Master Thesis in Finance

THE STOCKHOLM SCHOOL OF ECONOMICS

Does industry structure impact systematic risk?

A study of the interaction between product markets and capital markets within Swedish industries

Jarina Dahlgren[♣] Helena Lindvall[♠]

Abstract

Backed by industrial organization theory, it is believed that firms with high individual market shares and firms operating in industries where output is concentrated to a few sellers and entry barriers are high can to some extent insulate their operations from general market risk. If stocks of such powerful firms involve less systematic risk and if assets are priced rationally in the capital market, these stocks should generate lower average returns. Using a sample of 80 Swedish firms listed on the OMX Nordic Exchange Stockholm classified into 35 different industries, we perform cross-sectional regressions to test if two indicators of industry structure, individual market share and industry seller concentration, are related to market risk as measured by beta. Further cross-sectional regressions are applied to test if these industry structure variables can proxy directly for systematic risk and therefore explain average stock returns. Two sample periods are used in this study; 2005-2009 and 2000-2009. It is found that individual market share and measures of seller concentration within an industry are negatively related to beta during the extended sample period 2000-2009. When investigating if industry structure variables can proxy directly for systematic risk and therefore explain stock returns we find no significant results for neither of the sample periods.

Keywords: Industry structure, Industry concentration, Beta, Systematic risk, Average stock returns

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[♣] 20785@student.hhs.se

[♠] 21053@student.hhs.se

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1. Introduction

In existing literature surrounding asset pricing theory continuous attempts have been made to explain patterns of expected stock returns to investors. Several theories rely on a conventional positive relationship between risk and return implying that higher average returns can only be earned with a higher risk exposure. Investors can limit their exposure to firm-specific risk by diversifying their portfolio of investments and therefore only systematic risk should be rewarded with higher expected return. Sharpe (1964), Lintner (1965) and Black (1972) initiated the Capital Asset Pricing Model (CAPM) – one of the earliest and most well-known models to describe the relationship between systematic risk and expected returns. The model is based on the use of market beta as a sufficient explanatory risk variable to describe the cross-section of expected stock returns.

Both academics and practitioners have made efforts to modify or reject the original CAPM by breaking down beta into components and including additional factors to further explain cross-sectional differences in stock returns. However, one issue that has attracted limited attention so far is how average stock returns are potentially linked to risks implied by the industry structure prevailing in the product market a firm operates within. The structure of the industry, i.e. the number of firms operating in an industry and each firm's market share in that industry, may affect the riskiness of a firm's cash flows which should hence be reflected in the stock returns. Some attempts have been made to link certain characteristics of the industry structure of the product markets with aspects of risk and return in the capital markets. Even though the methodologies applied and the results found when investigating this link are somewhat disperse, there still appears to be a general finding that different industry structures along the spectrum monopoly, oligopoly, monopolistic competition and perfect competition facilitate different levels of risk. The structure of the industry in which a firm operates is mainly believed to influence potential cash flows, profitability levels and innovation activities which are all attributes connected to risk.

For instance, Sullivan (1978) analyzes the relation between industry structure and beta, a widely used measure of systematic risk. His main finding is that market power of firms, approximated by absolute sales and the concentration of output to a limited amount of sellers, seems to reduce the riskiness of firms in terms of sensitivity of a firm's stock price to general market movements. Given the finding of a negative relationship between market power variables and beta as a measure of economy-wide risk, Sullivan concludes that investors may demand a lower expected dividend and price appreciation return to invest in the stock of a powerful firm compared to a non-powerful firm. Another more recent study performed by Hou and Robinson (2006) examines how a certain industry structure could be directly related to the expected returns the stock of a firm within an industry generates. The main finding is that firms in industries characterized by a concentrated amount of sellers supplying a majority of the

output generate lower stock returns even after controlling for size, book-to-market, momentum and other potential return determinants. The authors base their study on the belief that equilibrium operating decisions induced by the structure of the industry affect the riskiness of the firm's cash flows and if this is realized by the investors, different industry structures should translate into different expected returns in the capital market. If the industry structure is highly concentrated in terms of sellers the firms' operations should for various reasons, related to profitability levels and innovation activity, be more insulated from certain types of systematic risk.

Inspired by previous literature, the purpose of this thesis is to explore if the relationship between industry structure, systematic risk and average stock returns is analogous to previous research when a study is performed on Swedish data as opposed to frequently used U.S. data. To the best of our knowledge there is no exhaustive or recent research within this field of study based on Swedish industries and only limited research based on U.S. firms. We therefore consider our attempt to study the relationship between industry structure and the dynamics of the capital market, using Swedish data, unique and a contribution to the existing finance literature.

