumably lie in the maximization of their personal net worth. However, in modern firms that are owned jointly by thousands of shareholders, the owners of the firm are typically excluded from the day-to-day process of making decisions, having delegated the authority to trained managers whose job is to make these decisions. As absent owners, shareholders are unable to observe whether or not the managers may pursue their own personal objectives, to some degree, rather than seek the maximization of net worth. Only in the case of owner-managed firms can we expect the objectives of the owners and the managers to coincide perfectly. This difficulty has been called the *principal-agent problem*. The manager is an agent of the shareholders (the principals), making decisions on their behalf. Although the principals may monitor the agents' actions, monitoring involves information-search costs, and it will not be taken to the ultimate degree, with the result that there remains an asymmetry of information such that the actions of the agent are not perfectly observed by the principal. Thus managers may make decisions that do not best serve the firm's (owners') objective. The manager may not select the decisions alternative[12] that maximizes the firm's

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[12] $X = \{x_1, x_2, ..., x_n\}$ = vector of quantities of all factor and activities within the firm from which the manager derives non-pecuniary benefits (such as office space, air conditioning, etc.), the x_i are defined such that his marginal utility is positive for each of them (Jensen and Meckling, 1976);

$C(X)$ = total cost of providing any given amount of these items;

$P(X)$ = total value to the firm of the productive benefits of X;

$B(X) = P(X) - C(X)$ = net benefit to the firm of X ignoring any effects of X on the equilibrium wage rate, the optimum levels of factors and activities X are defined by $X*$ such that

$$\frac{\partial B(X*)}{\partial X*} = \frac{\partial P(X*)}{\partial X*} - \frac{\partial C(X*)}{\partial X*} = 0$$

net worth if another alternative better serves the manager's own objectives. These may include rapid promotion, personal enrichment or avoidance of stress and competitive conflict both within the firm and in the firm's product markets. A means of helping to ensure that the manager's efforts will serve the firm's objectives is to offer the manager an incentive contract that relates the manager's total compensation package to the profit performance of the firm.

3.3 Agency Costs

At one extreme of ownership and management structures are firms whose managers own 100 per cent of the firm. These firms, by their definition, have no agency costs. At the other extreme are firms whose managers are paid employees with no equity stake in the firm. In between are firms where the managers own some, but not all, of their firm's equity. Agency problems arise because contracts are not costlessly written and enforced (Fama and Jensen, 1983). Agency costs include the costs of structuring, monitoring, and bounding a set of contracts among agents with conflicting interests, plus the residual loss incurred because the cost of full enforcement of contracts exceeds the benefits.[13] Agency costs arise when the interests of the firm's managers are not aligned with those of the firm's owner(s), and take the form of preference for on the-job perks, shirking, and making self-interested and entrenched decisions that reduce shareholder wealth. The magnitude of these costs is limited by how well the owners and delegated third parties, such as banks, monitor the actions of the outside mangers.

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[13] This definition of agency costs first appears in Jensen and Meckling (1976).

3.4 Tobin's Q

Tobin's Q plays an important role in many financial interactions. Defined as the ratio of the market value of a firm to the replacement cost of its assets, Tobin's Q has been employed in numerous studies on firms' performance and corporate governance, such as the relationship between managerial equity ownership and firm value (McConnell and Servaes, 1990). Another strain, and focus of previous research has been on the clear evidence of agency problems in relation to acquisition announcements, since managerial investments decisions may reflect their personal interest rather than those of the shareholders. Lewellen, Loderer, and Rosenfeld (1985) find that negative returns are most common for bidders in which their managers hold little equity, suggesting that agency problems can be assumed because of management concentrating on growth and diversification opportunities. This implies that management is risk averse in their decisions rather than risk neutral as they should be according to portfolio theory.

Jensen (1986) argues that managers choose to reinvest the free cash rather than return it to shareholders. Lang, Stulz, and Walking (1991) find that bidder returns are the lowest among firms with low Tobin's Q and high cash flows. Their result supports Jensen's (1986) version of agency theory, in which the worst agency problems occur in firms with poor investment opportunities and excess cash, i.e. firms with low Tobin's Q. These results support the use of Tobin's Q as a proxy for agency cost. Firms with agency problems will encounter agency costs, since excess of cash and poor investment opportunities will be reflected in firms having lower Tobin's Q in accordance to Lang, Stulz, and Walking (1991). One interpretation of these results is that Tobin's Q is a measure of managerial ability, and the market rewards good managers.

Tobin's Q is defined as the simple Q measure, Qs, in Perfect and Wiles (1994). The formula requires only basic financial and accounting information.

Perfect and Wiles report that this measure of Q has a correlation of 0.93 with that estimated using the Lindenberg and Ross (1981) more theoretically correct approach. I adopt the simple measure of Q^{14} because of this high correlation, its ease of computation, and to maximize the availability of data. Tobin reasoned that net investment should depend on whether Q is greater or less than 1. If Q is greater than 1, then the stock market values installed capital at more than its replacement cost. In this case, managers can raise the market value of their firms' stock by buying more capital. Conversely, if Q is less than 1, the stock market values capital at less than its replacement cost. In this case, managers will not replace capital as it wears out. Tobin's Q depends on current and future expected profits from installed capital (Mankiw, 1997).

If the marginal product of capital exceeds the cost of capital, then firms are earning profit on their installed capital. These profits make the firms desirable to own, which raises the market value of these firms' stock, implying a high value of Q. Similarly, if the marginal product of capital falls short of the cost of capital, then firms are incurring losses on their installed capital, implying a low market value and a low value of Q^{15}. If management continually makes poor investment decisions or frequently invests in unproductive assets, it is expected that the value of Tobin's Q will fall. Hence, the first ratio is a measure of how effectively the firm's management can increase the market value of the firm by acquiring more capital to its business. It is important to remember that Tobin's Q varies inversely with agency costs.

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[14] $Q = (MVE + DEBT)/TA$, where MVE is the product of a firm's share price and the number of common stock shares outstanding, DEBT is the value of the firm's total debt, and TA is the book value of the total assets of the firm (Perfect and Wiles, 1994). All of these required inputs are readily obtainable from a firm's basic financial and accounting information.
[15] The interested reader can find more on the relationship between the neoclassical model of investment and Q theory, see Fumio Hayashi (1982).

