INTERNAL CAPITAL MARKETS
AND COMPANY VALUE

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ABSTRACT

Ever since the first conglomerates were formed in the 1920ies, researchers have examined advantages and disadvantages of conglomeration, and if it creates or destroys shareholder value. The purpose of this thesis is to examine how variables that are descriptive for internal capital markets, one of the main features of conglomerates, affect the market value of Swedish company groups. Our findings suggest that internal capital markets destroy value in company groups with operations in capital intense industries, while there is no evidence that this is true for company groups with operations in less capital intense industries. In capital intense industries, the strongest negative influence on company value is the dispersion of the internal capital market, which decreases the market value of the average company group by 5.1 percent. This is followed by the complexity, which decreases the market value by 4.9 percent. Finally, the volume of transfers in the internal capital markets decreases the market value by 0.6 percent. In extreme cases however, the value destruction is substantially more severe.

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1 INTRODUCTION

In the mid 1920ies, a new type of company began to emerge; the conglomerate. These companies were highly diversified, with operations in a variety of industries. Ever since, researchers have examined the advantages and disadvantages of conglomeration and how it destroys or creates shareholder value. In the last few decades, the consensus has been that conglomerates destroy value, as evidence have indicated that the market value of conglomerates is less than the sum of the stand-alone value of their subsidiaries. This is commonly referred to as the "conglomerate-"or "diversification discount".[1] A wide variety of explanations for the discount has surfaced including agency problems, inefficient capital allocation, and overinvestment in underperforming segments.

1.1 THE HISTORY OF MERGERS AND CONGLOMERATES

Diversification is a relatively new phenomenon in the corporate world. Although the first diversified companies emerged in the 1920ies, the trend did not pick up until much later. The wave of diversifying mergers began in the mid 1950ies in the United States. Previously, the U.S. market had experienced two waves of mergers, during the periods 1898 to 1904 and 1925 to 1931. In the former period, the typical mergers were horizontal mergers between market leaders in the industries, with the formation of U.S. Steel as a prominent example. In the latter period, mergers where characterized by small companies being acquired by larger competitors (Morgan, 1977). During the 1960ies, corporate diversification became the most common reason for companies to merge, and a large number of conglomerates were formed until the first years of the 1970ies. Evidence suggests that during the 1960ies, conglomerates were traded at a small premium, or at least not at a discount. However, this was not true in the 1970ies (Klien, 2001). During that time, conglomerates began to trade at a discount. Triggered by the discount and by the alleged disadvantages of conglomerates, managements and capitalists began to engage in leveraged buyouts and hostile takeovers during the 1980ies. The popular idea was to take control over a conglomerate and to break it up into smaller, specialized, companies. Although the trend of leverage buyouts weakened in the 1990ies, the popularity of conglomeration has never returned.

1.2 PURPOSE AND SCOPE

The purpose of this thesis is to examine the extent to which internal capital markets affect the market value of company groups. We will examine the effect, which three variables that are descriptive for internal capital markets, have on the market value. These variables are the value of capital transfers in

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[1] The diversification discount should not be confused with the holding company discount that is prevalent in companies such as Investor, Industrivärden and Latour. Please refer to section 1.4 for the definition of the holding company discount, and the diversification discount.

the internal capital market, the dispersion, and the complexity of the internal capital market. We will not constrain ourselves to the typical definition of a conglomerate. Instead we will examine internal capital markets in company groups.[2]

The study encompasses company groups that at some point in time, during the period 1997 to 2003, were quoted either on the Stockholm Stock Exchange, the Nordic Growth Market (NGM), Nya Marknaden, Aktietorget, SBI-listan, IM-listan, or Göteborgslistan.

1.3 CONTRIBUTION

In a time when merger activity is about to reach a historical peak, it is important to consider its advantages and disadvantages. Some of the current mergers can be classified as conglomerate mergers. There is still some debate among researchers on whether conglomeration creates or destroys value, and since internal capital markets are one of the main features of conglomerates, it is important to understand how they affect market value. The access to the *MM-partners'* database enabled us to utilize uniquely detailed financial data, that has not been available in earlier studies. We were thereby able to measure the activity of internal capital markets more precisely than previously has been possible. Since we could use more precise measures of the effect that internal capital markets have on company value, we were able to pinpoint where a substantial part of the diversification discount arise, and explain why this is the case and how conglomerates can best remedy this. Thereby, this thesis hopes to help investors to find conglomerates that can be refined, and help conglomerates to create more shareholder value.

Although a large amount of research has been conducted on conglomerates and internal capital markets in the United States, the topic has not been thoroughly examined in Europe. To our knowledge, our study is the first large scale examination of how internal capital markets affect the value of Swedish company groups. By adding evidence from Sweden on how internal capital markets contribute to the value of company groups, we believe that another piece of the diversification discount puzzle will be added.

1.4 DEFINITIONS

Some of the company structures referred to in this thesis is sometimes not used in a precise manner in the regular finance literature. The concepts *company group* and *conglomerate* are sometimes is used interchangeably. Since the distinction between different companies and company structures is of

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[2] Please refer to section 1.4 for the definition of a conglomerate and a company group.

importance in this thesis, it is vital to present them as they are defined in this thesis. Some other concepts that are important to understand are also defined in this section.

Associated Company

An associated company is a company in which the total control of the parent's voting rights is between thirty and fifty percent. Even though a company group often has substantial control over an associated company, the equality principle of shareholders will leave it impossible for the company group to fully integrate the associated company into its internal capital market.

Company Group

A company group refers to a group of companies in which one of the companies (the parent) has full control over the other companies. Another condition that must be fulfilled in order to be included in this thesis is that the group must entail at least one company with a subsidiary, and thus have an internal capital market.

Conglomerate

A conglomerate is a special case of company group. There are two conditions that must be fulfilled for a company group to be classified as a conglomerate. The first condition is that the group must entail at least one company with a subsidiary, and hence have an internal capital market. The second condition is that the companies within the group must operate in at least two different SNI-code segments.[3]

Diversification Discount

The diversification discount refers to the generally accepted fact that most quoted conglomerates are traded at a value that is less than the combined value of the subsidiaries that the conglomerate entails. Since the market value of the conglomerate is less than its "true" value, the company is said to be traded at a discount.

Group Contribution

A group contribution is an accounting entry that is tax deductible for the donor and tax liable for the recipient. The purpose of group contributions is to smooth profits within a conglomerate. Group contribution can only be made within company groups, and to or from Swedish companies. Because

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[3] Please refer to section 1.4 for the definition of the SNI-coding system.

of its nature as purely being an accounting entry, a group contribution does normally not lead to an actual transfer of cash.

Holding Company Discount

The holding company discount refers to the fact that quoted holding companies are traded at a value that is less than the combined value of the shares they hold in other companies. Since the market value of the holding company is less than the market value of its assets, the company is said to be traded at a discount.[4]

SNI-Code

The SNI-coding system is used in Sweden to classify which industry a certain company is operating in. It is a classification system that consists of a five-digit code that every registered company is assigned. The first two digits define the broad industry that the company is active in, such as mineral extraction. For each of the following digits the industry is more and more narrowly defined. In the five-digit form, each code thus defines a relatively specific industry, such as extraction of uranium.

1.5 THESIS OUTLINE

The remainder of this thesis is structured in the following way. First, we present the theoretical foundation of the study. This includes the advantages and disadvantages of corporate diversification, and a review of the specific regulatory issues that influence the internal capital markets of Swedish company groups. Thereafter, we present our hypotheses. This is followed by a methodology section in which our model and its variables are presented. The subsequent section includes a description of our data set and comments about missing data. Next, the empirical results are reported, the accuracy of the hypotheses is discussed, and our results are analyzed and compared to previous research results. Finally, we end with conclusions and suggestions for further research.

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[4] In Swedish, this discount is known as "substansrabatt".

2 THEORETICAL FOUNDATION

The valuation of conglomerates has been a popular area of research during the last two decades. Even though most research has been conducted in the last 20 years, the first theory related to internal capital markets was presented by Ronald Coase as early as in 1937.

2.1 EARLY THEORY -THE EMERGENCE OF INTERNAL CAPITAL MARKETS

Coase (1937) was one of the first to argue why companies exist and why they grow. In the classic article *The Nature of the Firm*, he suggested that companies emerge when it is possible for them to internally, i.e. produce what they need within the company, to a lower cost than if they would acquire the resource in the external market. A variety of additional costs is the explanation for why it might be more expensive to buy from the external market rather than to produce internally. According to Coase, these costs encompasses transaction-, information-, bargaining-, and enforcement costs, as well as costs for keeping trade secrets. Coase further argued that increasing the size of the company will initially be beneficial, but that decreasing returns to scale will eventually limit the size of the company. By explaining the existence of companies, he implicitly described the rationale behind the use of internal capital markets. An internal capital market can function as a complement, or a substitute, to external markets by handling certain transactions better and more cost efficient.

2.2 ADVANTAGES AND DISADVANTAGES OF CORPORATE DIVERSIFICATION

The research on the diversification discount and conglomerates has resulted in numerous theories of advantages and disadvantages of corporate diversification. The most prominent advantages include economies of scope, economies of scale, and greater debt capacity. The disadvantages encompass overinvestment, complexity and size, and principal-agent problems. Internal capital markets have been proposed to be both an advantage as well as and a disadvantage.

2.2.1 Advantages of Corporate Diversification

Lower variability of cash flows enables a higher tax shield
A company group with operations in a variety of unrelated industries will, ceteris paribus, experience a lower variability of cash flows than a company with operations in a single industry (Berger & Ofek, 1995). The result is a lower business risk, which should enable the company to take on a lager amount of debt. This implies a higher valuation due to the greater tax shield that the higher debt level generates.

Economies of Scope

The theory of economies of scope proclaims that operations in one business area can create positive externalities for businesses in other areas of operation, in form of internal spill-over effects. These spills-over effects include process innovations, technical innovations, R&D etc. Under the assumption that they only can be created within a single company, corporate diversification would create value. (Barney & Hesterly, 2006)

Managerial economies of scale

It has been suggested that one prominent reason behind the diversifying mergers of the 1960ies was to take advantage of the skills of "super managers". This concept is similar to the concept of economies of scale. Managerial economies of scale are created by making greater use of the abilities of a superior management team replacing an inferior management team. In this way, the company can be run more efficiently, which tend to increase overall shareholder value (Mueller, 1969). Other types of economies of scale have also been proposed to be advantages of corporate diversification.[5]

2.2.2 Disadvantages of Corporate Diversification

Overinvestment

In some conglomerates, the companies have small, if any, capital needs. More specifically, the companies might have no new opportunities for investments in new projects, and low capital needs in production. If the company group simultaneously is producing revenue, a certain problem often arises. This is known as the problem of overinvestment, by which is meant that the company group invests more funds than necessary in internal projects. Simultaneously, the shareholders of the company group might be able to find more profitable investment opportunities elsewhere. In such a situation it would be optimal to distribute the cash to shareholders, instead of retaining the revenue within the company group. The problem of overinvestment has been discussed by Berger and Ofek (1995).

Manager Entrenchment and Empire Building

Managers generally wish to retain their position once they reached as high as they believe they can. One way of securing their position is by entrenching themselves. Entrenchment refers to the situation in which managers make themselves indispensable to the organisation. Some of the ways that this can be done can be value destructing. One possibility is that the manger tries to gain so much power that it is hard to dispose of him. He can decrease the possibility of being replace by

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[5] These include economics of scale in production, R&D, etc.

investing in a wide variety of different businesses, so that the number of people that are qualified enough to understand and run the conglomerate is minimized. The consequences are similar to those of overinvestment, but the incentives are somewhat different. In the case of entrenchment, the manager's incentive is to make himself indispensable, while in the case of overinvestment, the incentive might be not to distribute excess cash. By doing this the manager makes himself indispensable, and entrenches himself in the organization. This goes hand in hand with related concept of empire building. This concept refers to some managers' strive to increase their power. It is done by increasing the size of the company, thus increasing the manager's empire and his power. Generally, this leads to the company group over expanding, which often leads to decreased shareholder value.