By performing cross-sectional Fama-Macbeth regressions on a sample of 80 stocks listed on the OMX Nordic Exchange Stockholm within 35 industries, applying individual market share and seller concentration as indicators of the industry structure, we find some results implying that there is a negative relationship between exposure to market risk and the level of industry concentration. Furthermore, given that different industry structures may facilitate different levels of fundamental risk, it could be hypothesized that features of the product market such as market share and industry concentration can proxy *directly* for systematic risk and therefore explain average stock returns. However, our empirical findings indicate that characteristics of the industry structure have no significant power in *directly* explaining average stock returns of the 80 Swedish stocks included in the sample.

The outline of the thesis is as follows. This introduction is followed by a theoretical and empirical framework where applicable microeconomic theory, industrial organization theory and asset pricing theory is presented in addition to previous empirical research within the field of industry structure and capital markets. With the knowledge of theory and previous studies we define two hypotheses presented in section 5. Subsequently, in section 6 we present the data, specify key variables and describe characteristics of the sample. Thereafter, in section 7, the methodology is explained in terms of the cross-sectional regression specifications applied in this study. Following this, we present our empirical findings and cover the robustness of the model in section 8. In section 9, the empirical findings are further interpreted and limitations of the study are critically discussed together with suggestions of further research within the field. Finally, in section 10 some concluding remarks are given as a closure to this study.

2. Industry structure

According to microeconomic theory there are four basic product market structures or industry structures: monopoly, oligopoly, monopolistic competition and competition. The industry structures differ in aspects such as the market power of the firms, the number of firms operating within the market, seller concentration, ease with which firms may enter and leave the market and the ability of firms to differentiate their products from those of its competitors (Perloff 2007). Known determinants of the differences in industry structure are technology techniques, each individual firm's market share, the effectiveness of managerial organization, and the receptiveness of consumers to advertising (Scherer and Ross 1990). In the following sub-sections the implications of different industry structures in terms of profitability and innovation are developed and analyzed from a risk-based perspective with the support of microeconomic fundamentals and economics of organization. We also give an overview of the industry structure and competitive conditions prevailing in the Swedish market since that is the geographical focus of this thesis. The Swedish overview is based on recent reports of studies made on Swedish industries by The Confederation of Swedish Enterprise and the Swedish Competition Authority.

2.1 Market power and profitability

One channel through which industry structure is believed to affect risk is the aggregate profitability level within a certain industry structure. It is known that industry structures are differing in the level of concentration among sellers and the market power of each seller, ranging from highest level of market power and concentration within monopoly structures to lowest level of market power and concentration within competitive structures. A general definition of market power is the ability of a firm to charge a price above marginal cost and thereby earn a positive profit (Perloff 2007). Assuming that firms face many price-taking buyers, the price-setting ability can arise from one or several of the possible industry structure determinants mentioned above. Monopolists, oligopolists and monopolistic competitors are all able to influence price by their output decisions, i.e. each of them can increase the quantity of output sold under given demand conditions only by reducing price. Hence, all three possess some degree of power over price, referred to as monopoly power or market power (Scherer and Ross 1990). Some industries are monopolized simply as a consequence of that firm having a technology or cost advantage over the other firms, but market power can also be a creation made by the government (Perloff 2007). A competitive product market structure is, as opposed to the other three structures, characterized by homogeneity of the product, insignificant size of individual sellers and buyers relative to the market, and low or no barriers to entry. As a result of this, firms operating under competitive conditions possess no power to influence price by varying quantity and

consequently these firms lack prospective to earn sustainable abnormal profits (Scherer and Ross 1990).

Due to the uncertainty surrounding a potential association between the level of competition and the structure of the industry, Bain (1951) early targeted a need for detailed empirical studies that formulated specific hypotheses on the relations of industry structure and performance. The main hypothesis of his study indicated that on average higher profit rates would be earned within industries characterized by high seller concentration than within industries with lower concentration. Bain´s study of 42 American manufacturing industries during the period 1936-1940 confirmed that if holding demand, cost conditions and entry conditions constant, concentrated industry structures like monopoly or effective collusive oligopoly tend to maintain higher prices and yield higher aggregate profit rates than competitive industry structures in the long-run.

Shepherd (1972) made an attempt to demonstrate the impact of industry structure on profitability using a panel of 231 large industrial U.S. firms during 1960-1969. The premise of Shepherd's static study is that a firm's position within an industry affects its attainable degree of profitability. Industry structure is defined by market share, seller concentration within the industry, individual firm size and advertising intensity. Shepherd finds that in static models market share, which is positively correlated with profitability, emerges as the primary element independent of industry concentration and barriers. Shepherd's study therefore suggests that a change in market share will lead to greater yields in terms of profitability than altering for example industry concentration or entry barriers. Overall, Shepherd's study reinforce that there is a relationship between certain aspects of industry structure and aggregate profitability levels.