3.5 Sales to Total Assets

The second ratio is a measure of how effectively the firm's management deploys its assets. The proxy for agency cost is here the sales to total assets ratio. Ang, Cole and Wuh Lin (2000) apply this ratio in order to quantify agency costs. This measure of agency costs is calculated as the ratio of annual sales to total assets. If the ratio is low, the firm is not using its assets up to their capacity and must either increase sales or dispose some of the assets. A firm whose sales to total assets ratio is lower than the base case firm experience positive agency cost. These costs arise because management acts in some or all of the following ways: makes poor investment decisions, exerts insufficient effort, resulting in lower revenues; consumes executive perquisites, so that the firm purchases unproductive assets, such as excessively fancy office space, office furnishing, automobiles and resort properties. One problem in interpreting this ratio is that it is maximized by using older assets because their accounting value is lower than newer assets (Ross, Westerfield, and Jaffe, 1996). Also, firms with relatively small investments in fixed assets, such as retail and wholesales trade firms, tend to have high ratios when compared with firms that require a large investment in fixed assets, e.g. manufacturing firms. It is important to remember that sales to total assets vary inversely with agency costs.

4. Empirical Results and Analysis

In this section, I present and analyse the results from the study. Section 4.1 provides descriptive statistics. The results are divided up into different sections (4.2, 4.3, and 4.4) depending on the objective of the analysis. The first analysis (section 4.2) focuses on the separation between ownership and control. Sections 4.3 and 4.4 concentrate on the determinants of agency costs in the

firms. Hence, the purpose of the three different methods (4.2, 4.3, and 4.4) of analysing the data is to reduce the bias of the results through applying several methods. I analyse both the total sample and certain sub groups in order to better understand the outcome of the analysis of the collected data concerning agency costs and ownership structure for the firms listed on the SSE's O-list in the year 2000.

4.1 Descriptive Statistics

The data is examined and tested in order to determine whether it is possible to identify relative equity agency costs in firms that are dependent on the management and ownership structure. Table 1 shows descriptive statistics for both efficiency ratios. The mean value for sales to total assets is 0.940 whereas the mean value for Tobin's Q is 2.122. Sales to total assets ranges from 0 to 4.31 and Tobin's Q ranges from 0.129 to 16.55.

Table 1. Descriptive statistics for the two agency cost proxies.

	Sales to Total Assets	Tobin's Q
Mean	0.940	2.122
Median	0.860	1.351
Standard Deviation	0.717	2.182
Sample Variance	0.515	4.762
Minimum	0.000	0.129
Maximum	4.314	16.553
N	173	173

It is of importance to realize that both of the efficiency ratios vary across industries because of the varying importance of inventory and fixed assets. Figure 1 shows the ratio of annual sales to total assets by industrial classification. This efficiency ratio ranges from 0.31 for "Financials" to 1.70 for "Service". Figure 2 illustrates the ratio of Tobin's Q by industrial

classification. This efficiency ratio ranges from 1.29 for "Financials" to 3.06 for "Health Care". The rationale is that the definition of assets for financial firms causes their Tobin's Q to be systematically different from that for other firms[16]. There is also a need to control for firm size. First, the ratio of annual sales to total assets is analysed in order to detect whether scale of economies can be realized as measured by the ratio of sales to assets.

Figure 1. Sales to total assets ratio by industry classification for a sample of 173 firms[17].

Sales to Total Assets
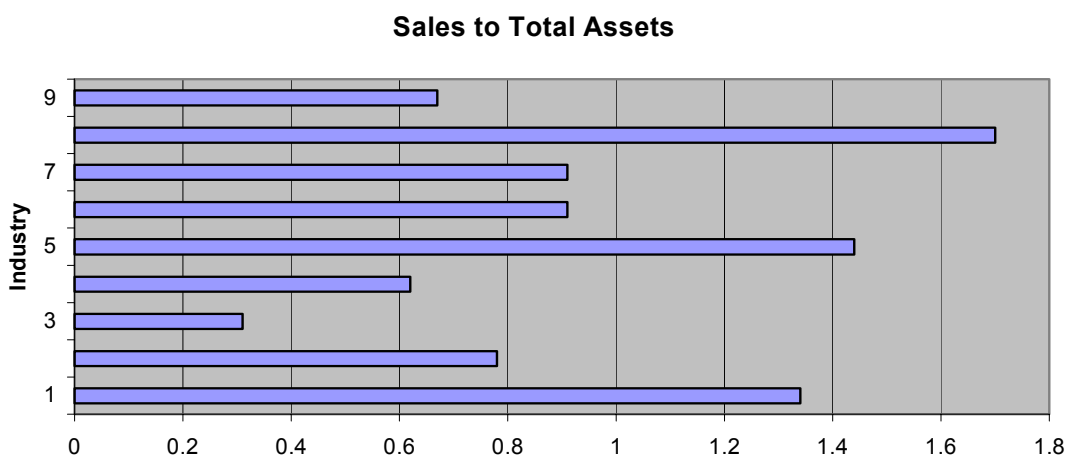
Figure 2. Tobin's Q ratio by industry classification for a sample of 173 firms[18].

Tobin's Q

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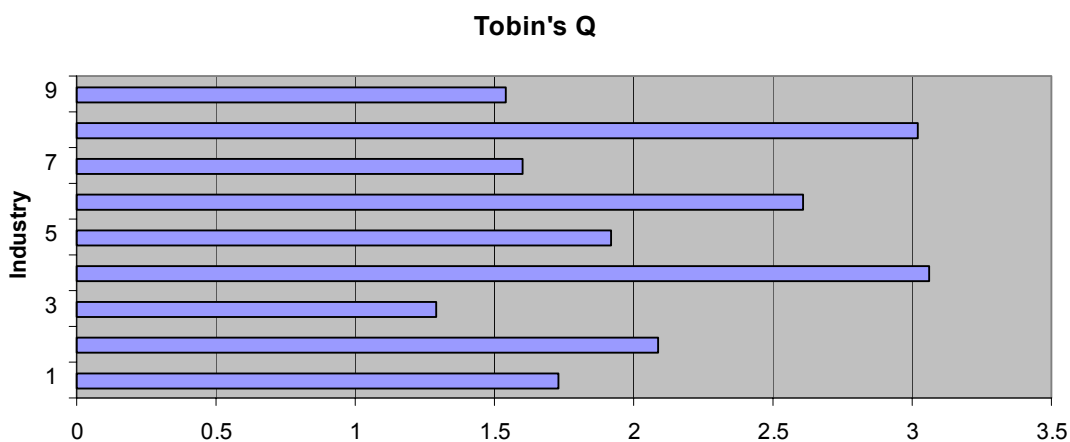
[16] Demsetz and Lehn (1985) include a dummy variable for such firms. McConnell and Servaes (1990) exclude financial firms from their sample. The sample of this study contains 27 financial firms.
[17] Industry classification: (1) Consumer, (2) Entertainment, (3) Financials, (4) Health Care, (5) Industrials, (6) Information Technology, (7) Materials, (8) Service, (9) Telecommunication Service
[18] See footnote 17.