Equity as an option

Mansi and Reeb (2002) presented a quite different objection against corporate diversification that stems from basic finance theory. Theoretically, one can consider the equity of a company as a call option with a strike price equal to the size of the company's debt. As the risk or volatility increases, the value of the option increases. Corporate diversification reduces the overall business risk of the company group. Therefore, Mansi and Reeb (2002) conclude that diversification is not beneficial for shareholders, since it reduces risk and thus the value of their option. The opposite is true for bondholders, who gain when a leveraged company diversifies.[6] [7]

2.3 THE IMPACT OF AN INTERNAL CAPITAL MARKET

The creation of an internal capital market has both positive and negative effects for the company group. The two main arguments in favour of an internal capital market is that ineffective external markets makes it less expensive to finance projects and businesses internally than externally, and that they provide opportunities for tax planning. The two main arguments against internal capital markets are that some subsidiaries within a company group are given inefficiently large capital budgets, and that an internal capital market allocates investment funds less efficiently than the external capital market.

2.3.1 Advantages of an internal capital market

Internal financing is usually more cost efficient than external financing. The two most common choices that a company faces when it needs to raise resources for a project externally, is to conduct a

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[6] The underlying assumption is that the debt level is fixed. An increased debt level might lead to higher costs of debt, which offset the gain for bondholders.
[7] Mansi and Reeb (2002) find that the diversification discount is in fact related to leverage According to their findings, all-equity financed companies did not display any discount while increased leverage led to a discount.

public offering or to take on debt.[8] Both a public offering and rising of external debt is associated with high costs.

Underpricing of equity issues

There are basically two ways of issuing equity, either by an initial public offering (IPO), which occurs when a company issues equity to the public for the first time, or by a seasoned equity offering (SEO), which is the term for all equity offerings after the IPO. Of course, in the case of a company seeking additional financing, SEO:s is the more common of the two. However, IPO:s of subsidiaries within the company group is also a likely possibility. Loughran and Ritter (2002) reports that the underpricing of IPO:s was on average 14 percent in a sample of 3025 U.S. companies that went public during the period 1990 to 1998. There are also direct costs of IPO:s, including the underwriting spread, lawyer fees, and accountant costs. In an examination of U.S. IPO:s by Lee et al. (1996) the direct costs amounted to 11 percent. Adding on the indirect costs, this amounts to a total cost of 25 percent for the average U.S. IPO. In the case of SEO:s, the direct costs are somewhat lower than for an IPO, mainly since the process does not demand as rigorous paper work and advertising. Lee et al. (2002) found that the average direct cost of SEO:s in the U.S. amounts to 7.1 percent, while Mola and Loughran (2003) found that the average underpricing of SEO:s was 3 percent in a sample of 4814 U.S. SEO:s during the period 1986 to 1999. Thus, the total cost of a SEO:s is about 10 percent. The costs of equity offerings can be completely avoided if the company chooses to finance the subsidiary with internal resources.

Cost of debt financing

The same reasoning holds for external debt, even though the cost for this form of financing in the last few years has been at a historical low. With the present situation of low interest rates, the direct cost of external debt can in some extreme cases be completely offset by the positive effect generated by a greater tax shield. However, taking into account not only the direct cost of debt, i.e. interest and amortization, but also the additional cost of financial distress, the cost of debt is much higher. The cost of financial distress entails bankruptcy costs and costs for the conflicting interest of bond- and shareholders (Brealey & Myers, 2003). Adding on the costs of financial distress, the total cost of debt is always higher than the cost of internal financing.

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[8] This is somewhat simplified since external debt encompasses a wide variety of instruments such as convertible bonds, mezzanine debt, warrants etc. The specific means of external debt financing is not relevant for the purpose of this thesis, and the reasoning can be applied for all types of external financing.

More efficient corporate tax shield

Another argument in favour of an internal capital market is that it provides tax benefits for the company group as an entity. There are two main cases in which this is possible. The first case is a company group in which the subsidiaries are in different stages of development. In this case, the company group will usually entail subsidiaries that are generating profits, as well as subsidiaries that are running losses. A mature subsidiary is often generating profits, while subsidiaries that are in an earlier stage of development (emerging companies) often are producing losses due to substantial R&D costs, and heavy investments in infrastructure. The second case is a company group that encompasses subsidiaries that are counter-cyclical in their nature. Under certain market conditions some subsidiaries are producing losses, while some are generally generating profits. Examples of such companies are airlines and oil producers. As the market price for oil increases, so does the price for air fuel. Since the market price of oil is the prime determinant for the revenue of oil producers, and air fuel is one of the main costs for airlines, these companies will produce revenue in a counter-cyclical pattern. In both the first and second example, these company groups can effectively transfer profits generated by one subsidiary, to another subsidiary that is making losses, and thereby avoid taxation of profits.

Lower personal taxes

Another argument in favour of an internal capital market is that it provides tax benefits for shareholders and investors. This is best illustrated by an example. One quoted company produces high revenue but has low capital needs in their operations, and few opportunities for new profitable investments. Thus, the company has an overflow of cash each fiscal year. This cash is, in lack of capital needs, distributed to the shareholders in the form of dividends. The shareholders are obliged to pay personal taxes for the dividends.[9] A second company is in an early stage of development. The company does not produce any revenue, but needs capital to be able to make the necessary investment in developing their new products. Thus, the company turns to the stock market for funds, and the shareholders of the first company use their dividends to invest in the second company. This way of financing the second company is not optimal. If the two companies instead would belong to the same company group, the first company could have used its revenue to directly cover the second company's capital needs. This would save shareholders the 30 percent that they had to pay in personal taxes. Thus internal capital markets can lower personal taxes, as well as corporate taxes.

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[9] In Sweden dividends is counted as income of capital, and is taxed by 30 percent.

2.3.2 Disadvantages of an internal capital market

The two most common arguments against internal capital markets are that they generate inefficiently large capital budgets, and that the allocation of capital is less efficient than when external financing is used. There is thus both a problem with the size of the capital budget, and the investment allocation.

General Agency Problems

Williamson (1985) introduced agency problems as an explanation to why corporate diversification destroys value. The theory provides an explanation to why the problems of inefficiently large capital budgets, and worse allocation of capital, arise in company groups. Williamson (1985), states that when moving transactions from a high-powered incentives environment (the external market) to a low-powered incentives environment (the company) value is lost due to agency problems. Several researchers have contributed with more specific models of the agency problems that arise in conglomerates. In particular, these models address the question of agency costs and inefficient capital allocation.

Rent-Seeking and "Socialism"

The usage of an internal capital market brings about agency problems specific to company groups. Scharfstein and Stein (2000) investigated one of these; rent-seeking by divisional managers. They developed a two-period model that shows how rent-seeking behaviour from divisional managers destroys the function of the internal capital market. Through rent-seeking behaviour, the divisional managers persuade the company group CEO to give them preferential treatment when resources are allocated. This leads to what Scharfstein and Stein (2000) call "socialism", which implies that strong businesses feed the weaker businesses.

Decreased Managerial Incentives

In the same spirit as Scharfstein and Stein (2000), Brusco and Panunzi (2003) constructed a model in which, even if the management allocates recourses efficiently ex post, the internal capital market destroys value. The reason for this is that if the management moves funds between divisions, the divisional managers' incentives are decreased ex ante. The advantages of allocating resources efficiently can be more than offset by the decreased managerial incentives.

Complexity and Size

A large internal capital market increases the complexity and size of a company. This is what happens in company conglomeration. Increased complexity and size of a company, and the internal capital market, is a disadvantage in two was. First, the complexity affects the transparency of the company

group in a negative way. It is harder for the management to have full control over the resources, opportunities, and manager capabilities in all business segments. Thus it will be harder for the management to transfer resources to the subsidiaries with the best investment opportunities. Second, in the investors' perspective, a company with a complex internal capital market is even less transparent than a company with a less complex capital market. Investors will thus to a much lesser extent than in the case of stand-alone companies, be able to value the company correctly.

2.4 REGULATORY ISSUES OF CAPITAL TRANSFERS IN COMPANY GROUPS

The legal aspects of capital transfers are mainly twofold. First, the equality principle of shareholders must be respected. Second, there are some tax issues, provided that the company group entails at least one foreign subsidiary. As long as considerations are made for these issues, company groups are free to reallocate cash openly, as well as hidden. The ways in which transfers are done openly are by (Holmström, 2006):

- *Dividends*, which is a transfer of cash from a subsidiary to the parent.
- *Share issues*, which normally is cash transfers from a parent to a subsidiary, but could also be from one subsidiary to another.
- *Infusion of capital*, which is a transfer of cash from the parent to a subsidiary.
- *Loans*, which basically is a relocation of cash between any subsidiaries in the company group.
- *Interest payments*, which is a consequence of the loans.

These ways of openly relocating cash between subsidiaries in a company group should not be confused with group contributions[10], which merely are accounting entries with no real cash implications, designed to evade tax.

Hidden transfers between subsidiaries in a company group can be done in a variety of different ways. The two most obvious are transfer pricing of products below or above market price, and sales of assets for a price that differs from the actual value of the asset. There are however, several other ways a hidden transfer may arise. It could be through license fees, franchise fees, marketing contributions, consultancy fees etc. The main reason why a company group may want to hide capital transfers is for tax avoidance purposes when the company group is operating in more than one country. It could also simply be a result of the company's financial control system.

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[10] Please refer to section 1.5 for the definition of a group contribution.

3 HYPOTHESES

Researchers have used a wide variety of approaches to examine conglomerates.[11] Most research have not focused on the internal capital market per se, but only concluded that it is one of the variables that affect the market value of companies. However, those studies examining internal capital markets provide a starting point for our study. The studies have mainly focused on two important problems that arise in internal capital markets. Lundstrum (2003) focused on internal capital markets and agency problems, while Billett and Mauer (2000 & 2003), Fauver, Houston and Naranjo (2003), Rajan, Servaes and Zingales (2000), and Shin and Stulz (1998), focused on different forms of inefficient capital allocation and agency problems. We find that although their research provides some insights of why internal capital markets destroy value in company groups, the empirical evidence on the specific role of internal capital markets is still insufficient. Therefore, we will use the previous research as a starting point, but we will elaborate and introduce new variables that might shed some light on the possible value destruction or creation due to the use of an internal capital market. Specifically, we will examine the following hypotheses about internal capital markets and their effect on the value of Swedish companies:

Hypothesis 1: Active internal capital markets destroy more value than less active internal capital markets.
Most previous research has concluded that internal capital markets destroy value. Thus it is reasonable to presume that less active internal capital markets destroy less value than more active internal capital markets. For example, when several subsidiaries are engaged in cash transfers, rather than when only two parties are involved, there is more leeway for managers, which increases the risk of agency problems occurring.

Hypothesis 2: Internal capital markets with higher volume of capital transfers destroy more value than internal capital markets with less volume of capital transfers.
The reasoning is the same as for *hypothesis 1*. The higher the amount (volume) of money transferred in the internal capital market, the higher the impact on the total value of the company. A higher volume of capital transfers should mean greater value destruction. The logic is that if internal capital markets are inefficient, the damage is greater the higher the volume of money transferred.

Hypothesis 3: Complex internal capital markets destroy more value than less complex internal capital markets.
The complexity, i.e. the number of companies and layers of subsidiaries involved, of the internal capital market affects the value of the company in a variety of ways. First of all, a company with a

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[11] Please refer to section 6.4 for an examination of previous research.

complex internal capital market is less transparent than a company with a less complex capital market. Investors will thus to a much lesser extent be able to value the company correctly. Second, in less transparent companies, it will be harder for the management to transfer resources to the subsidiaries with the best investment opportunities. Thus the complexity should affect value in a negative way.

Hypothesis 4: Internal capital markets destroy more value in capital intense industries, than in less capital intense industries.

As found in previous studies, there are industry differences with regard to the conglomerate discount. Since such differences have been documented, we find that it is reasonable to believe that internal capital markets have different impacts in different industries. We believe that the degree of capital intensity of the company group is an important factor to the extent the internal capital market destroys value. The reason is that capital intense industries have previously been found to exhibit two characteristics that we believe increases the value destructive power of the internal capital market; related diversification, and investments in tangible assets.[12] First, there is a substantial difference between the types of conglomerates in capital intense contra non-intense industries. Capital intense conglomerates are more often than not related diversified, meaning that the subsidiaries operate in related businesses. Less capital intense conglomerates are generally unrelated diversified, i.e. the subsidiaries operate in widely unrelated businesses. While conglomerates with subsidiaries that operate in unrelated industries will experience a reduced risk that enables a higher leverage and an increased tax shield, conglomerates with subsidiaries that operate in related industries will not.[13] Moreover, this would introduce higher agency costs in capital intense conglomerates, since the competition for investments is larger when the subsidiaries do not exhibit large differences amongst each other. Second, capital intense industries invest in a higher degree of tangible assets, which increase the visibility of the internal capital markets actions for investors. If investors can perceive the actions of the internal capital market more easily, they can also penalize the company for using it.