Microeconomic theory in combination with empirical studies suggests that a positive relationship exists between the degree of market power that commensurate with a certain industry structure and the profitability of firms. Furthermore, it can be argued that a consequential effect of this basic relationship is that powerful firms can exploit their power to manage fluctuations in cash flows. If powerful firms are able to respond to positive demand shocks by increasing either prices or output without facing competition they could potentially increase profitability when good market conditions rule. The potentially increased profitability could ease the ability for the firm to hoard cash during favourable economic conditions. The hoarding of cash is believed to serve to even out variability in overall cash flows and in that way protect the firm during economic downturns. Since the described cash flow activity helps firms to withstand harsh market conditions without being forced to exit the market or lower their price, an industry where the output is concentrated to a few powerful firms is assumed to be related to higher barriers to entry. An industry structure characterized by high seller concentration, barriers to entry and high individual market shares can according to this interpretation contribute to insulate firms from cash flow and distress risk and therefore measures of industry

concentration and market power can be viewed as proxies for general economy wide risk in terms of cash flow risk and distress risk (Hou and Robinson 2006).

2.2 Innovation activity

Another channel through which industry structure is believed to influence systematic risk is innovation activity. Allocating resources into innovation generally comes with a trade-off and some risk of not being able to capitalize the value of the innovation at a later stage. Like other investments, the resources used in innovation activities diminish current output and lower other types of investment that otherwise could have served to raise future output (McGee 1971). Schumpeter (1934) concludes that firms in competitive industries are not necessarily the most efficient organizations in the sense of providing innovation. Rather he argues that larger firms provide a more stable platform to invest in R&D and that concentrated industry structures therefore promote innovation. Conversely, Arrow (1962) argues that a pure monopoly that is not exposed to competition for existing or new technologies has less incentive to invest in R&D than does a firm in a competitive industry. The reason for this is that a firm in a monopoly position has a flow of profit that it enjoys even if no innovation takes place. Surely the monopolist can increase its profit by innovating, but at the same time it also loses the profits from its old technology. Tirole (1988) defines this reduced incentive to innovate due to potential loss of existing profits as the "replacement effect". He states that as opposed to the monopolist, a firm in a competitive industry with low concentration only has the normal profits of a competitive industry to lose and hence does not forgo a flow of profit by engaging in innovation. Consequently, if the competitive firm is able to capture the same benefit from innovation as the monopolist, its differential return is higher. Because of a pressure of prices, Scherer and Ross (1990) believe that if industry capacity always meets the demand, the competitive firms are only able to differentiate their products and capture positive profits if they are superior in innovation. Hence it is expected that innovation is higher and technological progress more rapid where a competitive, less concentrated industry structure prevails.

Gilbert (2006) defines the incentive to innovate as being the difference in profit that a firm can earn if it invests in R&D compared to corresponding earnings without this investment. He concludes that even firms that are competitive price-takers can earn positive profits when offering differentiated products, indicating that also a competitive firm faces the replacement effect when making innovation decisions. He argues that competition ensures that the competitor's profit using an old product is less than the corresponding profit made by the monopolist. Hence, the replacement effect should be less for the competitive firm, implying that a firm in a competitive, less concentrated industry has a greater net incentive to invest in product innovation. Along the same line Geroski and Pomroy (1990) perform a study suggesting a relationship where innovation quickly reduces the level of concentration within industries and that this de-concentration in turn leads to further stimulation of innovation activity.

To summarize, innovation is considered to be a risky activity that could either jeopardize or amplify future cash flows of a firm. Given existing theory, different industry structures facilitate different levels of innovation and therefore there is a probable link between the industry conditions under which a firm operates and the level of innovation risk it faces. In line with this reasoning competitive firms that tie up resources in innovation activity can be considered to be more vulnerable and not as capable to respond to deteriorating market conditions. Since engagement in innovation is considered a risky activity, the less concentrated industry structures facilitating higher level of innovation could very well cause investors to demand a premium in the security market.

2.3 Determinants of Swedish industry structures

The Confederation of Swedish Enterprise (2005) has been investigating the structure of Swedish industries in order to determine prevailing competitive conditions. Changes in the industry structures in Sweden have been observed following the entrance into the European Union since the membership brought competition into some industries that earlier had been protected. Also the deregulation of Swedish markets that earlier were regulated or monopolized have increased the competition and had a de-concentrating effect on some industries. However, The Confederation of Swedish Enterprise (2005) determines that competition in some Swedish industries is still limited due to a large public sector that supplies itself. The absence of competition in some Swedish industries has been proven to result in too high prices and a lower level of innovation and product development, which is in accordance with previously outlined microeconomic and organizational theory. It is also acknowledged that an increased level of competition is known to decrease the floating profits of Swedish firms and create a need for more effective production.