Figure 3 shows the ratio for the four sales quartiles. The graph indicates a positive relationship. I perform a regression on the sales to total assets ratio against sales in order to find some results on economies of scale, I find a positive but statistically insignificant relationship $(t = 1.46)$. However, the result that was obtained when the sales to total assets ratio is regressed against the natural logarithm of sales indicates a positive and statistically significant relationship $(t = 6.13)$. Second, the ratio of Tobin's Q is analysed in order to detect whether firm size influences the ratio. Figure 4 shows the ratio for the four sales quartiles. The graph indicates a negative relationship. If I regress the Tobin's Q ratio against annual sales, I find a negative relationship that is statistically insignificant $(t = -1.34)$. The result does not change when regressed against the natural logarithm of sales.

Figure 3. Sales to Total Assets ratio by sales quartile for a sample of 173 firms.

Sales to Total Assets
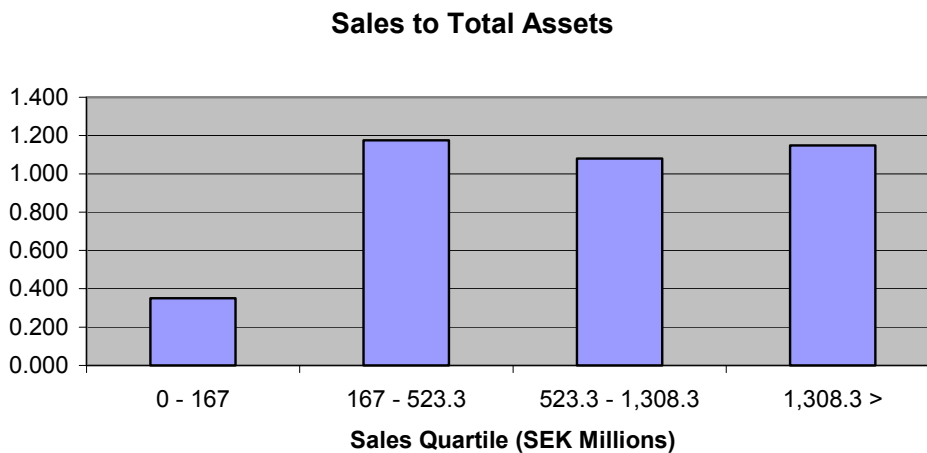
Figure 4. Tobin's Q ratio by sales quartile for a sample of 173 firms.

Tobin's q
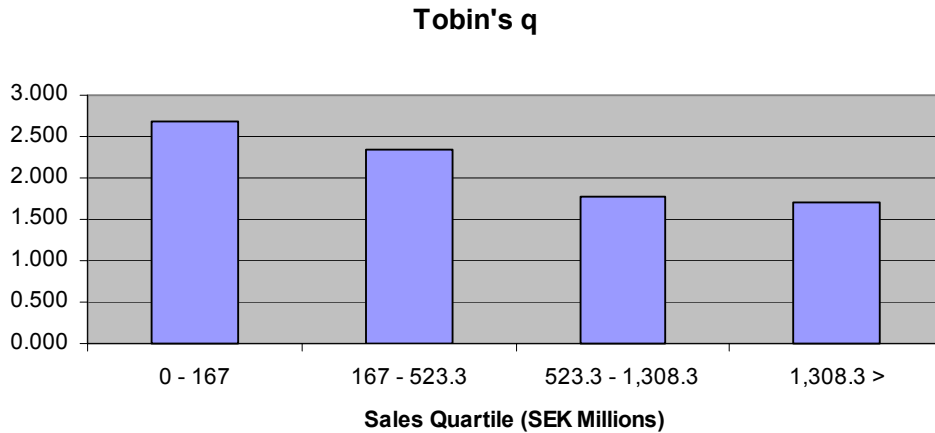
Publicly traded firms are frequently characterized as having highly diffuse ownership structures that effectively separate ownership of residual returns[19] from control of corporate decisions. The concern in this section is to inspect and describe the ownership structure of the data in the study. For a sample of 173 firms on SSE's O-list, Table 2 lists the distribution of the following four measures of ownership concentration: the percentage of a firm's outstanding equity owned by the primary shareholder (A1_SHARE), the percentage of share owned by the five largest shareholders (A5_SHARE), the percentage of shares owned by the 20 largest shareholders (A20_SHARE), and a Herfindahl-Hirschman index (HII). First I will start to describe the variation in ownership concentration among the corporations in table 3.

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[19] Income from an asset or business that remains after all fixed obligations are met (Milgrom and Roberts, 1992).

Table 2. Frequency distribution of A1, A5, A20 and HII for 173 firms in the sample.

	A1_SHARE		A5_SHARE		A20_SHARE		HII	
Range (%)	Freq.	Cum. Percentage	Freq.	Cum. Percentage	Freq.	Cum. Percentage	Freq.	Cum. Percentage
0-9.99	26	15.0	0	0.0	0	0.0	109	63.0
10-19.99	60	49.7	6	3.5	0	0.0	38	85.0
20-29.99	36	70.5	17	13.3	2	1.2	15	93.6
30-39.99	30	87.9	38	35.3	7	5.2	6	97.1
40-49.99	11	94.2	38	57.2	17	15.0	2	98.3
50-59.99	2	95.4	23	70.5	19	26.0	2	99.4
60-69.99	5	98.3	22	83.2	43	50.9	1	100.0
70-79.99	3	100.0	17	93.1	42	75.1	0	100.0
80-89.99	0	100.0	9	98.3	33	94.2	0	100.0
90-100	0	100.0	3	100.0	10	100.0	0	100.0

Table 3. Summary Statistics of A1, A5, A20 and HII for 173 firms in sample.

Variable	N	Mean	Median	STD	Min	Max
A1_SHARE	173	24.05	20.33	15.22	4.65	79.72
A5_SHARE	173	49.67	46.95	18.44	14.65	95.85
A20_SHARE	173	68.34	69.24	15.89	20.36	98.85
HII	173	11.25	7.41	11.10	0.64	63.58

The value of A1_SHARE ranges from 4.65 to 79.72 around a mean value of 24.05. The value of A5_SHARE ranges from 14.65 to 95.85 around a mean value of 49.67. Similar variations are found in the values of A20_SHARE and HII: A20_SHARE ranges from 20.36 to 98.85 and HI ranges from 0.64 to 63.58. The corresponding average values of these two variables are 68.34 and 11.25, respectively.

4.2 Separation of Ownership and Control

In this section I will introduce some results on how agency costs vary with the separation of ownership and control, i.e. whether the firm's manager is a shareholder or an outsider with no ownership stake. The upcoming analysis shall offer some insights into the effects of managerial alignment with owners on equity agency costs. Table 4 will compare the agency costs of firms under

two types of managers: owners versus outsiders. Panel A shows results when agency costs are measured by the Tobin's Q ratio. Panel B shows results when agency costs are measured by the ratio of annual sales to total assets. Higher Tobin's Q ratios are associated with greater efficiency and lower agency costs, the same holds for the ratio of annual sales to total assets.