The most exact way to examine how capital intensity affects market value, would be to calculate a separate capital intensity measure for all company groups in the sample. This would however be difficult and very time consuming, and hence out of the scope of this thesis. We leave this to future research and instead use the average industry capital intensity as a proxy for which companies that are capital intense.

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[12] This relationship was first found by Barton (1988) and has since then been supported by other studies.
[13] Please refer to the theories of Berger and Ofek (1995), and Mansi and Reeb (2002) in section 2.2.

4 METHODOLOGY

Our way of identifying parameters descriptive of internal capital market differs from previous research. Therefore, we have developed a new model that entails the three dimensions of an internal capital market that we believe are the most important for its influence on the value of a company group; its dispersion, volume of transfers, and complexity. Two of these, the dispersion of the internal capital market, and the volume of transfers, are variables that describe the activity of the capital market. We have chosen a dependent variable that is related to the value of the company, and included a number of control variables in order to make sure that the explanatory variables only capture the effect of the factors of interest.

4.1 VARIABLES USED TO EXAMINE INTERNAL CAPITAL MARKETS

4.1.1 Explanatory Variables

The Complexity Variable

In general, most company groups are structured in the same way. The company group encompasses a parent and a number of subsidiaries. The subsidiaries can own their own subsidiaries, which in turn can have subsidiaries. In theory, an unlimited amount of layers of subsidiaries is possible. Further, in some company groups, one subsidiary can be owned by two or more other subsidiaries within the company group. The structure of a company group can thus be quite complex. This leaves a possibility for some alternative variables, which could be used to describe the complexity of a company group. One alternative would be to calculate the number of layers of subsidiaries within the company group.[14] Another way would be to count the total number of subsidiaries. As the number of layers is rather complicated and sometimes unfeasible to calculate, e.g. in the case of subsidiaries with cross ownership or where we lack data in one or several layers, we decided to chose the other alternative. Hence, the variable used to describe the complexity of the internal capital market is the number of subsidiaries.

The Activity Variables

The internal capital market essentially consists of capital transfers between the subsidiaries within the company group. Open capital transfers can as previously described, come in form of dividends, share issues, infusions of capital, loans, and interest payments. Capital transfers can also be hidden, as in the case of transfer pricing and marketing contributions. It should be emphasized that only open capital transfers are captured in this study.

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[14] Please refer to section 5.2 for an explanation.

The first and second hypotheses are related to the dispersion, and volume of transfers of internal capital markets. Hence, we needed to define and measure these characteristics. We were able to consider a variety of methods of measuring the volume of transfers of the internal capital market, by first defining what an activity in the internal capital market is. An activity in the internal capital market can be defined as either the net contribution of cash received, or the net contribution paid by one subsidiary to the rest of the company group. These two ways of defining an activity shall under all circumstances be equivalent, and total the same amount in the company group as a whole. In our model, we have used the absolute value of the net contributions to be sure not to miss any transfers. The cash flows data allow us to take into consideration changes in company group internal debt, interest payments to group companies and different kinds of changes in subsidiaries equity, excluding net profit and changes in the ultimate parent's equity.

To attain the volume of transfers' variable in the internal capital market we simply sum up all internal cash flows and divide by total assets. The normalization with assets is natural, as we want a measure independent of the companies' sizes. The intuition behind this variable is that in a company group with higher volume, relative to its size of capital transfers between subsidiaries, the impact of the internal capital market is stronger. Formally, it is calculated in the following way:

$$\text{Cash Flow/ Assets} = \frac{\sum |CF|}{\sum Assets}$$

The problem with using this measure alone, would be that it does not take into account the number of subsidiaries that are active in the capital market. A company group consisting of only a parent and a subsidiary might have a fairly active internal market, but few would disagree to the fact that a company group encompassing twenty subsidiaries, with the same volume of transfers in the capital market, is larger. To overcome this problem, we have utilized the Herfindahl Index in our model. The Herfindahl Index is normally used as an indicator of market concentration (or competition) within an industry, and it is in that setting defined as the sum of squared market shares of individual companies over the squared total market. When used in our setting, the inverse Herfindahl Index indicates how many equally contributing subsidiaries the internal capital entails.[15]

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[15] The meaning of the Herfindahl index differs, depending on which variable we have indexed.

The Herfindahl indexed cash flow variable captures the dispersion of the internal capital market. Formally, it is calculated in the following way:

$$\text{Herfindahl Indexed Cash Flow} = \left(\sum_i \left(\frac{|CF_i|}{\sum_i |CF_i|} \right)^2 \right)^{-1}$$

CF is the internal cash flow from each subsidiary to the rest of the company group. As mentioned earlier we use the absolute value of cash flows in order to capture both inflows and outflows, as data in many cases is incomplete. Thereby, we have created a factor that increases by the number of subsidiaries engaged in the internal capital market. Consequently, the factor created describes the dispersion of the internal capital market.

Interaction Effect

The Interaction effect measures the interacting effect of the volume of transfers and dispersion of the internal capital market. There is an important difference between the single variables and the interaction effect. The effect of the dispersion variable captures the effect it has directly on the dependent variable, holding the other variables constant. The effect of the interaction variable captures the effect that the dispersion variable has on the dependent variable *as* the volume of transfers variable *varies*. The reason why we include this variable is that a company could have either a high dispersion with a low volume of capital transfers, or a high volume of capital transfers with a low dispersion, and it would still have a minor effect on the value of the company. When the two variables are combined, however, intuitively there would be room for more value destruction. The interaction effect is calculated by multiplying the Herfindahl indexed cash flow variable with the cash flow over assets variable.

$$\text{Interaction Effect} = \left(\sum_i \left(\frac{|CF_i|}{\sum_i |CF_i|} \right)^2 \right)^{-1} \cdot \frac{\sum |CF|}{\sum Assets}$$

4.1.2 Explanatory Variables in Practise

In order to illustrate how we in practice examine the internal capital markets, we have constructed a theoretical example below. Two hypothetical conglomerates have been created; conglomerate A

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consists of four first-layer subsidiaries and one second-layer subsidiary, and conglomerate B consists of three first-layer subsidiaries (see *figure 1,* and *figure 2*). The example has been constructed to illustrate that two structurally different conglomerates of differential sizes and volumes of capital transfers, still can have equally dispersed internal capital markets. The different types of capital transfers in the conglomerates are presented in *table 1* and *table 2*. Note that the transfer pricing between subsidiary a4-1 and subsidiary a4 has not been captured in our study since it is not possible to find such data in practice, nor have capital transfers with foreign subsidiaries been captured. *Figure 1* and *figure 2* illustrates the structure of the two conglomerates, and *table 1* and *table 2* reports the assets of the companies, and the internal cash flows of the respective capital markets.[16]
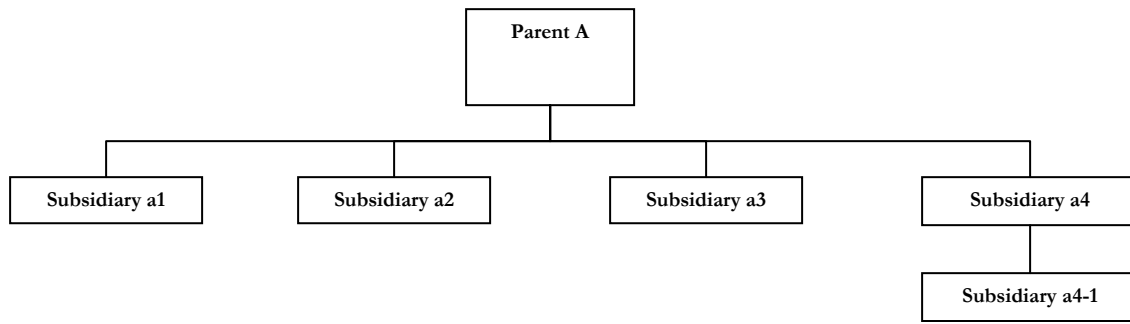
Figure 1, Conglomerate A Structure

		Receiver					
		Parent A	*Subsidiary a1*	*Subsidiary a2*	*Subsidiary a3*	*Subsidiary a4*	*Subsidiary a4-1*	*Assets*
	Parent A	----	800 (CI)	500 (SI)		650 (SI)	300 (CI)	25000
Sender	*Subsidiary a1*	200 (D)	----	300 (L), 15 (IP)		75		2500
	Subsidiary a2	100 (D)	100 (L), 5 (IP)	----		200 (L), 10 (IP)	100 (L), 5 (IP)	1500
	Subsidiary a3				----	80 (L), 4 (IP)		200
	Subsidiary a4	750 (D)	300 (SI)		100 (L), 5 (IP)	----	300 (L), 15 (IP)	6000
	Subsidiary a4-1	75 (D)		400 (L), 20 (IP)		100 (TP)	----	800

Table 1, Conglomerate A: Internal Cash Flows
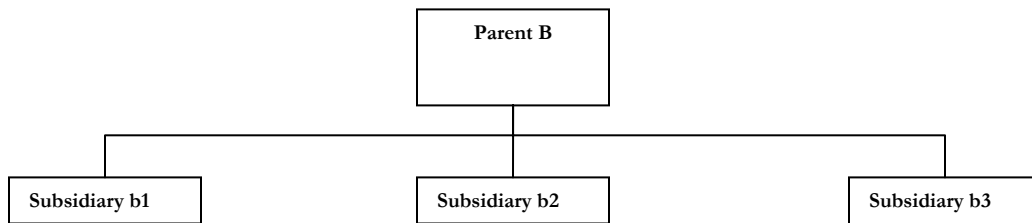
Figure 2, Conglomerate B Structure

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[16] D = Dividend, SI = Share Issue, CI = Capital Infusion, L = Loan, IP = Interest Payment (5 percent of the loan).

	Receiver				
	Parent B	*Subsidiary b1*	*Subsidiary b2*	*Subsidiary b3*	*Assets*
Parent B	----	300 (CI)	500 (SI)	100 (SI)	8000
Subsidiary b1	75 (D)	----	200 (L), 10(IP)		700
Subsidiary b2	100 (D)	100 (L), 5 (IP)	----		1000
Subsidiary b3	25 (D)			----	300

Table 2, Conglomerate B: Internal Cash Flows

Calculating the explanatory variables for both conglomerate A and conglomerate B render the results presented in *table 3*. As the results show, conglomerate A has more than twice as large volume of capital transfers as conglomerate B and is almost twice as complex, but both conglomerates have the same dispersion of the internal capital market.

	Conglomerate A	**Conglomerate B**
Volume of Trans.	11.361	5.225
Dispersion	0.150	0.150
Interaction Effect	1.707	0.781
Complexity	5	3

Table 3, Explanatory Variables

4.1.3 Dependent Variable

The dependent variable had to depict the value of the company, since it is the focus of the thesis. The variable also needed to be independent of the size of the company, and thus we were not able to use the market value as it was. Instead, the value was related to a size variable. The natural candidates were the market-to-book values of total assets and net tangible assets. We have chosen to use the market-to-book value of net tangible assets, as this variable is not affected by excess cash. Net assets also exclude intangible assets, such as patents.[17] This is beneficial for our study, since such assets sometimes inflate the book value. Such inflation could introduce a systematic bias, since intangible assets constitute a greater part of total assets in some industries, e.g. computer software developers.