Furthermore, a high level of seller concentration within Swedish industries is associated with high barriers to entry and in addition to this, the import competition is considered to be rather weak in several industries. When assessing the industry structure The Confederation of Swedish Enterprise (2005) stresses the necessity of using both quantitative and qualitative measures in order to get a complete overview of the competitive conditions. Among the quantitative variables concentration ratios and profitability measures are found, which highlights the practical importance of seller concentration and profitability when evaluating Swedish industry structures. For concentration the Four-firm concentration ratio is commonly used which measures the four largest firms' revenues in relation to the total of the industry. High concentration is generally assumed to be equivalent to low competition. Various measures of profitability can be applied and high values of profitability are assumed to be an indicator of low competition.

In line with The Confederation of Swedish Enterprise (2005), The Swedish Competition Authority (2009) points out that competition has improved in some industries as a possible result of an increased internationalization of the Swedish economy. The Swedish Competition Authority (2009) emphasizes

that the possibility to enter a market is important when analyzing the ability to practice market power. It is recognized that concentrated markets are often characterized by firms with valuable market shares possessing ability to practice market power and charge higher prices. Besides, dominating firms in concentrated industries can create strategic barriers to entry by making tactical pricing decisions in order to prevent other firms to entry or expand. For example, competition-limiting collaborations such as cartels, with the intention to extend profits, are believed to be more easily created within concentrated industries with fewer actors. Simultaneously, it is concluded that more firms and less concentrated industry structures make it harder for the large firms to misuse their position at the expense of the smaller players.

Profitability levels of firms or industries are also used by The Swedish Competition Authority (2009) as an indicator for evaluating the industry structure. The Swedish Competition Authority (2009) states that high profitability within industries can be interpreted as firms using their market power in order to enjoy profits that otherwise would not be possible, e.g. by setting prices significantly higher than the costs. When analyzing the profitability within a market, it is essential to distinguish between if it is few firms enjoying extended profitability or if most of the firms within an industry have high profitability in order to get a complete view of the industry structure.

The Swedish Competition Authority (2009) mentions the use of the Herfindahl index to measure industry concentration. This measure is estimated by adding the squared market shares of all firms within an industry. However, some difficulties in determining the level of concentration in Swedish industries are identified. When firms within one industry are acting on different geographical markets, the degree of market power tends to be underestimated if one only considers the number of firms. Different branches of a business might over- or underestimate the level of concentration and thereby also the market power, since each firm is often only referred to what is considered its main branch when the concentration index is estimated. Yet another important factor is the existence and level of import. If imported products are substitutes to domestic production, the true level of concentration within the Swedish industry could be overestimated.

Finally, The Swedish Competition Authority (2009) also covers the issue about how the pressure of productivity is higher in competitive industry structures due to the risk of being forced to exit the market. This pressure should translate into higher innovation activity of firms in less concentrated industries. On the other hand, The Swedish Competition Authority (2009) outlines the possibility that monopoly firms due to their availability of capital may invest more in research and development, but in the end the authority still stresses that this speculation does not have any empirical support and that few studies have concluded that large firms or high industry concentration is connected with higher innovation activity.

3. Capital markets

The intention of this section is to give an overview of the dynamics of capital markets and describe the different forces that constantly revise existing asset pricing theory. The renowned risk-return relationship has proven to be ambiguous and highly dependent on underlying assumptions about efficiency and rationality. Up to this day, there is no general agreement as to how the level of systematic risk and the resulting expected returns of a stock ought to be estimated. Throughout the years, focus has been directed towards a variety of factors in order to completely explain stock returns. In some research these factors are claimed to be proxies for systematic risk, in other research it is concluded that differentials in stock returns do not only reflect systematic risk but rather is a consequence of investor behavior. Before it is viable to consider to what extent industry structure variables may incorporate risk, it is essential to outline some major characteristics of the capital market.

3.1 Dynamics of the efficient capital market

Theoretically, if the market is efficient, any existing information that could be used to predict stock performance should already be reflected in stock prices. As soon as there is any new information indicating that a stock is underpriced and therefore offers a profit opportunity, investors flock to buy the stock and immediately bid up its price to a fair level, where only returns that commensurate with the systematic risk of the stock can be expected. Even though there are theories explaining the relationship between risk and expected return in efficient, rational capital markets there is no existing theory about the levels of risk that should be found in the actual marketplace. It can be observed that prices of assets in the capital market fluctuate due to corporate news and overall macroeconomic events but since there is no theory about the frequency and magnitude of such events no "natural" level of risk can be quantified. Even though empirical approaches use proxies for sources of market risk, none of the proposed factors in existing models can be identified as hedging a specific source of uncertainty (Bodi, Kane and Marcus 2008). The same holds for industry structure features. Even though it has been argued that certain structural factors of an industry can be justified as proxies for sources of market risk, it is not indefinite which sources these factors may represent. Adding to the problem is the fact that expected returns are not directly observable – only *realized* rates of returns occurring after the events can be measured. As a consequence, existing asset pricing theories model expected returns and estimate risk levels that investors actually anticipated from historical data in order to predict the relationship between expected returns and risk in the future (Bodi, Kane and Marcus 2008). This will be the method applied in this study to investigate the relationship between industry structure, systematic risk and expected return.