4.2.1 Agency Costs as Measured by the Ratio of Tobin's Q

In Panel A of Table 4, columns 2 and 3 show the number of observations and the mean ratios of Tobin's Q. Columns 4 and 5 show the same information for firms whose manager is an outsider. The data indicates that a majority of the corporations are managed by shareholders rather than by outsiders (116, or 67 per cent of the 173 sample firms). However, there is not an insignificant number of firms that hire outside managers (57, or 33 per cent of the 173 sample firms). Thus, there appears to be a sufficient number of firms in these two groups to make meaningful statistical comparisons of their Tobin's Q ratio. The table shows that the mean value of Tobin's Q ratio is higher for firms managed by owners (column 3) rather than outsiders (column 5). This holds for all combinations of ownership structure and control. For all firms (line 1 of Panel A), the mean ratios of Tobin's Q at insider-managed firms and outsider-managed firms are 2.204 and 1.955, respectively. However, the 0.249 difference in these means is statistically insignificant even at the 10 per cent level. Nevertheless, the data makes it possible to estimate this difference lost in market value for a median firm in absolute SEK. The difference of 0.249 implies on average a loss in market value for a corporation with median total assets of SEK 652.9 million of SEK 163 million per year when an outsider rather than a shareholder manages the firm.

Also included in the full sample are 51 firms in which the primary owner (A1) holds a controlling interest of more than one third of the firm's equity.

Among the firms in this sample, 28 were managed by an insider rather than by an outsider. As shown in Table 4, Panel A, line 2, the ratio of Tobin's Q for these firms is 0.845 lower when the owner hires an outside manager than when the owner manages the firm. However, this difference is not statistically significant $\left(|t|=1.32\right)$. There are also 73 firms in which the five largest shareholders (A5) control more than half of the firm's equity. As shown in line 3 of Panel A, the average ratio of Tobin's Q is 0.217 lower when the firm is managed by an outsider than when the firm is managed by a shareholder. This difference is not statistically significant $\left(|t|=0.46\right)$. Also included in the full sample are 100 firms in which the 20 largest shareholders (A20) control more than two thirds of the firm's equity. As shown in line 4 of Panel A, the average ratio of Tobin's Q is 0.145 lower when the firm hires outside managers than inside managers with an equity stake in the firm. However, this difference is likewise not statistically significant $\left(|t|=0.37\right)$. One final group of interest is composed of 122 firms in which no single shareholder holds a controlling interest of more than one third of the firm's equity. Out of these, 88 are managed by shareholders and 34 are managed by outsiders without any equity stake in the firm. Because of the diffuse ownership in this subgroup, it is expected that the agency costs for the latter firms are higher. This is also confirmed in line 5 of Panel A, the average ratio of Tobin's Q is 0.241 lower when the firm is managed by an outsider than when the firm is managed by a shareholder. However, the result is not statistically significant $\left(|t|=0.77\right)$. To summarize the analysis on separation of control and ownership when agency cost is measured through Tobin's Q, I can conclude that the results in no one of the five different subgroups were significant. Hence, it could be questioned whether the ratio of Tobin's Q is an adequate indicator of equity agency costs.

4.2.2 Agency Costs as Measured by the Ratio of Sales to Total Assets

In Panel B of Table 4 results from a similar analysis of agency costs are presented, but here I measure agency costs by the ratio of annual sales to total assets rather than the ratio of Tobin's Q. As predicted, the results show that the sales to total assets ratios are higher in all categories of shareholder-managed firms versus outsider-managed firms. This holds for the full sample of 173 firms (line1) and for the sub samples where the primary owner (A1) holds more than one third of the firm's equity (line 2), where the five largest shareholders (A5) control more than half of the firm's equity (line 3), where the 20 largest shareholders (A20) control more than two thirds of the firm's equity (line 4), and finally where the primary owner holds less than one third of the firm's equity (line 5).

For the full sample, displayed in line 1, Panel B, the average sales to total assets ratio at insider-managed firms is almost 44 per cent higher than at outsider-managed firms at 1.045 and 0.726, respectively. The 0.319 difference is statistically significant at the 1 per cent level $\left(|t| = 2.97 \right)$. The difference of 0.319 implies on average a loss in revenues for a corporation with median total assets of SEK 652.9 million of approximately SEK 210 million per year when the firm is managed by an outsider-manager rather than a shareholder. In each of the remaining four comparisons (lines 2-5 of Panel B), the average ratio of annual sales to total assets also is greater when the firm is managed by a shareholder than when the firm is managed by an outsider without any equity stake in the firm. The corresponding differences in the sub groups are all statistically significant at the 1 per cent level. Overall, the results displayed in Table 4 suggest that sales to total assets is a more adequate proxy when estimating equity agency cost in this first analysis of the consequences of separation of control and ownership.

Table 4. Agency Costs, Ownership Structure, and Managerial Alignment with Shareholders[20]

| | Owner-Manager | | Outsider-Manager | | Difference |
	Number of Firms	Ratio Mean	Number of Firms	Ratio Mean	in Means
	Type of Manager				
	Panel A: Tobin's Q Ratio				
All firms	116	2.204	57	1.955	0.249
A1 > 33%	28	2.661	23	1.817	0.845
A5 > 50%	46	2.249	27	2.032	0.217
A20 > 66%	65	2.238	35	2.093	0.145
A1 < 33%	88	2.058	34	1.817	0.241
	Panel B: Annual Sales to Total Assets Ratio				
All firms	116	1.045	57	0.726	0.319***
A1 > 33%	28	1.181	23	0.743	0.437***
A5 > 50%	46	1.252	27	0.835	0.417***
A20 > 66%	65	1.160	35	0.811	0.35***
A1 < 33%	88	1.001	34	0.714	0.288***

*, **, *** indicate statistical significance at the 10, 5 and 1 per cent level, respectively.