4.1.4 Control Variables

Degree of Diversification

The first control variable included, determines the degree of diversification within the company group. Based on Berger and Ofek's (1995) study, we have defined this as the number of SNI-segments that the company group is active in.[18] To make this measure comparable between companies, the inverse Herfindahl index was used to calculate how many equally sized (SNI-segmented) subsidiaries each group theoretically entails. To determine the part of a company group

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[17] Please refer to appendix 1 for the exact definition of net assets.
[18] The SNI-code identifies the industry in which the company has operations. Please refer to section 1.4 for the definition of SNI-Code.

that a particular SNI-segment constitutes we have used sales figures for each subsidiaries. Based on Berger and Ofek's (1995) results, we expect the variable to have a negative coefficient.

$$\text{Degree of Diversification} = \left(\sum_i \left(\frac{|SNI_{sales\,i}|}{\sum_i |SNI_{sales\,i}|} \right)^2 \right)^{-1}$$

Another way of measuring the degree of diversification would have been to count the number of segments in which the company is active. However, using this method, we would have lost comparability between companies. One example of such a situation is the case of company group A, that is active in 20 segments, but have 90 percent of their sales in one of these segments, and company group B, that is active in 10 segments, but has equally large sales in each segment. We would like to consider company group B more diversified than company group A. But if only the number of segments that the company groups are active in would be counted, company group A would be twice as diversified as company group B. By using the Herfindahl index, this problem is solved.

Leverage Ratio

In the spirit of Mansi and Reeb (2002), who argued that leverage is positively correlated with the diversification discount and negatively correlate with the value of a conglomerate, we have included leverage as a control variable. It is important to control for leverage, since leverage has a well documented effect on the market value of a company. If the leverage is too high, this induces bankruptcy costs, and if leverage is too low the company is not using the optimal tax-shield. In both these situations, the leverage ratio will lower the company's market value. The leverage ratio is calculated by dividing long-term debt with total assets.

Natural log of Assets

The natural log of assets variable, is a control variable for the size of the company group. It is calculated by taking the natural log of the company's total assets. The variable is logged since it otherwise is non-stationary. The reason why size is controlled for is that the value of a company may be affected by its size, independently of its internal capital market. Since the activity of an internal capital market might be positively correlated with the company's size this is important to control for. Another reason why we use the natural log of assets is that this seems to be a standard variable in previous studies. For example, this variable was used as an explanatory variable by Lundstrum (2003),

who found a negative effect on the market value, and by Lins & Servaes (2002) who found a positive effect on the market value.

EBIT Margin

EBIT margin controls for the profitability of the company group. Profitable companies are usually higher valued than companies that do not produce profit. The effect of profitably is not of direct interest in this thesis, and hence it is important to control for it. EBIT margin is calculated by dividing the conglomerate's operating income by its total sales. This variable was used as an explanatory variable by Morck et al. (1988) and by Lins & Servaes (2002), who both found a positive coefficient.

Year Dummy

Since our data encompasses information from the time period 1997 to 2003, we introduced year dummies. The problem with the time period is that it entails an extreme bull market and a bear market. During the bull market during the first part of the time period until the early 2000s, most companies were valued at extremely high multiples. A substantial correction was made in the following years of bear market. Thus, there is probably a substantial difference in the average market-to-book values of the two sub-periods, due to the differences in the market climate. We have controlled for this by introducing a dummy for each year. These dummies take on the value 1 if the observation is from a certain year, and the value 0 if it is not. Defined this was, we expect positive signs for the years 1998 and 1999, around zero for 2000, and negative signs for the years 2001 and 2002.

4.2 MODELLING

We have run a fixed effects regression and a random effects regression. The Hausman Specification test was used to evaluate the models, and the model that performs best in our setting was chosen; the fixed effects estimation model.[19]

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[19] Please refer to appendix 2 for the Hausman specification test.

The primary model with explanatory variables is stated below.

$$MtB = \beta_1 + \beta_2 HCF_{i,t} + \beta_3 CFA_{i,t} + \beta_4 IE_{i,t} + \beta_5 NS_{i,t}$$

Where the abbreviations expresses the following variables:

MtB = Market-to-Book value of net assets

HCF = Herfindahl indexed Cash Flow

CFA = Cash Flow over Assets

IE = Interaction Effect

NS = Number of Subsidiaries

Thereafter, the model was extended with the control variables. The control variables are important elements to capture the effects on the market value previously documented, but not of interest for our study. In its extended version the model is expressed in the following way:

$$MtB = \beta_1 + \beta_2 HCF_{i,t} + \beta_3 CFA_{i,t} + \beta_4 IE_{i,t} + \beta_5 NS_{i,t} + \beta_6 DD_{i,t} + \beta_7 LR_{i,t} + \beta_8 LNA_{i,t} + \beta_9 EM_{i,t}$$
$$\beta_{10} YD99_{i,t} + \beta_{11} YD00_{i,t} + \beta_{12} YD01_{i,t} + \beta_{13} YD02_{i,t}$$

Where the additional abbreviations expresses the following control variables:[20]

DD = Degree of Diversification

LR = Leverage Ratio

LNA = Natural log of Assets

EB = EBIT Margin

YD99 = Year Dummy for 1999

YD00 = Year Dummy for 2000

YD01 = Year Dummy for 2001

YD02 = Year Dummy for 2002

After running the regression to examine hypothesis 1 to 3, we turned to the last hypothesis. This hypothesis was examined by running the same regressions as for the first three hypotheses, with the difference that two separate regressions were run; one for the industries that were classified as being capital intense, and one for the industries that were classified as being less capital intense.[21] The classification of which industry a company group belongs to has been made on basis of the group parent's reported SNI-segment.

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[20] To avoid the dummy-variable trap, a year dummy for 1998 was not included.

[21] Please refer to appendix 3 for a list of industries and the classification of industry capital intensity.

5 DATA

To examine our hypotheses, we have used panel data, i.e. observations of a number of companies over a number of years. We have used the broader definition company group, instead of conglomerate, to avoid the problems associated with small samples. This increased the sample size significantly.

5.1 THE DATA SAMPLE AND THE SOURCES

Three different types of data were needed in this study; financial data for both the parents and the subsidiaries, market-to-book values of the companies, and structure data for the company groups. The main data source used was the *MM Partners'* database. This database provides a variety of data for a large number of Swedish companies. All financial information available was used, including full income statements and balance sheets, as well as structure data in the form of SNI-codes. The market-to-book values were retrieved from the *DataStream* database. In the cases where *DataStream* did not provide market-to-book values, these where, whenever possible, calculated from stock prices retrieved from *OMX,* and the number of shares and net assets retrieved from the financial reports of the respective companies found in the database *Affärsdata.*

Since we aspired to put together a sample with a wide variety of companies, all companies quoted during the period 1997 to 2003 on either one of the following Swedish stock markets were included; the Stockholm Stock Exchange, the Nordic Growth Market (NGM), Nya Marknaden, Aktietorget, SBI-listan, IM-listan, and Göteborgslistan. The number of listed companies on these stock markets during the period was 703.[22] These 703 companies had 13 221 subsidiaries, and thus the total initial dataset entailed 13 924 companies. After excluding companies for which it was impossible to retrieve full financial information or market-to-book values, the dataset consisted of 334 quoted companies with 4 942 subsidiaries, totalling 5 276 companies.[23]

Initial Sample Size	703
No Match with Organization Number.	-10
Foreign Group Parent	-71
No Two Year Listing	-28
Company Not Found in MM	-4
Missing Info in MM	-97
Missing Info in DataStream (not found elsewhere)	-159
Number of Observations	**334**

Table 4, Missing observations

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[22] To be exact, 703 companies were listed on either of the exchanges on *the last trading day* of the year during the period 1997-2003.

[23] Please refer to appendix 3 for a list of all quoted companies in the sample.

The decrease from 703 to 334 companies in the dataset can to a large extent be explained by three factors. These are that; the company group has a foreign group parent, that data is missing in the *MM-Partners'* database, and that there is missing information in *DataStream*. As seen in *table 4*, 10 companies were dropped since they could not be matched with an organizational number. In the following step, 71 companies were dropped since they had a foreign group parent. Therefore, we classified them as foreign firms and excluded them since this thesis only concerns Swedish company groups. Next, 28 of the companies in the initial sample were listed less than two years. Since most variables are calculated by subtracting one year's figures by the previous year's figures, we imposed the requirement that a company must be listed on any stock exchange during two consecutive years. This was not the case for a number of companies, mostly listed on the small stock exchanges as SBI-listan and IM-listan. Thus, these companies were dropped. Four companies have been excluded since we have not been able to match the quoted company with any company listed in the *MM-Partners'* database. This problem predominantly exists with regard to companies listed on the smallest stock exchanges. Further, 97 companies was dropped due to missing information in the *MM-Partners'* database. In some cases, two crucial pieces of information are not reported in the database; revenues and assets. Since this information is vital when calculating the cash flow- and asset variables, the difficulty to retrieve the necessary information led us to exclude these companies from the dataset. Secondly, insufficient information with regard to cash flow transfers further limited the number of company groups. However, the main reason for the large drop in the number of included companies is missing data in *DataStream*. 159 companies were dropped because the market-to-book values, or the net assets were not found either in the *DataStream* database or elsewhere. The true number of companies with missing information in the database is 246. However, for 87 out of these companies, the missing information could be found using statistics from *OMX* and information from *Affärsdata*.

5.2 MISSING DATA

In the ideal case, we would have perfect information of all the capital flows between the subsidiaries within a company group, including foreign subsidiaries. This would include all open, as well as hidden capital transfers. To identify open capital transfers between subsidiaries in a company, one needs to analyze the financial reports of the companies. However, all open capital transfers can not be detected. In particular, two types of transfers can not be found in the financial reports; share issues when less than 100 percent of the subsidiary's shares are held by the parent, and shares in the parent owned by a subsidiary.

The hidden transfers are even more complicated to find. Even with full information about all capital transfers within a company group, many assets or products do not carry a market value to compare

the transfer price with. In most cases, the transfer prices will not be available at all. Further, it would be arbitrary to judge the value of consulting services, licenses etc within the company group. Hence, the full value of an internal capital market will only be possible to capture in two situations, either when the subsidiaries do not conduct any business with each other, or when they only engage in business with products where the market values are clearly specified, for instance in case of raw materials.

Furthermore, there is some data that ideally would be available but that unfortunately is not. In the ideal case, the SNI-codes would be reported with respect to sales figures. This would make it possible to perfectly calculate the degree of diversification in a company group. The SNI-codes are however, reported on a subsidiary level and a single subsidiary might operate in several SNI-segments, which brings the effect that the diversification measure becomes a proxy for the true diversification. However, this should not be significant problem, since it is reasonable to assume that most subsidiaries are active only in one SNI-code segment.[24]

The quality of the structure data in the *MM-Partners'* database is another problem. Ideally, we would be able to construct a variable that appropriately describes the complexity of the internal capital market. One way of doing that would be to calculate the number of layers of subsidiaries within a company group. This would require exact information about how the company group is structured. Although it is possible to retrieve structural information of the company groups from the *MM-Partners'* database, the information is not detailed enough to calculate the number of layers of subsidiaries. In the database, each company's group mother company and its mother company is reported. The issue is that, when a company is missing in the database, it is not possible to link its subsidiaries to the ultimate parent, thereby making it impossible to know exactly how many layers there is between the subsidiary and the ultimate parent. Thus, instead of using the *number of layers of subsidiaries* as the complexity variable, we have chosen to use another proxy. Our choice was to use the *number of subsidiaries* in a company group, since we believe that the variable entails similar information regarding the complexity of an internal capital market, as does the number of layers variable. Moreover, the *number of subsidiaries* variable is straightforward to construct and to calculate in a precise manner.

Finally, we have not been able to capture the hidden capital transfers within the company groups in our study. On the other hand, we have been able to capture almost all open capital transfers within

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[24] Or that at least the main part of their sales is directly traceable to the reported SNI-segment.

the Swedish subsidiaries. There was one final important decision that had to be made; *how to handle capital transfers from associated companies*. We have defined transactions with associated companies as purely external and have hence not considered any transactions with associated companies as being part of the internal capital market. The reason for this is that even though a company often has substantial control over an associated company, the equality principle of shareholders will leave it impossible for the company to fully integrate associated companies into its internal capital market.[25]

5.3 LIMITATIONS DUE TO MISSING DATA

In the ideal scenario, we would have access to all data that is needed to calculate the variables we intended to use in the model. However, due to the lack of certain data, we were not able to conduct the study in the optimal way. The greatest limitation was that we were not able to capture any hidden transfers. Therefore, we could not conduct a study of the entire internal capital markets. It is difficult to predict how severe this problem is. We believe that it is not detrimental to the extent that our results can be questioned, since in most cases the volume of *reported* capital transfers should be a sufficient proxy for the true capital transfers.