3.2 Predicting expected returns

Size in terms of market equity, book-to-market value of equity and one year lagged returns are alternative explanatory factors of stock returns that will be applied, in addition to industry structure variables, in this empirical study. These factors have been scrutinized in numerous previous studies and emerged as having an impact on stock returns. Still, as we review the results of such studies in this section, it is evident that there is no consensus on how to interpret why these factors may explain stock returns.

Banz (1981) initiated the prominent size-effect, stating that stocks of small firms as measured by market equity have generated higher average returns than stocks of large firms historically. One possible explanation for this is that the information about larger firms is more extended which serves to an increased willingness to hold stocks of larger firms and therefore smaller stocks come with some priced illiquidity risk. Along the same line Fama and French (1992) find that both stocks of small size and stocks with high book-to-market equity appear to earn higher average returns in the cross-section and hence they argue that size and book-to-market ratios act as proxies for some unobservable risk factors. Fundamental to this risk-based explanation of the book-to-market ratio is that the book-to-market ratio is an indicator of the relative prospect of a firm. This risk interpretation can be further validated by the fact that firms experiencing financial distress risk are normally associated with low levels of market equity. These findings are believed to be solely due to predictability in the risk premium, not in risk-adjusted abnormal returns. Therefore, if assets are rationally priced, the findings are consistent with an efficient market where investors are expecting and requiring higher returns for taking on higher levels of non-diversifiable economy-wide risk.

On the other hand, there is also evidence pointing against the existence of a rational market and the equilibrium trade-off between non-diversifiable risk and stock returns. It is suggested that differences in stock returns come as a surprise to the investor and are not always related to measures of market risk. Chopra, Lakonishok, and Ritter (1992) find that even after adjusting for the size-effect and additional risk there is an economically significant overreaction effect present in the stock market. The authors state that it is unlikely that this effect can be attributed to risk measurement problems, since abnormal returns consistent with the overreaction hypothesis are also observed for short windows around announcements of quarterly earnings.

Furthermore, contrary to Fama and French (1992), Lakonishok, Schleifer and Vishny (1994) find no evidence for investments in value stocks (high book-to-market ratios) to be riskier than investments in glamour stocks (low book-to-market ratios) when applying conventional risk measures. Instead they argue that the higher average returns of stocks with low book-to-market compared to those with high book-to-market values emerge due to mispricing in an inefficient market. Naive investors appear to consistently overestimate future growth rates of glamour stocks relative to value stocks by

extrapolating past earnings growth too far into the future, overreacting to good or bad news or simply associating a good investment with a well-run firm irrespective of actual stock prices. If the market is efficient in the long term the overreaction by investors tend to be corrected and thereby subsequent abnormal returns will be generated by high book-to-market stocks. This view commensurate with an interpretation of the book-to-market ratio as a return determinant however the differences in returns are explained by systematic undervaluation by investors rather than differences in the fundamental risk of the stock.

According to Haugen and Baker (1996) the true relation between expected return and risk is believed to be disguised due to imperfections in the patterns of realized returns caused by bias in the pricing of stocks. If stocks differ in their liquidity and if pricing is biased relative to available information, many non risk-related variables can be considered to be important in predicting cross-sectional returns. Overall relatively profitable firms tend to grow faster, at least until competitive entry into their lines of business forces profits to normal levels. Based on this assumption that currently profitable firms have greater potential for future growth, the authors use several measures of profitability as predictive factors. They find that the greater the growth potential for profits and dividends is, the greater the expected future rate of return is. If the market mistakenly price stocks with differing growth potentials, the growth potential factor payoffs are expected to be collectively positive. Haugen and Baker conclude that there is no evidence from differences in firm fundamental characteristics, or from the distribution of returns in their sample, that differences in realized returns are risk-related. The result is consistent with the plausible explanation that the predictability in returns arises from the fact that investor behavior leads to homogenous determinants of variation in expected returns.

Yet another finding is that good or bad performance of stocks appears to continue over time, which is an observation that has lead to that past stock returns could be used as a potential indicator of future expected stock returns. This effect is referred to as momentum and there is some cross-sectional evidence that price momentum exists in the short- to intermediate-horizon (Bodi, Kane and Marcus 2008). Jegadeesh and Titman (2002) find that portfolio strategies that buy stocks with high returns over the previous 3-12 months and sell stocks with low returns over this same time period perform well over the succeeding 12 months. Some argue that the returns associated with momentum strategies are attributable to risk that may not have been detected with traditional asset pricing models. To the extent that high past returns may be partly due to high expected returns, the winner portfolios could potentially contain high-risk stocks that would continue to earn higher expected returns in the future. However, Jegadeesh and Titman show that cross-sectional differences in expected returns only have modest explanatory power of the momentum profits and therefore the performance of the momentum strategies are not likely justified by risk exposure, which once again implies that the investor can earn returns based on other characteristics than systematic risk exposure.