4.3 Determinants of High- and Low-agency Cost Firms

Next step in the analysis of agency costs in the sample firms is to present descriptive statistics for the variables hypothesized to explain agency costs. Statistics are presented both for the entire sample (173 firms) and for two groups of firms constructed by dividing the entire sample in half, based on the sample's median ratios of agency costs. Hence, by dividing the sample into two sections (below median and above median), important results can be drawn from the data set concerning the existence of agency costs in the firms analysed and the determinants of these (Table 5). On average, a shareholder manages the firm 67 per cent of the time and controls approximately 9 per cent of the equity;

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[20] Agency costs are presented for the 173 firms in the sample. The data has been divided into two groups of firms: those managed by owners (aligned with shareholders) and those managed by an outsider (not aligned with shareholders). Agency costs are proxied alternatively by the ratio of Tobin's Q and the ratio of annual sales to total assets. Separate analyses are presented for each agency cost proxy and for subgroups. The last column shows the difference between the mean ratios of the insider-managed firms and the outsider-managed firms. Statistical significance of the differences in the mean ratios is based on the two-sample *t*-statistic from a parametric test (based on the assumption of unequal variances). This test is used to test hypotheses about the difference between two population means.

the primary owner (A1) controls 24 per cent of the firm's equity on average and also controls more than one third of the equity 29.5 per cent of the time. The average number of nonmanager shareholders is 8,432, but this statistic is strongly influenced by extreme values, as the median number of nonmanager shareholders is 4,606. On average the five largest owners (A5) control 50 per cent of the firm's equity and control more than half the equity in 42 per cent of the time. The 20 largest owners (A20) control 68 per cent of the firm's equity on average and control more than two thirds of the equity in 58 per cent of the time. The concentration index of ownership (HII) indicates an average value of 0.11 for the entire sample. This value is on average equivalent to approximately 10 owners of equal size per firm. Also, the average firm has a debt to asset ratio (DEBTtoASSET) of 0.425 and annual sales of SEK 1,154 million.

In order to detect any differences in agency costs due to the different variables that are hypothesized to explain variations, I have split the sample into low-expense and high-expense ratio groups. Based on *t*-tests for significance differences in the means of the two groups I can conclude that there appear to be differences in both of the proxies for agency costs. However, the differences in the means between the two groups for sales to total assets (Panel C) seem to be more significant than those for Tobin's Q (Panel B). It seems that the former is a better proxy for agency costs. Based on *t*-tests, the only significant results regarding Tobin's Q is the variable A20 and the ownership share controlled by management (MGMT_SHARE). The former indicates that the ownership concentration is higher among the low agency cost firms for A20, a result that is in sequence with what has previously been stated as being related to the free-rider-problem. The negative relationship for MGMT_SHARE could be referred to as the entrenchment effect, implying that at high levels of managerial ownership the probability of a takeover diminishes, and, therefore, the firm will incur a loss in market value. This phenomenon is developed in a model by Stulz (1988). However, I do not agree that agency

costs should be positively correlated with the ownership share of management in the firm. I expect agency costs to be inversely related to the ownership share of management.

The results concerning the ratio sales to total assets (Panel C) are more in sequence with the hypotheses stated previously in the thesis. When I split the sample into low and high asset-utilization groups as I did concerning Tobin's Q, I find strong differences in the two groups. Low-efficiency firms are less likely to be managed by a shareholder $\left(|t| = 2.99\right)$, have lower percentage ownership by both A5_SHARE and A20_SHARE, both statistically significant on the 10 per cent level. Also, low-efficiency firms tend not to have owners (A5 and A20) that control more than 50 and 66 per cent of the firm's equity to the same extent as high-efficiency firms $\left(|t| = 2.66\right)$ and $\left(|t| = 2.10\right)$. As postulated in the problem discussion, agency costs are hypothesized to be inversely related to the ownership share of management. As shown in the table, low-efficiency firms are more likely to be controlled by a management with a minor equity share than those of high-efficiency firms, and also to a larger extent have more nonmanager shareholders.

Low-efficiency firms also tend to have lower debt to asset ratio than high-efficiency firms. External monitoring is carried out by banks, the bank's incentive to monitor is proxied by the firm's debt to total asset ratio. As leverage increases, so does the risk of default by the firm, hence the incentive for the lender to monitor the firm. Because banks generally require a firm's manager to report results honestly and to run the business efficiently with profit, bank monitoring complements shareholder monitoring of managers, indirectly reducing owner-manager agency costs. That is, by incurring monitoring costs to preserve their loans, banks lead firms to operate more efficiently by better utilizing assets and moderating perquisite consumption in order to improve the firm's reported financial performance to the bank. Thus, lower priority claimants, such as outside shareholders, should realize a positive

externality from bank monitoring, in the form of lower agency costs (Ang, Cole and Wuh Lin, 2000). The difference in debt to total asset ratio between the two groups (low- and high-efficiency firms) is statistically significant $\left(|t| = 6.16 \right)$. To summarize this section on the determinants of high- and low-agency cost firms, I can, as in preceding section, conclude that Tobin's Q is not an adequate proxy for equity agency cost.

Table 5. Descriptive Statistics for Variables Used to Analyse Agency Costs[21]

	Panel A		Panel B			Panel C		
				Tobin's Q			Sales to Total Assets	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Below Median	Above Median		Below Median	Above Median	
Ownership Variables	Mean	Median	Median	Median	Diff.	Median	Median	Diff.
MGMT	0.668	1	0.698	0.644	0.054	0.57	0.779	-0.209***
A1 > 33%	0.295	1	0.291	0.302	-0.011	0.291	0.299	-0.008
A5 > 50%	0.422	1	0.43	0.419	0.011	0.326	0.523	-0.197***
A20 >66%	0.578	1	0.535	0.628	-0.093*	0.506	0.663	-0.157***
HII	0.112	0.074	0.108	0.118	-0.01	0.113	0.112	0.001
MGMT_SHARE	8.849	2.34	11.868	5.722	6.146***	5.797	12.052	-6.255***
A1_SHARE	24.049	20.33	23.6	24.615	-1.015	24.397	23.811	0.586
A5_SHARE	49.672	46.95	48.883	50.366	-1.483	46.977	52.405	-5.428*
A20_SHARE	68.34	69.24	67.491	69.103	-1.612	66.801	70.109	-3.308*
OWNERS	8432	4606	8194	8751	-557	11574	5314	6260***
External Monitoring Variables								
DEBTtoASSET	0.425	0.441	0.457	0.393	0.064	0.33	0.523	-0.193***
Control Variables								
SALES (SEK millions)	1154.391	523.3	1267.491	1061.072	206.419	1019.995	1287.753	-267.758

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[21] Selected variables used to analyse agency costs in a sample of 173 corporations. The variables are identified in column 1, the sample means and medians (Panel A) appear in columns 2 and 3. The data for the two variables used to proxy agency costs are shown in Panels B and C. For each proxy the data was constructed through splitting the sample into two equal-size groups based on the entire sample's median Tobin's Q and sales to total assets ratio. Columns 4 and 5 (columns 7 and 8) are the means for the two proxies and groups. Column 6 (column 9) shows the difference in the two groups' means, and the results from a *t*-test for significant difference in the means of the low- and high-ratio groups of firms. *, **, *** indicate statistical significance at the 10, 5 and 1 per cent level, respectively.