5.4 DESCRIPTION OF SWEDISH COMPANY GROUPS

Table 5 reports the summary statistics of the explanatory, and the dependent variables. Of the 334 company groups in the final sample, the average company group had a market-to-book-value of 3.06, entailed almost 19 subsidiaries, had a Herfindhal indexed cash flow of 3.25, and its internal cash flow over assets was 0.27. Two numbers deserve some additional explaining: the maximum values of the Cash flow over assets variable (49.61) and the Interaction effect (194.93). These values are extremely high. The maximum value of Cash flow over assets is, as well as a couple of other extreme values for this variable, an effect of extremely high volume of transfer in certain years for a few companies. The maximum value of the Interaction effect is a direct result of the Cash flow over assets variable.

Descriptive Statistics

Variable	Mean	Std. Deviation	Max	Min
Market-to-book	3.056	4.482	41.71	-44.41
Herfindahl Cash flow	3.253	2.574	18.243	1
Cash flow/Assets	0.271	1.573	49.611	0
Interaction Effect	1.254	6.912	194.928	0
N Subsidiaries	18.697	27.439	266	1

Table 5, Variable descriptives

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[25] Please refer to section 1.4 for the definition of an associated company.

To illustrate the wide variety of different company groups in Sweden, we will present two illuminating examples with quite stabile variables over the time period. One company group is at the lower end of the spectra, with respect to our descriptive variables, and one is at the higher end.

Westergyllen

Westergyllen is a company group at the lower end of the spectra. It is an industrial conglomerate with operations in mainly two segments, machinery and electronics. Its cash flow over assets has averaged 0.098 over the studied period, thereby indicating that the company group does not utilize its internal capital market to a large extent. The company group has had an average of 7.15 in Herfindahl index cash flow, and an average of 23 subsidiaries during the period. These numbers indicate that the group has a high dispersion of the internal capital market, and an average number of subsidiaries.

AddNode

AddNode is a company group at the higher end of the spectra. It is an information technology conglomerate with operations in four segments: financials, industrials, media, and technology. Its cash flow over assets has averaged 0.84 over the period, indicating that the company group utilizes its internal capital market to large extent. The company group has had an average of 2.95 in Herfindahl index cash flow, and an average of 10 subsidiaries during the period. These numbers indicate that it has a low dispersion of the internal capital market, and a low number of subsidiaries.

6 EMPIRICAL FINDINGS

This section covers the results of the regressions and a thorough examination of what the results can tell us about the accuracy of our hypotheses.

6.1 ESTIMATION MODEL AND ROBUSTNESS TESTS

Outliers

To remove the effect of distant outliers, all outliers that deviate more that three standard deviations from the mean were removed. These outliers are listed in *table 6*.

Year	Company Name	MtB
2001	Biophausia	- 50
2001	Cashguard	656
2002	Cashguard	130
1999	Labs2 Group	59
1998	Sanmina-SCI	70
1999	Sanmina-SCI	61

Table 6, Distant outliers

The common element of these outliers is that the companies are characterized by a high valuation combined with low net assets. In the case of Biophausia, the company had negative net assets in 2001. The result of low (negative) net assets is that the market-to-book value is extremely high (negative).

The Hausman Specification Test

Our choice of model was essentially one between an estimation model with random effects, and one with fixed effects. The two different models were subjected to a Hausman specification test, which showed that the appropriate model for our data is a fixed effects model.[26]

Multicolinearity, Autocorrelation and Heteroscedasticity

To confirm the robustness of the model, tests for multicolinearity, autocorrelation between the explanatory variables, and a test for heteroscedasticity in the error term, had to be conducted. The results showed that the data exhibits no signs of multicolinearity or autocorrelation, while heteroscedasticity was found to be present. Since heteroscedasticity was found, the error term was adjusted accordingly.[27]

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[26] Please refer to appendix 2 for the test results.
[27] Please refer to appendix 2 for the test results.

6.2 RESULTS AND HYPOTHESES VALIDITY

The results of the estimation are presented in *table 7*.

Estimation results

R2	0.106		N(Obs.)	1234
			N(Groups)	334

Variable	Predicted Sign	Coefficient	95% CI	P-value
Herf CF	-	-0.1115	[-0.2003 ; -0.0227]	0.014
CF/ Assets	-	-0.0303	[-0.3247 ; 0.2641]	0.840
Interaction Effect	-	0.1399	[0.0522 ; 0.2275]	0.002
N Subsidiaries	-	-0.0068	[-0.0140 ; 0.0004]	0.064
Diversification	Control (-)	-0.2036	[-0.4792 ; 0.0720]	0.148
Leverage Ratio	Control (-)	-1.1991	[-2.1207 ; -0.2775]	0.011
Ln Assets	Control (- or +)	-0.1485	[-0.2923 ; -0.0047]	0.043
EBIT Margin	Control (+)	-0.0047	[-0.0328 ; 0.0233]	0.740
Year Dummy 1999	Control (+)	0.3917	[-0.7500 ; 1.5334]	0.501
Year Dummy 2000	Control (-)	-0.4749	[-1.1957 ; 0.2458]	0.196
Year Dummy 2001	Control (-)	-1.0568	[-1.6957 ; -0.4178]	0.001
Year Dummy 2002	Control (-)	-1.3991	[-2.1364 ; -0.6619]	0.000
Constant	N/A	6.6180	[4.5229 ; 8.7131]	0.000

Table 7, Regression Results

Hypothesis 1: Active internal capital markets destroy more value than less active internal capital markets.

The activity of the internal capital market is captured by both the Herfindahl Indexed cash flow variable and the Cash flow over assets variable. Since we have included an interaction effect between these two variables, we can also take into account the interacting effect these two variables have on the market value. As shown in *table 7*, the coefficients for the dispersion (Herf CF) and the coefficient for the volume of transfers (CF/ Assets) are both negative. The interpretation is that, when holding the other variables fixed, the market value decreases when either the dispersion of the internal capital market increases, or the volume of transfers increases. These effects support the hypothesis that active internal capital markets destroy more value that less active internal capital markets. However, the interaction effect between the two variables must also be taken into account. First of all, the coefficient of the interaction variable is positive (0.1399) and significant. The positive effect is unexpected and surprising.[28] However, it should be noted that the positive coefficient does *not* necessarily mean that increasing both the volume of transfers and the dispersion add value. It only means that, while the effect of increasing the dispersion or the volume of transfers by themselves is negative, increasing both the variable *at the same time* will to some extent levitate the negative effect. The interpretation of the interaction effect can only be done for the significant variable, Herfindahl indexed cash flow. For this variable, we can calculate the interaction-adjusted effect of the dispersion

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[28] We have not found any theories that explain this finding. However, please refer to appendix 2 for a possible statistic explanation.

of the internal capital market. This is done by calculating the effect on an average company. The formula is:

$$CoeffAdj_{HerfCF} = Coeff_{HerfCF} - Coeff_{InteractionEffect} * CF / Assets_{average}$$

For the average Swedish company group, the adjusted coefficient is:

$$-0.1115 + 0.1399 * 0.271 = -0.0736$$

Even after adjusting for the interaction effect, the coefficient is still negative. The coefficient indicates that the economic effect of the variable is that it decreases the market value of the average company group by 2.4 percent. Hence, we conclude that the overall effect of the activity of internal capital markets is that active internal capital markets destroy more value than less active internal capital markets.

Hypothesis 2: Internal capital markets with a higher volume of capital transfers destroy more value than internal capital markets with less volume of capital transfers.

The volume of transfers of the internal capital market is captured by the cash flow over assets variable. As shown in *table 7*, the coefficient for this variable is negative, indicating that adding the amount of the book value of asset of the company group, the market value decreases with 0.03. This might be an indication that the volume of transfers in capital transfers in internal capital markets is an important factor for the value of a company. However, the coefficient is not significant. Therefore, is hazardous to say that the effect in reality is negative. Thus, we can not conclude that the influence of the volume of transfers in capital transfers in internal capital market by itself has a negative influence on the market value. However, there is an indication that higher volume of capital transfers destroys more value than when the volume of capital transfers is less, in Swedish company groups.

Hypothesis 3: Complex internal capital markets destroy more value than less complex internal capital markets.

The complexity of the internal capital market is captured in the number of subsidiaries variable. As shown in *table 7*, the coefficient for this variable is slightly negative, indicating that for each subsidiary added to the company group, the market value decreases with 0.007. Although this is not a substantial decrease by itself, the cumulative decrease of adding 19 subsidiaries, is 0.13.[29] The economic effect of the complexity is that it lowers the market value of the average company group by 4.1 percent. This clearly indicates that the complexity of the internal capital market (and the company) is indeed an important factor of value destruction. The coefficient is significant at the ten

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[29] 19 is the average number of subsidiaries in the company groups in this study.

percent level, which indicates the strength of the results. Hence, we conclude that complex internal capital markets destroy more value than less complex internal capital markets in Swedish company groups.

Hypothesis 4: Internal capital markets destroy less value in capital intense industries than in less capital intense industries.

This hypothesis has been examined by running the same estimation model as above, with the difference that the sample was split in two parts; one with the company groups in the most capital intense industries, and one with the company groups in the least capital intense industries.[30] A summary of the estimation results is reported in *table 8*.

Estimation results		F-value	0.0000	F-value	0.0000	
Variable	Non-Int Coeff.	P-value	Int Coeff.	P-value	Predicted Diff.	Difference
Herf CF	-0.0507	0.070	-0.1322	0.057	+	0.0824
CF/ Assets	1.1523	0.524	-0.0086	0.041	+	1.1609
Interaction Effect	0.0499	0.064	-0.0017	0.030	+	0.0516
N Subsidiaries	-0.0098	0.005	-0.0063	0.005	+	-0.0034

Table 8, Intense vs. Non-intense industries

There are substantial differences between the coefficients of the two samples. As predicted, internal capital markets destroy more value in capital intense industries. The most striking result is that in less capital intense industries, there is few evidence of value destruction. All coefficients, except the complexity coefficient, are insignificant. In capital intense industries, the volume of capital transfers, the interaction variable, and the complexity variables are highly significant, while the dispersion variable is significant at the ten percent level. All coefficients are negative, indicating that the effect of the internal capital market is strongly negative. There is thus a substantial difference between the overall effects on market value due to internal capital markets in capital intense, contra non-capital intense industries. Calculating the interaction adjusted coefficients for Herfindahl indexed cash flow, and for Cash flow over assets, renders the following coefficients.

$$Herf \_ CF = -0.1322 + (-0.0017) * 0.284 = -0.1327$$

$$CF / Assets = -0.0086 + (-0.0017) * 3.318 = -0.0142$$

For the average company group, the economic effect is that the dispersion decreases the potential market value with 5.1 percent, the complexity decreases the market value with 4.9 percent, and the

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[30] The 12 industries with a capital intensity measure above average have been classified as intense, while the remaining 14 industries have been classified as non-intense. Please refer to appendix 3 for the industry classification table.

volume of transfers decreases the market value by 0.6 percent. The combined effect of the internal capital market is that it decreases the market value by 10 percent. This is clear evidence that internal capital markets is a value destroyer, and that it destroy more value in capital intense industries than in less capital intense industries.

6.3 POTENTIAL REFINEMENT OF THE ESTIMATION MODEL

Since a substantial part of the companies in the data set entails several foreign subsidiaries, and since we were not able to retrieve financial information for these, we were not able to capture their entire internal capital markets. This was a priori, thought to be one of the main problems of the study. Thus, the primary refinement of the model was to take into account how large part of the total company groups we had data for. We tried to refine the estimation by trying to account for the missing data. It was done by using the number of employees as a proxy for the proportion of missing data. A ratio of the number of employees in the part of the company group that we had financial information for, to the total number of employees in the company group, was created. A ratio of 0.75 meant that 75 percent of the total number of employees was hired in the part of the company group we had information for. In that case, we assumed that our data covered 75 percent of the internal capital market. Our refinement consisted of adjusting the affected variables in accordance with the ratios.

After running the same estimation model on the adjusted data and then analyzing the results, we decided to stay with the original data. The reason for this was that the estimation results with the adjusted data, in most parts, rendered coefficients for both the explanatory variables and the control variables, which were inconsistent with previous studies and with our unadjusted estimation results. Thus, we concluded that the number of employees' ratio was not an effective proxy for missing data.