4. Previous evidence of the link between industry structure and capital markets

It can be concluded that the true relationship between risk and return appears to be ambiguous and highly dependent on whether or not investors are rational and to what extent markets are efficient. Still economists keep exploring the risk-return relationship by looking at historical data, aiming to find possible explanatory risk factors. Some research have identified the need for models that explicitly incorporate features of the product market, especially industry structure, as opposed to only including financial factors such as size or book-to-market. Over time there are few but still some published findings that different characteristics of industry structure could be determinants of profitability, systematic risk and average stock returns.

Sullivan (1977) try to extend Shepherd's (1972) relationship between industry structure and profitability by further investigating if superior profits that arise due to market power are passed on to future stockholders in the form of average dividends and capital gains. Sullivan performs his study on a panel of 129 U.S. firms for the period 1961 through 1970. An arithmetic mean of net income to book value of equity is applied as a measure of profitability and is regressed on market share and industry concentration (Four-firm concentration ratio) in two separate regressions using size, variance, firm growth and industry growth as control variables for each firm. Resulting coefficients of market share and industry concentration are positive and significant, confirming that even when controlling for the influences of size, growth and risk, firms in industries with few sellers and firms with higher market shares appear to earn higher profits than other presumably more competitive firms. Sullivan continues by evaluating to what extent, if any, monopoly profits flow through to stockholders and therefore produces abnormal returns indicated by positive values of alpha in the CAPM. The intention is to reveal to what extent returns in excess of those required by the risk-free rate and the non-diversifiable risk exposure is awarded to investors of powerful firms in concentrated industries. Sullivan find no evidence that excess returns as measured by alpha are generated by stocks of powerful firms and therefore he concludes that a highly efficient capital market seems to correctly value the risk-return characteristics of firms, including the risk implied by the level of market power.

Sullivan (1978) makes yet an attempt to draw parallels between industrial organization and capital markets. Attention is drawn to the fact that both capital market literature and industrial organization literature are valuable reference points for those who would hope to understand the allocation of capital in the economy and how it may affect the conditions of entry, level of price and level of output. Capital market theory relates capital costs to risk and hence the specific purpose of Sullivan's study is to determine if the systematic risk as measured by beta, and therefore also cost of capital, is lower for powerful firms. Market power is represented by size of firms in terms of absolute sales and seller concentration within an industry when Sullivan performs his study on 1,409 firms from several U.S

industries. Each firm's beta is estimated from the original CAPM model without any detailed discussion about underlying assumptions and then the betas are regressed on the independent variables sales and Four-firm concentration ratio as well as dummies for compounded sales growth and durability of the products. Firm size and industry concentration emerge as significant determinants of both leveraged and unleveraged beta. Their association with beta is consistently negative suggesting that beta in general appears to be lower for firms that are large and for firms that sell in concentrated industries. Sullivan also finds that securities of powerful firms are subject to less non-diversifiable price volatility after being issued and therefore investors demand a lower return to invest in powerful firms in concentrated industries. The observation that stock prices of powerful firms are relatively more stable is given the interpretation that powerful firms, because of size and market power, are able to influence or more successfully react to major systematic factors such as changes in social, economic and political events.

Subrahmanyam and Thomadakis (1980) perform a study that focuses on the microeconomic determinants of systematic risk in a single-period model of the firm. The study develops a model of the firm under uncertainty from which a relationship between systematic risk and firm characteristics such as monopoly power, demand elasticity and the labor-capital ratio is derived. The model serves to further integrate the real and the financial view of the firm. With the underlying assumption that CAPM is a proper description of the risk return relationship in the capital market the effect on beta of a deviation from perfectly elastic demand functions is studied with the purpose to indicate the relationship between systematic risk and monopoly power. Subrahmanyam and Thomadakis essentially conclude that among firms using the same production technique, those with higher (lower) monopoly power exhibit lower (higher) betas, which imply that irrespective of the source of uncertainty monopoly power unambiguously reduces the firm's beta.