4.4 Multiple Regression Results Explaining Agency Costs

In this section, the results from the multiple regression models earlier specified will be presented. Hence, the objective for the models is to capture the determinants of the two proxies for agency costs, the ratio of Tobin's Q and the ratio of annual sales to total assets. Each proxy is regressed against the management, ownership, external monitoring, and control variables previously introduced and discussed. These regressions will make it possible to draw further conclusions regarding the impact of ownership and management variables on the agency costs. Tables 6 and 7 present the results from the multiple regressions analysing agency costs as measured by the ratio of Tobin's Q and sales to total assets. In column 1 the different explanatory variables are identified, and columns 2 through 12 display parameters estimated for eleven different model specifications. Because of the importance of industry structure and economies of scale, as previously described, I include in each regression variables to control for firm size and industry effects. The measure of size is the logarithm of annual sales, also previously used, and the controls for industry effects are the dummy variables, one for each industry classification.

4.4.1 Agency Costs as Measured by the Ratio of Tobin's Q

First, I will present the result on agency costs as measured by the ratio of Tobin's Q. Column 2 of Table 6 shows that a firm managed by a shareholder has a Tobin's Q ratio that is 0.20 greater than that of a firm managed by an outsider. For a firm with median total assets of SEK 652.9 million, this incurs a loss on average in market value of SEK 130.6 million when an outsider rather than an owner manages the firm, however, the coefficient is not significantly different from zero $(t = 0.56)$. This is due to the high variance for Tobin's Q as

a result of outliers. When regressing MGMT_SHARE (column 3) against Tobin's Q, I receive a negative non-significant relationship. The result is similar to that of section 4.3 concerning MGMT_SHARE, a possible explanation is the entrenchment effect developed by Stulz (1988). The variables A1_SHARE, A5_SHARE and A20_SHARE (columns 4, 5 and 6), all indicate a positive relationship, as predicted according to the free-rider-problem presented in earlier sections. However, none of these parameters is statistically significant.

Further, column 7 provides a concentration index (HHI) as an explanatory variable, although this index shows a positive parameter, it is not statistically significant. Columns 8, 9 and 10 indicate whether primary owner (A1) controls > 33 per cent, if A5 controls > 50 per cent, and if, A20 controls > 66 per cent of the firms equity. The results on these parameters are all positive, indicating that larger ownership concentration reduces agency costs, nevertheless, none of the parameters is statistically significant on the 10 per cent level. In column 8 I present that a firm in which the primary owner owns a controlling interest of more than 33 per cent has a Tobin's Q ratio that is on average 0.609 higher than for other firms. Thus this result is not statistically significant, the following may be illustrative. For a firm with median total assets of SEK 652.9 million, the coefficient in column 8 implies on average an agency cost of SEK 398 million in loss of market value when the primary owner of the firm does not control more than 33 per cent of the firm's equity.

In column 11 of Table 6 I analyse the number of nonmanger shareholders. I expect a negative relationship between the proxy of the agency cost and this variable, as the returns to monitoring decrease and the free-rider-problem increases with the number of nonmanager shareholders. However, the coefficient in column 11 is almost zero and not significant ($t = 0.37$). In column 12 of Table 6 I analyse the relation between capital structure and ownership on agency cost. As discussed in previous sections, I expect a positive relationship

between Tobin's and the debt-to-asset ratio. Although I find a positive relationship, it is not significantly different from zero.

In each of the eleven specifications displayed in columns 2 through 12 of Table 6, the size variable, the natural logarithm of annual sales, is negative and statistically not significant. Hence, there is no evidence of the existence of economies of scale. Not shown in Table 6 are statistics indicating that three of the eight industry dummies used in each of the model specifications are statistically significant at least at the 10 per cent level. Note that the adjusted R^2 statistics appearing at the bottom of Table 6 indicate that the models are only able to explain about 3 per cent of the variability in the ratio of Tobin's Q. Also in this final analysis of the determinants of agency costs in different model estimations, I can conclude that Tobin's Q is not a satisfactory proxy.

4.4.2 Agency Costs as Measured by the Ratio of Sales to Total Assets

Table 7 displays the results from the multiple regressions analysing agency costs as measured by the ratio of annual sales to total assets. Similar to analysing the former ratio it is important to remember that the sales to total assets ratio varies inversely with agency costs. Table 7, column 1 identifies the explanatory variables and columns 2 through 12 display parameter estimates for different specifications of the regression model. In column 2 of Table 7, the estimate indicates that a firm managed by a shareholder has a sales to asset ratio that is 0.257 greater than that of a firm managed by an outsider, and this coefficient is statistically significant at better than the 1 per cent level $(t = 2.8)$. This is close to the 0.319 difference reported for all firms in Panel B of Table 4. For a firm with median total assets of SEK 652.9 million, this incurs a loss, on average, in revenues of SEK 167.8 million when an outsider rather than an owner manages the firm. This evidence supports the hypothesis that agency costs are higher when an outsider manages the firm. In column 3 I test the

hypothesis whether agency costs are inversely related to the ownership share of the management in the firm. The estimate indicates a positive relationship as predicted in the hypothesis; however, the relationship is not statistically significant at the 10 per cent level $(t = 1.157)$. Column 4 through 6 present results on the ownership share for the different indicators of ownership concentration. The signs of all three parameters are in conflict with the hypothesis related to the free-rider-problem since the relationship is negative, indicating that high concentration of ownership would lead to higher agency costs in the firm. Yet, none of these parameters is statistically significant.

Further, column 7 includes a concentration index (HHI) as an explanatory variable, also this sign of the parameter is in conflict with the hypothesis. However, this variable is not significantly different from zero. Columns 8, 9 and 10 indicate whether primary owner (A1) controls > 33 per cent, if A5 controls > 50 per cent, and if, A20 controls > 66 per cent of the firms equity. All these variables are not statistically significant. In column 11 of Table 7, I analyse the number of nonmanager shareholders, as expected in the hypothesis, the relationship is negative and statistically significant at better than the 1 per cent level $(t = -3.738)$. This indicates that firms with a large amount of nonmanager shareholders *ceteris paribus* will feature higher agency costs than firms with a smaller amount of shareholders. In column 12 I analyse the effect of capital structure on the sales to asset ratio. The results indicate that firms with higher debt ratios have higher sales to asset ratios, and that this relationship is statistically significant at better than the 1 per cent level. This finding is supportive of a version of the theory put forth by Williams (1987) that additional debt decreases agency costs. In each of the eleven specifications displayed in Table 7, I observe that the size variable, the natural logarithm of annual sales, is positive and statistically significant at better than the 1 per cent level, which is evidence of economies of scale. As before, not shown are statistics indicating that 6 of the 8 industry dummies used in each of the model

specifications are statistically significant at least at the 5 per cent level. These findings underscore the critical importance of controlling for differences across industries when examining the sales to asset ratio. The adjusted R^2 for each of the eleven specifications indicates that the models explain approximately 40 per cent of the variability in the ratio of sales to assets.