6.4 CONGRUENCY WITH PREVIOUS FINDINGS

Since this study uses unique explanatory variables that have not been used in previous research, it is not possible to precisely compare our results with previous findings. However, earlier research on internal capital markets and their effect on company value and the diversification discount provides a point of reference. Most previous research on internal capital markets has documented a negative influence on company value and the diversification discount, while a few claims that the evidence of a diversification discount is an artefact of measurement errors or endogenity. Some of the variables used in previous studies, have been included as control variables in our study. In general, the results

of our study support the findings of most previous studies, including the signs of our control variables. [31]

6.4.1 The Classic Model, Berger & Ofek (1995)

Berger and Ofek (1995) have produced one of the most cited papers related to the diversification discount. They used financial information retrieved from the *CompuStat* database, to which U.S. companies are obliged to report a selection of accounting data for SIC-segments in which they have more than ten percent of their total sales.[32] In order to calculate the diversification discount, Berger and Ofek (1995) computed the stand-alone value of the different subsidiaries and compared the total value with the market value of the conglomerate. Specifically, they produced ratios of total capital to three accounting measures; sales, assets, and earnings. Each subsidiary was assigned the median values of these ratios for the corresponding single segment companies. The assigned values of the subsidiaries were then summarized in order to find the theoretical value of the conglomerate. The actual market value of the conglomerate was deducted from the calculated theoretical value to find the discount. Berger and Ofek (1995) concluded that conglomerates in the United States on average traded at a 13 to 15 percent discount, compared to the computed total stand-alone value of their subsidiaries. Since it was published in 1995, other researchers have used the Berger and Ofek's (1995) model to confirm their results and elaborate further. An important contribution of the Berger and Ofek (1995), study was to show that the degree of diversification is positively correlated to the diversification discount. That is, the more diversified a firm is, the more value is destroyed. Our conclusion, that internal capital markets destroy market value, is consistent with their findings. Our result indicates that out of the 13 to 15 percent predicted by Berger and Ofek (1995), 10 percent is traceable to the activity and complexity of internal capital markets.

Fauver, Houston, and Naranjo (2003) used a modified Berger and Ofek model in which they calculated the ratio of the market value of equity plus the book value of debt, to sales. The sample consisted of conglomerates from 35 different countries. They found that the diversification discount is related to the degree of capital market development, international integration, and to the legal system in the area of operation. Their findings suggest that diversification is beneficial in regions and time periods in which it is costly to secure financing through external capital markets. This would explain the lack of evidence for a diversification discount in the United States in the 1960ies, and in contemporary emerging markets. Hence, it is not surprising that we find that internal capital markets destroy value in Swedish companies, especially since the Swedish market is considered to be highly

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[31] Please refer to appendix 2 for comments about our control variables.
[32] SIC-codes identify the business in which a company operates and are specific for U.S. companies. In Sweden, the corresponding classification code is called SNI.

developed, internationally integrated, and Sweden's legal system facilitates external financing. However, in a similar study, Lins and Servaes (2002) did not find evidence of more efficient internal capital markets in areas with external market imperfections. Thus, the empirical evidence is not conclusive on this issue, although our study supports the former conclusion.

6.4.2 Previous Work Focused on Internal Capital Markets

Lundstrum (2003) calculated the extent to which a subsidiary in a conglomerate had access to an internal capital market. The proxy used is called Internal Capital Market Access (ICMA). Lundstrum's method is quite different from the one used by Berger and Ofek (1995), and has the advantage that it focuses on the actual value of having an internal capital market. ICMA is calculated by dividing cash flow[33] with capital expenditure and then deducting the same measure for a corresponding single segment company. Since a stand-alone company by definition has no access to an internal capital market, its cash flow over capital expenditure measure is estimated.[34] A positive value for the ICMA variable indicates that the conglomerate's internal capital market is more accessible for funds, than the capital market of a sales-weighted portfolio of the corresponding single-segment companies. Lundstrum (2003) compared the relationship between internal capital market access and information problems between the conglomerate and the investors.[35] He also examined the relationship between internal capital market access and the value of the conglomerate. Lundstrum (2003) found that in conglomerates with large information problems, the access to an internal capital market has no value. He also concluded that internal capital markets do not create shareholder value in such conglomerates. On the other hand, Lundstrum (2003) found that when information problems are small, the benefits of having access to an internal capital market can contribute to company value. Since our study provides evidence that internal capital markets do not destroy value in less capital intense industries, it is interesting to draw a parallel to Lundstrum's findings. If Lundstrum's findings are correct, this could be an indication that in capital intense industries, companies suffer from more information problems than in less capital intense industries. However, without further investigation of the relationship between these variables, it is hazardous to draw any definite conclusions.

Another study which introduced a proxy for the value of internal capital markets is Billett and Mauer's (2003). The measure had three components; (1) the transfer of resources within a multi-segment conglomerate, (2) the efficiency of the transfers, and (3) whether the segment would have

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[33] Cash flow equals earnings before extraordinary items, interest and taxes, plus depreciation.
[34] Please refer to appendix 1 for the exact method of calculation.
[35] Information problems are a subdivision of the broader concept agency problems.

had difficulties securing external financing if it had been a stand-alone company. Billet and Mauer (2003) concluded that internal capital markets add value only when capital is allocated to small, capital constrained divisions, independent of whether the division has good or bad investment opportunities. Their findings were supported by Fauver, Houston and Naranjo (2003). These findings could be another possible explanation for our finding that companies in less capital intense industries do not exhibit a negative value-effect due to the use of internal capital markets. Based on Billett and Mauer's (2003) findings, companies in less capital intense industries might have subsidiaries that, to a higher degree than in capital intense companies, are capital constrained. This seems reasonable in the sense that many of the companies in less capital intense industries included in our sample are new-economy companies. These companies certainly have many investment opportunities, but often lack funds.

Another study that supports the view that the diversification discount is due to poorly functioning internal capital markets is Rajan, Servaes, and Zingales's (2000). They used a measure developed by Lang and Stulz (1994) in order to measure excess value.[36] It is a methodology that resembles Berger and Ofek's (1995) in the sense that excess value is computed by taking the difference between the market value of a multi-segment conglomerate and the market values of the corresponding single-segment companies within the same three-digit SIC-code[37].[38] Their findings illustrates that when there is diversity in investment opportunities and resources within a conglomerate, capital is allocated to the most inefficient business. Thus, the conglomerate's investment funds are not allocated optimally, which in turn leads to the conglomerate being valued at a discount. In relation to our findings, this could be an indication that capital intense companies exhibit more diversity in investment opportunities than in less capital intense companies. If this is true, the results of our study are somewhat surprising, considering that less capital intense industries encompasses many of the new-economy industries, e.g. computer software and services, while the more capital intense industries encompasses many of the old-economy industries, such as energy, chemicals, and real estate. It is reasonable to assume that in general, the old-economy industries are more mature than new-economy industries, and that mature industries have a much lesser degree of diversity in investment opportunities. Since we have found conflicting evidence, the relationship between capital intensity and diversity of investments opportunities must be studied further.

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[36] Please refer to appendix 2 for the exact method of calculation.
[37] SIC-code is the U.S. equivalent to the Swedish SNI-codes.
[38] Please refer to appendix 2 for the calculation of excess value.

Burch, Nanda and Narayanan (2003) found that conglomerates in industries with a high degree of conglomeration were valued higher in relation to the comparable single-segment companies, than conglomerates in industries with a low degree of conglomeration. They explained there findings by different value-theories of conglomeration. These theories suggests that; (1) a conglomerate structure improves the allocation of capital, (2) conglomerates can employ predatory pricing tactics is one market using profits from another market, and that (3) excess capacity in production factors can be used if a company transforms into a conglomerate. Since the industries with a high degree of conglomeration in their sample predominately are industries that are capital intense, their findings could be considered to be contradicted by our study. But since we have not included the level of industry conglomeration, we can not be sure that there are no other explanations for the discrepancy. One such could be that there are differences between U.S. and Sweden regarding which industries that have the highest levels of conglomeration. Further research has to be done with regard to this issue.

A final interesting study in relation to our, is Dittmar and Shivdasani's (2003). They showed that the efficiency of internal investments increases when the conglomerate divests. The divestment also leads to a decrease in the diversification discount. This has an important implication for companies in capital intense industries. If Dittmar and Shivdasani (2003) results hold in Sweden, it should be possible for companies in capital intense industries to create shareholder value by selling off those subsidiaries that is not part of the companies' core business.

6.4.3 Challenges to the Conventional Explanations

In addition, there are researchers that have reached alternative explanations for the diversification discount. Some researchers have concluded that the discount simply does not exist. For instance, Campa and Keida (2002) claims that there is an endogenity problem associated with the discount. They used Berger and Ofek's (1995) model to calculate the excess value for a number of conglomerates. Using econometric techniques, they also controlled for the endogeneity of the decision to diversify. Based on their findings, Campa and Keida (2002) concluded that conglomerates actually trade at a discount before they diversify. When the selection bias was accounted for, data indicated that conglomerates trade at a much smaller discount than Berger and Ofek (1995) concluded, or sometimes even at a premium. Whited (2001) is also of the opinion that the diversification discount is not as severe as indicated by Berger and Ofek (1995). The author claimed that the discount is largely due to measurement errors, and to the correlation between investment opportunities and liquidity. Villalonga (2004) came to the same conclusion. Using two different

approaches to calculate the excess value, Berger and Ofek's (1995) as well as Rajan, Servaes, and Zingales' (2000), he concluded that the diversification discount is due to segmented data that stems from *CompuStat*. When he used data from *BITS*[39], he found that conglomerates actually trade at a premium. Lamont and Polk (2001) have also conducted a study of endogenity. They found some support for the notion that companies which diversify are poor performers to begin with, but in contrast with Campa and Keida (2002), they found that diversification does indeed destroy value, even after this bias is corrected for. Since our study does not use *CompuStat*, the possibility of segmented data is not a concern in this study. Nor is endogenity, in sense described above, since we study all quoted company groups, not only those that are diversified. Even though the previously cited researchers have valid objections against the conventional findings about internal capital markets, none of these objections can be made against our study.

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[39] BITS stand for: Business Information Tracking Series, a new census database (2004).

7 CONCLUSIONS AND FINAL REMARKS

The results from the last two regressions indicate that internal capital markets do destroy value in Swedish companies with operations in industries that are capital intense. In less capital intense industries, the variables' coefficients are insignificant and their combined effect is positive, implying that internal capital markets might not destroy value in such companies. However, since all coefficients except the complexity coefficient are insignificant, no conclusion can be drawn. In capital intense industries, the results of our study have important practical implications both for investors and for companies. Since, the internal capital markets in the average company group in capital intense industries decreases the potential market value by 10 percent, there is a possibility for these companies to substantially increase shareholder value. The remainder of this section strictly refers to companies in capital intense industries.

From the investor's point of view, the main conclusion is that they should search for companies that are willing to change their policy regarding their use of internal capital markets. Companies that investors believe are about to announce a consolidation of their subsidiaries into a larger unit, and companies that are about to make a divestment of some subsidiaries, should have a greater chance to increase their market value and to produce higher returns to their shareholders.

From the company's point of view, it is important to try to minimize the dispersion and the complexity of the internal capital market. These variables seem to be exceptionally important factors of value destruction. One problem that might account for this effect is that large capital budgets are inefficiently allocated. Because of the complexity effect, it is also important to consider the reasons for starting up new subsidiaries. If it is possible to include the activities of a new subsidiary into the parent company or into an already existing subsidiary, an effort should be made to do so. Of course, agency problems are an important factor here. Rent-seeking behaviour by divisional managers is bound to increase as the complexity of the company increases. Another reason for the existence of the complexity effect could be that it is more difficult for top management to allocate responsibility, and easier for divisional managers to escape it. Finally, the volume of transfer effect must be considered. Although the result in itself is not statistically significant, it points towards a negative volume effect. The volume effect is another indication of the inefficient capital allocation in internal capital markets. It could also be a sign that investors consider the activities to be, at least in some parts, instances of overinvestment.