Hou and Robinson (2006) seek to further explore the economic link between product markets and capital markets and find a negative relationship between industry concentration and stock returns. It is recognized from industrial economics that equilibrium operating decisions affect the risk of a firm's cash flow and given a belief in a positive risk-return relationship those decisions should hence also influence expected stock returns. The data sample studied includes all NYSE-, AMEX-, and NASDAQ-listed securities with share codes 10 or 11 during the main period 1973-2001. The Herfindahl index, an acknowledged estimator of industry concentration, is used as a measure for barriers to entry which in turn is interpreted as an indication of the level of distress risk a firm faces in an industry. One hypothesis is that firms in highly concentrated industries earn lower returns because, all else equal, they are better insulated from non-diversifiable, aggregate demand shocks. Another hypothesis is that firms in more concentrated industries have lower returns because they engage less in innovation that is considered a risky activity. Cross-sectional regressions of monthly stock returns on the Herfindahl index and on other firm characteristics are conducted at both the industry average level

and the firm specific level. Hou and Robinson confirm that firms in more concentrated industries earn lower returns, even after controlling for size, book-to-market, momentum and other return determinants. By various tests chance, measurement error, capital structure and persistent cash flow shocks are ruled out as explaining this finding. In the same study it is also found that the spread in returns, between firms that operate in concentrated industries likely insulated from economic distress and the firms operating in less concentrated industries, grow as economic conditions deteriorate. This is consistent with a risk interpretation of industry concentration and Hou and Robinson conclude that in an efficient market where assets are rationally priced, industry concentration must proxy for sensitivity to a systematic risk factor in stock returns, suggestively distress or innovation risk.

5. Hypotheses

Linking microeconomic theory with industrial organization theory as well as general asset pricing theory provides us with a reason to believe that there is a relationship between features of a certain industry structure and the return an investor expects on a firm's stock in the capital market. Previous studies within this area are conducted on U.S. data over various sample periods and even though the approaches and specifications of industry structure are diverse, the consensus interpretation appears to be that measures of industry structure can to some extent capture levels of systematic risk.

Since different industry structures are believed to facilitate different levels of innovation it is probable that the level of innovation risk a firm is exposed to depend on the structure of the product market it operates in. The industry structure in terms of individual market power, seller concentration and resulting barriers to entry is also expected to affect the risk characteristics of a firm given that these attributes of industry structure affect managerial behaviour, strategic choices and the price-setting ability of the firm. Theoretically, firms with high market share and firms operating in concentrated industries with high barriers to entry could take advantage of their pricing-power to smoothen cash flows between favourable and less favourable economic states and in that way to some extent hedge themselves against both cash flow risk and distress risk. Due to this the systematic risk associated with powerful firms or firms in concentrated industries is expected to be lower due to the ability of these firms to successfully react to and protect themselves against macroeconomic conditions that could adversely affect the operations of the firm.

To fully determine the structure of a certain product market in practice, both qualitative and quantitative measures are necessary. Number of firms, seller concentration, entry activities, market shares and profits are attributes that can be estimated quantitatively and are therefore commonly used to get an overview of the competitive conditions within an industry (Swedish Competition Authority 2009). In this study we have chosen to limit our scope to three quantitative measures to indicate disparities in industry structures in terms of price-setting ability, seller concentration and entry conditions. The first measure is each firm's individual *market share*. The fact that a firm occupies an extensive market share indicates that a firm has benefited from high sales compared to rival firms within the same industry as a result of its power to set prices or output. Thereby it is expected that firms with high market shares can be equalized with firms with high market power for the purpose of this study. The other two measures of industry structure are the *Herfindahl index* and the *Four-firm concentration ratio* which are two commonly used measures for how concentrated the output of an

industry is to a certain number of sellers.[1] The degree of concentration in terms of sellers in an industry is expected to capture how successfully a firm can implement operational decisions without interaction from a large number of other incumbent firms. If the number of selling firms is high, each individual firm is assumed to be able to exert less market power. The concentration measures are also expected to function as an estimation of the prevailing barriers to entry in the industry. In industries where entry barriers are naturally high as a result of high fixed costs or superior production technologies, the number of firms tends to be low and each firm's output and market power high i.e. the output is concentrated to a limited amount of sellers. Accordingly, the fact that barriers for new firms to enter the industry are high coincides with industry structures where seller concentration is high and therefore we assume that high values of the Herfindahl index and the Four-firm concentration ratio represent high barriers to entry.

Our first aim is to test empirically if the measures of industry structure are related to systematic economy-wide risk when using Swedish data. Since market share, Herfindahl index and Four-firm concentration ratio are assumed to measure the degree of market power, concentration and entry barriers in an industry, we have decided to test how these variables are related to the firms' betas. Though often criticized, beta remains a commonly used parameter to measure the level of systematic risk an investor is exposed to by holding a stock (Graham and Harvey 2002). The suggested interpretations of how different industry structures facilitate different levels of risk in combination with the negative relationship found between industry structure variables and beta in similar empirical studies made on U.S. data lead us to our first hypothesis:

Hypothesis I: *Firms with high market shares and firms operating in concentrated industries with high barriers to entry, have lower betas on average than firms operating in a more competitive environment*

The first hypothesis implies that, if beta to any extent measures systematic risk, the higher the individual market share of a firm is, as well as the higher the value of the Herfindahl index and Four-firm concentration ratio in a firm's industry is, the lower the beta of a firm should be. The firm's return is expected to co-vary less with general market wide fluctuations if the firm possesses a high market share and or operate in a concentrated industry with high barriers to entry.