Table 6. Determinants of Agency Costs as Measured by Tobin's Q

There are three groups of independent variables: ownership/management variables, external monitoring variables, and control variables. Sample size is 173 firms. Each specification includes a set of 8 dummy variables indicating industrial classification. Data are from AMB and SIS. t-value is reported in parenthesis.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	3.109***	3.314***	3.046***	2.969***	2.670***	3.203***	3.246***	3.246***	3.236***	3.261***	3.225***
	(4.558)	(5.318)	(4.707)	(4.312)	(3.236)	(5.091)	(5.232)	(5.191)	(5.189)	(5.215)	(5.161)
MGMT	0.204										
	(0.562)										
MGMT_SHARE		-0.015									
		(-1.331)									
A1_SHARE			0.014								
			(1.235)								
A5_SHARE				0.010							
				(1.01)							
A20_SHARE					0.013						
					(1.096)						
HHI						1.200					
						(0.771)					
A1 > 33 %							0.609				
							(1.622)				
A5 > 50%								0.238			
								(0.654)			
A20 > 66%									0.390		
									(1.075)		
OWNERS										0.000	
										(0.37)	
DEBTtoASSET											0.898
											(0.973)
LN_SALES	-0.117	-0.112	-0.127	-0.138	-0.154	-0.124	-0.131	-0.124	-0.138	-0.125	-0.163
	(-1.122)	(-1.117)	(-1.325)	(-1.406)	(-1.514)	(-1.287)	(-1.374)	(-1.28)	(-1.411)	(-1.261)	(-1.518)
Industrial Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regression Summary Statistics											
Adjusted R^2	0.024	0.033	0.031	0.028	0.029	0.025	0.038	0.024	0.029	0.023	0.028
F-Statistic	1.409	1.568	1.541	1.486	1.505	1.440	1.661	1.421	1.500	1.390	1.478

*, **, *** indicate statistical significance at the 10, 5, and, 1 per cent levels, respectively.

Table 7. Determinants of Agency Costs as Measured by Sales to Total Assets

There are three groups of independent variables: ownership/management variables, external monitoring variables, and control variables. Sample size is 173 firms. Each specification includes a set of 8 dummy variables indicating industrial classification. Data are from AMB and SIS. t-value is reported in parenthesis.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	-0.092	0.096	0.138	0.142	0.246	0.113	0.105	0.099	0.100	0.108	0.069
	(-0.53)	(0.56)	(0.821)	(0.795)	(1.15)	(0.691)	(0.65)	(0.609)	(0.618)	(0.697)	(0.439)
MGMT	0.257***										
	(2.794)										
MGMT_SHARE		0.003									
		(1.157)									
A1_SHARE			-0.002								
			(-0.788)								
A5_SHARE				-0.001							
				(-0.528)							
A20_SHARE					-0.003						
					(-1.027)						
HHI						-0.214					
						(-0.53)					
A1 > 33 %							-0.105				
							(-1.075)				
A5 > 50%								0.045			
								(0.479)			
A20 > 66%									0.027		
									(0.284)		
OWNERS										-0.000014***	
										(-3.738)	
DEBTtoASSET											0.778***
											(3.355)
LN_SALES	0.142***	0.142***	0.145***	0.146***	0.152***	0.145***	0.146***	0.142***	0.142***	0.168***	0.102***
	(5.840)	(5.749)	(5.817)	(5.733)	(5.775)	(5.785)	(5.857)	(5.656)	(5.566)	(6.790)	(3.802)
Industrial Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regression Summary Statistics											
Adjusted R^2	0.408	0.384	0.381	0.380	0.383	0.380	0.384	0.380	0.379	0.429	0.420
F-Statistic	12.589	11.482	11.359	11.301	11.433	11.301	11.451	11.292	11.267	13.645	13.18

*, **, *** indicate statistical significance at the 10, 5, and, 1 per cent levels, respectively.

5. Summary and Concluding Remarks

Inspired by empirical evidence of Ang, Cole and Wuh Lin (2000) and the theoretical models of Jensen and Meckling (1976) on agency costs, I empirically explore how agency costs vary with a firm's management and ownership structure. This section summarizes the findings of this study.

The ownership structure and agency costs are calculated using data from firms listed on the SSE's O-list in December 2000. The two proxies that are used to estimate agency costs are Tobin's Q and sales to total assets ratio. Because the ownership data on the firms in the sample is highly variable, it is possible to estimate a firm's agency costs across a wide variety of management and ownership structures. In order to test the hypotheses presented at the end of the problem discussion, the data has been explored using different methods. Through consequent analysis of the data in sections 4.2, 4.3, and 4.4, important conclusions can be drawn concerning the proxies.

It is concluded that the ratio of Tobin's Q is not a satisfactory proxy of equity agency cost, since few of the results are statistically significant. One possible explanation for this phenomenon is that Tobin's Q is a more appropriate variable when estimating the value of intangible assets in firms. According to Hirschey (1985) the market value of the firm can be viewed as the capitalized values of profits attributable to tangible and intangible assets. When $Q > 1$, market value reflects valuable intangible assets not reflected in replacement cost data. Hence, according to the analysis, I can conclude that this ratio does not serve as a good proxy for equity agency cost. Therefore, the answers to the hypotheses set up at the end of the problem discussion will be based on the ratio of sales to total assets. By comparing the efficiency of firms that are managed by shareholders with the efficiency of firms managed by outsiders, it is possible to calculate the agency costs attributable to the

separation of ownership and control. In order to test the last two hypotheses, I also examine the determinants of agency costs in a multiple regression framework.

First, I find that agency costs are higher when an outsider manages the firm because of the lack of alignment between management and shareholders. Second, I cannot find any evidence that agency costs vary inversely with the manager's ownership share. One possible explantion to this can be found in the study of Stulz (1988). He argues that at higher levels of managerial ownership the probability of a takeover may be diminished and, therefore, the value of the firm falls. Third, I find no evidence that agency costs should be related to the ownership concentration in accordance to the free-rider-problem. Large investors might try to treat themselves preferentially at the expense of other investors (Shleifer and Vishny, 1997). A problem is that large investors represent their own interests, which need not coincide with the interests of other investors in the firm. This might lead to a process where the large investor uses his control rights to maximize his own welfare at the expense of others. However, I do find that agency costs increase with the number of nonmanager shareholders. Fourth, I find evidence that firms with higher debt ratios have lower agency costs, due to external monitoring by banks when agency costs are proxied by the ratio of sales to total assets.

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Appendix 1. Variable Definitions

MGMT = 1, if management controls equity in the firm, 0 otherwise.

MGMT_SHARE = Percentage of equity owned by management.