Of course, it is the investors that are responsible for setting the market value of the company by their activities in the stock market. This means that although the use of an internal capital market affects the market value in a negative way, it is not certain that they destroy value per se. It might be that the investors wrongly presume that they do destroy value. As our results suggests, investors seem to punish companies for having too complex and disperse internal capital markets that engage in a too high degree of capital transfers amongst each other. On the other hand, other variables that we might have left out, could affect the market value directly, while the effect of the internal capital market is indirect by affecting the omitted variables. This is more of a statistical note since in practice, if this would be the case, the internal capital market still have a negative effect on the market value of companies.

7.1 SUGGESTIONS FOR FURTHER RESEARCH

This study does by no means cover the entire spectra of the influence that internal capital markets expend on the value of companies. Although it is a large scale study in terms of the amount of companies studied, it is still possible to expand the data set. Hence, there are some areas in which it is possible for further research to make an important contribution.

The most important refinement of the study would be to calculate the capital intensity measure for each firm and include it as an explanatory variable. By doing that, the results of this thesis could be confirmed by using a more exact measure. Another refinement of the estimation could be to expand the time span of the study. In this study a five year time span was used. Although this approximately covers a normal business cycle, it is not certain that the time period used is representative for past- or future time periods. Thus, one elaboration would be to examine a longer time period. It would also be interesting to see if the results could be replicated in other markets, or if there are distinct differences among countries. One such difference could be the effect of different taxation policies. The estimation could also be refined by making use of information from all subsidiaries, Swedish as well as foreign. It might also be possible to find a better proxy for the complexity of the internal capital market, than the number of subsidiaries. Although this has proven to be a difficult task, it could be feasible. One could also imagine that there are other aspects of internal capital markets that could be included in the estimation model. Further, the dimensions used to describe the internal capital markets might be broken down into smaller components. The activity measure could be broken down to the activities in different types of transfers, such as tax deducting transfers, operational transfers, and financial transfers. Finally, it would be interesting to study differences in the internal capital markets of old-economy companies contra new-economy companies, to find if there is a difference in value destructiveness.

In sum, this study has built on the foundation laid by previous researchers. It has shown that internal capital markets are an important area to focus on for managers that are interested in increasing shareholder value. But even more importantly, it has refined the conclusions of earlier studies by breaking up the effect of internal capital markets into three subparts that all seems to affect market value negatively, the dispersion, the complexity of the internal capital market, and the value of capital transfers.

8 REFERENCES

Barney, Jay B., & William S. Hesterly (2006). *Strategic Management and Competitive Advantage*. New Jersey: Pearson Prentice Hall.

Barton, Sidney L. (1988). Diversification Strategy and Systematic Risk: Another Look. *Academy of Management Journal*, 31(1), pp. 166-175.

Berger, Philip G., & Eli Ofek (1995). Diversification's Effect on Firm Value. *Journal of Financial Economics*, 37, pp. 39-65.

Billett, Matthew T., & David C. Mauer (2000). Diversification and the Value of Internal Capital Markets: The Case of Tracking Stock. *Journal of Banking & Finance*, 24, pp. 1457-1490.

Billett, Matthew T., & David C. Mauer (2003). Cross-Subsidies, External Financing Constraint, and the Contribution of the Internal Capital Market to Firm Value. *Review of Financial Studies*, 16(4), pp. 1167-1201.

Brealey, Richard A., & Stewart C. Myers (2003). *Principles of Corporate Finance*, 7th ed. New York: McGraw-Hill, pp. 497-510.

Brusco, Sandro, & Fausto Panunzi (2005). Reallocation of Corporate Resources and Managerial Incentives in Internal Capital Markets. *European Economic Review*, 49, pp. 659-681.

Burch, Timothy R., Vikram K. Nanda, & M P. Narayanan (2003). Industry Structure and Value-motivated Conglomeration. *Working Paper*. Ann Arbor: University of Michigan Business School.

Campa, Jose M., & Simi Kedia (2002). Explaining the Diversification Discount. *The Journal of Finance*, 57(4), pp. 1731-1762.

Coase, Ronald H. (1937). The Nature of the Firm. *Economica*, 4(Nov), pp. 286-405.

Dittmar, Amy, & Anil Shivdasani (2003). Divestures and Divisional Investment Policies. *The Journal of Finance*, 58(6), pp. 2711-2743.

Fauver, Larry, Joel Houston, & Andy Naranjo (2003). Capital Market Development, International Integration, Legal Systems, and the Value of Corporate Diversification: A Cross-Country Analysis. *Journal of Financial and Quantitative Analysis*, 38(1), pp. 135-157.

Gujarati, Damodar N. (2003). *Basic Econometrics*, 4th ed. New York: McGraw-Hill.

Holmström, Nancy (2006). *Redovisa Rätt*. Stockholm: Bonniers Utbildning.

Klein, Peter G. (2001). Were the Acquisitive Conglomerates Inefficient?. *RAND Journal of Economics*, 32(4), pp. 745-761.

Lamont, Owen A., & Christopher Polk (2002). Does Diversification Destroy Value? Evidence from the Industry Shocks. *Journal of Financial Economics*, 63, pp. 51-77.

Lang, Larry H. P., & René M. Stulz (1994). Tobin's q, Corporate Diversification, and Firm Performance. *Journal of Political Economy*, 102(6), pp. 1248-1280.

Lee, Inmoo, Scott Lockhead, Jay R. Ritter, & Quanshui Zhao (1996). The Costs of Raising Capital. *Journal of Financial Research*, 14(1), pp. 59-74.

Lins, Karl, & Henri Servaes (2002). Is Corporate Diversification Beneficial in Emerging Markets?. *Financial Management*, Summer, pp. 5-31.

Loughran, Tim, & Jay R. Ritter (2002). Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?. *The Review of Financial Studies Special*, 15(2), pp. 413-443.

Lundstrum, Leonard L. (2003). Firm Value, Information Problems and the Internal Capital Market. *Review of Quantitative Finance and Accounting*, 21, pp. 141-156.

Mansi, Sattar A., & David M. Reeb (2002). Corporate Diversification: What Gets Discounted?. *The Journal of Finance*, 57(5), pp. 2167-2183.

Mola, Simona, & Tim Loughran (2003). Discounting and Clustering in Seasoned Equity Offering Prices. *Working paper*. Notre Dame: University of Notre Dame.

Morgan, Robert G. (1977). Merger Motives: Conglomerates Versus Congenerics. *Journal of Economics and Banking*: 16(1), pp. 47-54.

Morck, Randall, Andrei Shleifer & Robert Vishny (1988). Management Ownership and Market Valuation: An Empirical Analysis, *Journal of Financial Economics*, 20 (½), pp. 293-315.

Mueller, Dennis C. (1969). A Theory of Conglomerate Mergers. *Quarterly Journal of Economics*, 83(4), pp. 643-659.

Rajan, Raghuram, Henri Servaes, & Luigi Zingales (2000). The Cost of Diversity: The Diversification Discount and Inefficient Investment. *The Journal of Finance*, 55(1), pp. 35-80.

Scharfstein, David S., & Jeremy C. Stein (2000). The Dark Side of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment. *The Journal of Finance*, 55(6), pp. 2537-2564.

Shin, Hyun-Han, & René M. Stulz (1998). Are Internal Capital Markets Efficient?. *The Quarterly Journal of Economics*, May, pp. 531-552.

Villalonga, Bélen (2004). Diversification Discount or Premium? New Evidence from the Business Information Tracking Series. *The Journal of Finance*, 59(2), pp. 479-506.

Whited, Toni M. (2001). Is It Inefficient Investment that Causes the Diversification Discount?. *The Journal of Finance*, 56(5), pp. 1667-1691.

Williamson, Oliver E. (1985). *The economic institutions of capitalism: firms, markets, relational contracting*. New York: Free Press Corporation.

Wooldridge, Jeffrey M. (2006). *Introductory Econometrics; A Modern Approach*, 3rd ed. Mason: Thomson South-Western.

9 APPENDIX

A. 1 FORMULAS

Market-to-Book value

$$MtB = \frac{MV}{NA}$$

Where the abbreviations expresses the following variables:

MtB = Market-to-Book value of net assets

MV = Market Value of the conglomerate

NA = Book value of Net Assets

Net Assets

$$NA = A - IA - L - MI - PS$$

Where the abbreviations expresses the following variables:

NA = Net Assets

A = Total Assets

IA = Intangible Assets

L = Total Liabilities

MI = Minority Interest

PS = Preference Stock

Excess Value, Lang and Stulz (1994)

$$EV = \frac{MV_d}{RVA_d} - \sum \left(q_j \cdot \frac{BA_j}{BA_d} \right)$$

Where the abbreviations expresses the following variables:

EV = Excess Value

MV = Market Value of Assets

RVA = Replacement Value of Assets

q = Tobin's q of a single segment company

BA = Book value of Assets

ICMA, Lundstrum (2003)

$$ICMA_{i,t} = \frac{CF_{i,t}}{CapEx_{i,t}} - Benchmark_{i,t}\frac{CF}{CapEx}$$

Where the abbreviations expresses the following variables:

IMCA = Internal Capital Market Access

CF = Cash Flow; earnings before extraordinary items, interest and taxes plus depreciation

CapEx = Capital Expenditure

Benchmark = The single-segment imputed ratio calculated using only companies which operate in a single industry

A. 2 ROBUSTNESS TESTS AND CONTROL VARIABLES

The Hausman Specification Test

In order to choose which estimation model that was best suited for our data, we decided to conduct a Hausman specification test. It tests whether or not it is possible to use a random effects model, as opposed to a fixed effects model.

H_0 = Random effects are consistent and efficient

H_1 = Random effects are inconsistent

A significant test statistic indicates that the null hypothesis should be rejected. Running the Hausman specification test on the random effects model and the fixed effects model, rendered the following results.

$\chi_2(12) = 39.02$

$p - value = 0.0001$

The p-value is highly significant, thus we reject the hypothesis that it is possible to use a random effects model. In conclusion then, the appropriate model for our data is a fixed effects model.

Multicolinearity

There is no single accepted test for multicolinearity. Instead there exist a multitude of different "rules-of-thumb", of which we have chosen three that commonly are used (Gujarati, 2003).

1) *High R2, but few significant t-values indicate multicolinearity.*
   As the regression results show (*table 7*), no such effect is present in this case.
2) *Pair-wise correlations between regressors of more than 0.8 indicate multicolinearity.*
   Out of 45 pair-wise correlation, none is larger than 0.8.
3) *A condition number of more than 30 indicates severe multicolinearity (10-30 indicates moderate).*
   The condition index is the most widely accepted test for multicolinearity. As can be seen in *table 9*, the condition number is 8.78.

None of the rules-of-thumb indicates that the data suffers from even moderate multicolinearity.

Eigenvalue	Condition Index
4.3682	1.0000
1.4928	1.7106
1.0685	2.0219
1.0187	2.0707
0.9888	2.1019
0.9480	2.1465
0.7115	2.4779
0.5704	2.7673
0.4367	3.1628
0.2165	4.4922
0.1232	5.9553
0.0567	8.7753
Condition Number	8.7753

Table 9, Eigenvalues and Condition Index

Heteroscedasticity

To test for the presence of heteroscedasticity, the data was subjected to a modified Wald test for groupwise heteroscedasticity. In the modified Wald test, the null hypothesis indicates that there is homoscedasticity and this is tested against the alternative that there is not. A significant test statistic implies that the null hypothesis should be rejected. The results of the test are shown below.

$$\chi_2(334) = 8.1 \cdot 10^{30}$$

$$p-value = 0.0000$$

As one might suspect when using panel data, the modified Wald test indicates that the data suffers from heteroscedasticity. To solve the problem, we used White/Huber/Sandwich heterorscedasticity corrected standardized errors. This eliminated the heteroscedasticity.

Autocorrelation

To test for the presence of autocorrelation, the data was subjected to a Wooldridge test. This is a rather new test for autocorrelation in panel data. In the Wooldridge test, the null hypothesis, that there is first order autocorrelation, is tested against the alternative that there is not. A significant test statistic means that the null hypothesis should be rejected. The results of the test are shown below.

$$F(1:253) = 3.831$$

$$p-value = 0.0514$$

The test statistic is not significant on the five-percent level. Thus the Wooldridge test indicates that the data does not suffer from autocorrelation.