A1_SHARE = Percentage of shares controlled by primary shareholder.

A5_SHARE = Percentage of shares controlled by top five shareholders.

A20_SHARE = Percentage of shares controlled by top 20 shareholders.

HHI = Herfindahl-Hirschman index of ownership concentration. Calculated by summing the squared percentage of shares controlled by each shareholder.

A1 = 1, if A1_SHARE controls > 33 per cent of firms equity, 0 otherwise.

A5 = 1, if A5_SHARE controls > 50 per cent of firms equity, 0 otherwise.

A20 = 1, if A20_SHARE controls > 66 per cent of firms equity, 0 otherwise.

DEBTtoASSET = Debt to total assets ratio.

OWNERS = Number of nonmanager shareholders.

LN_SALES = Natural logarithm of sales in millions of SEKs.

Q = Tobin's Q, measured as (MVE + DEBT) / TOTAL ASSET.

Sales to Total Assets = Annual sales divided by total assets of the firm.

Appendix 2. Data

Firm #	Company	Industry	Firm #	Company	Industry
1	Academedia	Services	30	Clas Ohlson	Consumer
2	ACSC	Industrials	31	Cloetta Fazer	Consumer
3	Active	Health Care	32	Concordia	Industrials
4	Adcore	Information Technology	33	CTT Systems	Industrials
5	Adera	Information Technology	34	Custos	Financials
6	Affärsstrateger	Financials	35	Digital Vision	Information Technology
7	Array	Information Technology	36	Doro	Telecommunication Service
8	Artema	Health Care	37	Drott	Financials
9	Artimplant	Health Care	38	Duroc	Industrials
10	Audiodev	Information Technology	39	Elanders	Industrials
11	AU-System	Information Technology	40	Elektronikgr.	Industrials
12	Axis	Telecommunication Service	41	Empire	Industrials
13	Beijer Alma	Industrials	42	Enea	Information Technology
14	Beijer Electro	Industrials	43	Eniro	Services
15	Biacore	Health Care	44	Expanda	Consumer
16	Biogaia	Health Care	45	Fagerhult	Industrials
17	Biophausia	Health Care	46	Fastighetspart	Financials
18	Biora	Health Care	47	Feelgood	Health Care
19	Borås Wäfverier	Consumer	48	Fingerprint	Information Technology
20	Bossmedia	Information Technology	49	Fjällräven	Consumer
21	Broström	Industrials	50	Framfab	Information Technology
22	C Technologies	Information Technology	51	Frango	Information Technology
23	Capio	Health Care	52	Friluftsbolaget	Consumer
24	Castellum	Financials	53	Geveko	Financials
25	Cell Network	Information Technology	54	Gorthon Lines	Industrials
26	Celtica	Financials	55	Gotland	Industrials
27	CF Berg	Materials	56	Graninge	Materials
28	Cherry	Services	57	Havsfrun	Financials
29	Citymail	Services	58	Heba	Financials

Firm #	Company	Industry	Firm #	Company	Industry
59	HIQ	Information Technology	92	Mind	Information Technology
60	HL Display	Industrials	93	Modul	Information Technology
61	Iar Systems	Information Technology	94	Mogul.com	Information Technology
62	IBS	Information Technology	95	MSC	Information Technology
63	Icon	Information Technology	96	MTG	Entertainment
64	IFS	Information Technology	97	MTV	Entertainment
65	IMS	Information Technology	98	Multi Q	Information Technology
66	Intentia	Information Technology	99	Munters	Industrials
67	Invik	Financials	100	NAN	Materials
68	Itab	Industrials	101	Nea	Industrials
69	JABO	Materials	102	Nefab	Industrials
70	JC	Consumer	103	Net Insight	Telecommunication Service
71	Johnson Pump	Industrials	104	New Wave	Consumer
72	Kabe	Consumer	105	Nexus	Information Technology
73	Karlshamns	Materials	106	Nibe	Consumer
74	Karo Bio	Health Care	107	Nocom	Information Technology
75	Kipling	Information Technology	108	Nolato	Telecommunication Service
76	Klippan	Materials	109	Novestra	Financials
77	KMT	Industrials	110	Novotek	Information Technology
78	Kungsleden	Financials	111	OEM	Industrials
79	Latour	Financials	112	Opcon	Consumer
80	Ledstiernan	Financials	113	ORC	Information Technology
81	LGP Telecom	Telecommunication Service	114	Ortivus	Health Care
82	Ljungberggr	Financials	115	Pandox	Financials
83	Lundbergs	Financials	116	Partnertech	Telecommunication Service
84	Lundin Oil	Materials	117	Peab	Industrials
85	M2S	Information Technology	118	Perbio Science	Health Care
86	Meda	Health Care	119	Poolia	Services
87	Medi Team	Health Care	120	Precise Biometr	Information Technology
88	Medivir	Health Care	121	Prevas	Information Technology
89	Mekonomen	Consumer	122	Pricer	Information Technology
90	Micronic	Information Technology	123	Proact	Information Technology
91	Midway	Industrials	124	Proffice	Services

Firm #	Company	Industry		Firm #	Company	Industry
125	ProfilGruppen	Materials		157	TMT One	Financials
126	Pronyx	Information Technology		158	Tornet	Financials
127	Protect Data	Information Technology		159	Traction	Financials
128	Pyrosequencing	Health Care		160	Tricorona	Materials
129	Q-Med	Health Care		161	Trio	Information Technology
130	Ratos	Financials		162	Tripep	Health Care
131	Readsoft	Information Technology		163	TurnIT	Information Technology
132	Realia	Financials		164	Utfors	Telecommunication Service
133	Resco	Information Technology		165	Wallenstam	Financials
134	Riddarhyttan	Materials		166	VBG	Industrials
135	RKS	Information Technology		167	Wedins	Consumer
136	Rottneros	Materials		168	Westergyllen	Industrials
137	Saab AB	Industrials		169	Wihlborgs	Financials
138	Scand Online	Entertainment		170	Viking Telecom	Telecommunication Service
139	Semcon	Industrials		171	Vision Park	Entertainment
140	Senea	Industrials		172	Xponcard	Industrials
141	Sintercast	Consumer		173	Öresund	Financials
142	Skanditek	Financials				
143	Softronic	Information Technology				
144	Song Networks	Telecommunication Service				
145	Strålfors	Industrials				
146	Sv Orient Lin	Industrials				
147	Sweco	Industrials				
148	Svedbergs	Consumer				
149	Switchcore	Telecommunication Service				
150	Säk	Financials				
151	Tele2	Telecommunication Service				
152	Teleca	Information Technology				
153	Teligent	Information Technology				
154	Thalamus	Telecommunication Service				
155	Timespace…	Telecommunication Service				
156	Tivox	Industrials				