Control Variables

Based on previous findings we predicted the sings of the four control variables. The p-values of two out of four variables are insignificant, only the leverage ratio and the natural log of assets are significant at the five percent level. Hence, only the signs of these variables can be taken as true. All four control variables have the predicted sign. However, although the EBIT margin variable and the diversification variable have the predicted signs, none of them are significant at any reasonable level. We can thus not conclude that the signs of those variables are accurate. However, the results of the regression give the indication that their effect is the predicted. Based on the control variables congruence with previous findings, we can conclude that there is no reason to believe that our sample of companies is unrepresentative in relation to previous samples

Interaction Variable

One important comment can be made in relation to the two last regressions. The interaction effect in the regression for non-capital intense industries is positive but insignificant. Since the effect is highly insignificant there is a high chance that the effect in reality is coincidental, and that the true effect might in fact be zero or negative. This might also be an explanation for the positive, insignificant, coefficient in the total sample. However, we will have to wait for further research before we can draw any definite conclusions.

A. 3 LIST OF COMPANIES AND THEIR INDUSTRIES

	Name	Ind ID		Name	Ind ID
1—9	3L SYSTEM	23		BOSS MEDIA	21
A	ACADEMEDIA	23		BRINGWELL INTERNATIONAL	16
	ACCELERATOR	16		BRIO	13
	ACSC	16		BROSTRÖM	18
	ACTIVE BIOTECH	22		BT INDUSTRIES	10
	ADDNODE	23		BTS GROUP	23
	ADDTECH	16		BULTEN	16
	ADDVISE	23		BURE EQUITY	24
	AFFÄRSSTRATEGERNA	24	**C**	CAPIO	25
	AKZO NOBEL	7		CARDO	10
	ALFA LAVAL	10		CASTELLUM	20
	ALFASKOP	23		CELTICA FASTIGHETS	20
	ALLGON	11		CENTRECOURT	24
	ANOTO GROUP	16		CLAS OHLSON	16
	AQUA TERRENA	2		CLOETTA FAZER	2
	ARK TRAVEL	18		CONCORDIA MARITIME	18
	AROS QUALITY GROUP	11		CONFIDENCE INTERNATIONAL	23
	ARTIMPLANT	22		CONPHARM	7
	ASPIRO	23		CONSILIUM	23
	ASSA ABLOY	9		CONTEXTVISION	21
	ASTRA ZENECA	7		CTT SYSTEMS	12
	ATLAS COPCO	10		CUSTOS	24
	ATLE	24		CYBERCOM GROUP	23
	AUTOFILL	10	**D**	D. CARNEGIE	19
	AVALON ENTERPRISE	16		DECIM	22
	AVANZA	19		DELPHI	19
	AXFOOD	2		DIAL N' SMILE	18
	AXIS	18		DIAL NXT GROUP	18
B	BALLINGSLÖV	13		DIAMYD MEDICAL	22
	BEDMINSTER	23		DIFFCHAMB	7
	BEIJER ALMA	12		DIGITAL ILLUSIONS	21
	BEIJER ELECTRONICS	16		DIGITAL VISION	11
	BERG & CO.	4		DIMENSION	23
	BERGMAN & BEVING	13		DORO	23
	BIACORE INTERNATIONAL	22		DUROC	9
	BILIA	23	**E**	ECOVISION	21
	BILLERUD	5		ECTA RESURS	23
	BIOGAIA	22		ELANDERS	6
	BIOINVENT INTERNATIONAL	22		ELECTROLUX	10
	BIOLIN	22		ELEKTA	11
	BIOPHAUSIA	22		ELEKTRONIKGRUPPEN	16
	BIORA	22		ELVERKET VALLENTUNA	14
	BIORA	22		EMPIRE	16
	BIOTAGE	22		ENEA	23
	BOLIDEN	1		ENIRO	6
	BONGS LJUNGDAHL	5		ENTRA DATA	23
	BORÅS WÄFVERI	3		ERICSSON	11

	Name	Ind ID		Name	Ind ID
	ESSELTE	23		INWAREHOUSE	16
	EUROPEAN INSTITUTE OF SCIENCE	16		INVESTOR	24
	EUROPOLITAN VODAFONE	18		IRO	10
	EVIDENTIA FASTIGHETER	20	**J**	JC	16
	EXAVE	11		JEEVES INFORMATION SYSTEMS	21
	EXPANDA	24		JLT MOBILE COMPUTERS	11
F	FABEGE	20		JM	15
	FACILE	16		JP NORDISKA	19
	FAGERHULT	11	**K**	KABE HUSVAGNAR	12
	FASTIGHETS AB BALDER	20		KARLSHAMNS	2
	FB INDUSTRI	13		KARO BIO	22
	FEELGOOD SVENSKA	25		KAROLIN MACHINE TOOL	13
	FENIX OUTDOOR	16		KINNEVIK	24
	FINGERPRINT CARDS	11		KINNEVIK INDUSTRIER	13
	FINNVEDEN	12		KIPLING	23
	FLY ME	18		KJESSLER & MANNERSTRÅLE	23
	FOCAL POINT	21		KLIPPAN	5
	FOLKEBOLAGEN	13		KNOW IT	23
	FRANGO	21		KUNGSLEDEN	20
	FRONTYARD	18	**L**	LABS2 GROUP	21
	FÖRENINGSSPARBANKEN	19		LAGERCRANTZ	16
G	G & L BEIJER	16		LATOUR INVESTMENT	24
	GAMBRO	11		LB ICON	23
	GETINGE	11		LEDSTIERNAN	24
	GETUPDATED SWEDEN	11		LGP ALLGON	11
	GEVEKO	24		LINDAB	23
	GLOCALNET	18		LINDE	7
	GORTHON LINES	18		LINDEX	16
	GRANINGE	14		LJUNGBERGGRUPPEN	20
	GUNNEBO	23		LUNDBERGS	24
H	HAGSTRÖMER & QVIBERG	19		LUNDIN OIL	1
	HALDEX	12		LUNDIN PETROLEUM	1
	HAVSFRUN	20		LUVIT	23
	HEBA	20	**M**	M2S SVERIGE	21
	HENNES & MAURITZ	16		MALMBERGS	16
	HEXAGON	13		MANDAMUS FASTIGHETER	20
	HIQ INTERNATIONAL	23		MANDATOR	23
	HL DISPLAY	11		MEDA	7
	HOIST INERNATIONAL	17		MEDIVIR	22
	HOLMEN	5		MEGACON	16
	HQ FONDER	19		MEKONOMEN	16
	HÖGANAS	9		MICRONIC LASER SYSTEMS	11
I	IBS	21		MIDWAY HOLDINGS	24
	INDUSTRIVÄRDEN	24		MINI DOC	23
	INTELLECTA	6		MNW RECORDS GROUP	6
	INTELLIGENT MICRO SYSTEMS	16		MODERN TIMES GROUP (MTG)	6
	INTENTIA	21		MODUL 1 DATA	23
	INTRUM JUSTITIA	19		MOGUL	21

	Name	Ind ID		Name	Ind ID
	MSC KONSULT	23		PRICER	22
	MULTIQ INTERNATIONAL	11		PROACT IT GROUP	23
	MUNTERS	13		PROBI	22
N	NCC	15		PROFFICE	23
	NEFAB	23		PROFILGRUPPEN	9
	NEONET	19		PRONYX	23
	NET INSIGHT	11		PROTECT DATA	21
	NETONNET	16	Q	Q-MED	7
	NETREVELATION	21	R	RATOS	24
	NETWISE	21		READSOFT	21
	NEW WAVE GROUP	24		REDERI AB GOTLAND	18
	NEXUS	23		REDERI AB TRANSATLANTIC	18
	NIBE INDUSTRIER	10		RESCO	21
	NILÖRNGRUPPEN	23		RETAIL AND BRANDS (RNB)	16
	NOBEL BIOCARE	22		ROTTNEROS	7
	NOBIA	16		RÖRVIK TIMBER	4
	NOCOM	16	S	SAAB	12
	NOLATO	8		SAGAX	20
	NORDIFAGRUPPEN	13		SALUS ANSVAR	19
	NORDNET SECURITIES BANK	19		SANDVIK	9
	NOVACAST	21		SANMINA-SCI	11
	NOVESTRA	24		SAPA	9
	NOVOTEK	23		SARDUS	2
	NÄRKES ELECTRISKA	11		SAS	18
O	OBDUCAT	23		SCA	5
	OBSERVER	23		SCAN MINING	1
	OEM INTERNATIONAL	12		SCANDIA CONSULT	23
	OMX	19		SCANDIC HOTELS	17
	ONETWOCOM	23		SCANIA	12
	OPCON	11		SCRIBONA	23
	OPTIMAIL	23		SECTRA	21
	OPTIMUM OPTIK	11		SECURITAS	23
	ORC SOFTWARE	21		SEMCON	23
	ORTIVUS	22		SENEA	16
P	PA RESOURCES	1		SENSYS TRAFFIC	23
	PANDOX	20		SIGMA	23
	PARTNERTECH	23		SINTERCAST	12
	PEAB	15		SKANDIA FORSÄKRING	19
	PERBIO SCIENCE	11		SKANDITEK	23
	PERGO	13		SKANSKA	15
	PERSEA	16		SKF	9
	PERSTORP	7		SKISTAR	26
	PLATZER FASTIGHETER	20		SKY COMMUNICATION	11
	PLM	9		SKÅNE MÖLLAN	2
	POOLIA	23		SMARTEQ	16
	PRECIO SYSTEMUTVECKLING	23		SOFTRONIC	21
	PRECISE BIOMETRICS	11		SONG NETWORKS	18
	PREVAS	23		SRAB SHIPPING	18

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	Name	Ind ID		Ind ID	Industry	Intensity
	SSAB	9		1	Oil, Gas, Ore & Minerals (Ext*)	Int
	STARBREEZE	21		2	Food, Beverages, Tobacco (M**)	Non-Int
	STILLE	22		3	Textiles & Clothes (M)	Non-Int
	STRÅLFORS	23		4	Wood Products (M)	Non-Int
	STUDSVIK	23		5	Paper & Pulp (M)	Int
	SWECO	23		6	Publishing & Printing	Non-Int
	SVEDALA INDUSTRI	10		7	Chemicals & Pharmaceuticals	Int
	SVEDBERGS	13		8	Rubber & Plastics (M)	Non-Int
	SWEDISH MATCH	2		9	Metal Industry & Metallic Products (M)	Non-Int
	SVENSKA HANDELSBANKEN	19		10	Machinery (M)	Non-Int
	SVENSKA ORIENT LINIEN	18		11	Electronics & Optical Equipment (M)	Non-Int
	SWITCHCORE	22		12	Transportation Vehicles (M)	Int
	SYDKRAFT	14		13	Other Manufacturing	Int
	SYNGENTA	7		14	Electricity, Gas & Heating	Int
T	TALISMAN ENERGY	1		15	Construction	Non-Int
	TELE 2	18		16	Wholesale & Retail	Non-Int
	TELECA	23		17	Hotel & Restaurant	Int
	TELELOGIC	21		18	Transportations & Communication	Int
	TELIA SONERA	18		19	Financial Industry	Int
	TELIGENT	18		20	Real Estate	Int
	THALAMUS NETWORKS	23		21	Computer Software & Systems	Non-Int
	TICKET TRAVEL	23		22	Research & Development	Int
	TITE	23		23	Company Services	Non-Int
	TIVOX	23		24	Holding Companies	Int
	TORNET	20		25	Health- & Medical Services	Non-Int
	TRACTION	24		26	Community & Personal Services	Non-Int
	TRANSCOM WORLDWIDE	23		*	Extraction	
	TRELLEBORG	8		**	Manufacturing	
	TRICORONA	1				
	TRIO INFORMATION SYSTEMS	18				
	TRUSTOR	24				
	TURNIT	24				
	TV4	26				
U	UTFORS	18				
W	W. SONESSON	25				
	WALLENSTAM	20				
	VBG	12				
	WESTERGYLLEN	13				
V	VIKING TELECOM	16				
	VITEC	22				
	VITROLIFE	22				
	VLT	6				
	VOLVO	12				
X	XANO INDUSTRI	13				
	XPONCARD	11				
Z	ZODIAK TELEVISION	26				
Å	ÅNGPANNEFÖRENINGEN	23				
Ö	ÖRESUND INVESTMENT	24				