Another interesting aspect is to investigate how measures reflecting industry structure, may not only impact measures of non-diversifiable risk, but also directly affect the stock returns investors require and the cost of capital a firm faces in the capital market. When investors behave in a rational manner and the market incorporates new information efficiently, expected and required return should be

[1] For interpretation of the Herfindahl index and the Four-firm concentration ratio and division of our sample industries on the different levels of concentration see Appendix A.3

directly related to industry structure given that different industry structures facilitate different levels of systematic risk. The theoretical positive relationship between risk and expected return in existing asset pricing theory and the negative relationship found between measures of industry structure and average stock returns for U.S. firms give rise to a second hypothesis:

Hypothesis II*: Given that measures of market power can directly proxy for general economy-wide risk, stocks of firms with high market shares and firms in concentrated industries with high barriers to entry should have lower average stock returns*

The second hypothesis states that higher values of individual market share, the Herfindahl index and the Four-firm concentration ratio should on average be associated with lower stock returns since higher values of these variables are assumed to be equivalent to lower systematic risk exposure. Due to the prevailing disparities in existing asset pricing literature we find it interesting to also test other potential return determinants, for example book-to-market ratio, size and momentum in addition to the industry structure variables, however no separate hypothesis will be stated for this purpose.

6. Data and industry structure variables

This section outlines the methodological approach for constructing the data set, the equations and information used to estimate industry structure variables and finally a description of the sample characteristics of the variables included in our final sample.

6.1 Sample selection

To the best of our knowledge no similar study of the link between industry structure and the capital market has been performed on Swedish data before, hence no complete data set is available. Instead a set of panel data has to be composed for our specific purpose. This involves performing time consuming research and merging information from a variety of sources to make the data set as reliable and representative as possible. To identify industries and assign each firm in our sample a main industry we apply four-digit core NACE Rev 2 codes, which is a European standard of industry classification corresponding directly to the SIC codes that are commonly used in various studies on U.S. data. The starting point is to include Swedish firms listed on the OMX Nordic Exchange Stockholm in the sample. However, firms are eliminated from the study if their operations are too geographically spread or if they are conglomerates that do not conduct a high percentage of their operations within a single four-digit NACE Rev code 2. The criteria for geographical spread is that a firm is not allowed to be more dependent (measured by percentage of total sales) on another single country market than the Swedish. If the industry in which a firm sells a majority of its output is too broadly defined or have international characteristics, a national industry concentration or market share estimate will not be relevant. Existing literature within industrial organization encourages an elimination of poorly defined industries in order to avoid incorrect interpretation of concentration ratios (Scherer and Ross 1990). The intention of this elimination approach is that the structural characteristics of an industry (e.g. concentration and market share) can with higher certainty be used as market power proxies and the influences of sales activities outside the firm's primary industry should be diminished (Sullivan 1977). This approach leaves a total of 80 firms within 35 industries in our final sample.[2]

For stock prices and accounting data the primary source is Thomson Datastream Advance 4.0. Stock prices recorded at the last trading day of each 12 month (1 month) period are used to calculate yearly (monthly) buy-and-hold returns respectively for the period 2000-2009. If any of the sample firms has more than one stock trading on OMX Nordic Exchange Stockholm, only returns of the most liquid as measured by turnover are considered.[3] For construction of financial variables such as size and book-to-market, we use Market Capitalization (WC08001) and Common Equity (WC03501) from Datastream

[2] See Appendix A.1 for a complete list of the firms in our sample and A.2 for division of the firms into sample industries

[3] For most of the firms the returns of the B-stock are used prior to the returns of the A-stock

for each firm-year observation. The variable momentum consists of yearly (monthly) returns that are lagged 12 months. To ensure that the accounting information that some of the additional explanatory variables are based upon is incorporated in the replicated expected stock returns, the returns are measured during a 12 month period starting 6 months after the fiscal year end. This is rather conservative and is based on the assumption that the annual report is publicly available 6 months after the year end. Since not all firms have been listed throughout the period 2000-2009 and the accounting information is not available for each firm-year observation our study is based on an unbalanced panel data set.

6.2 Industry structure variables

Market share

Market share is a relative measure of market power and can be measured as the portion of sales, value added, assets, or employees depending on the purpose of the measure. Ideal for this study would be to measure market share as what proportion of total output a firm produces in a market. However, there is no achievable method to measure the value of output exactly and therefore the market share has to be estimated from other available data. In this study market share (ms_i) is measured as the proportion of firm i's sales (s_i) to the sum of the sales of all firms within firm i's industry.

$$ms_i = s_i / \sum_{i=1}^{I} s_i$$

Herfindahl index

The Herfindahl index measures the seller concentration in a market as the sum of the squared market share of each firm i within industry j (Michelini and Pickford 1985). It is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them.

$$Herfindahl_j = \sum_{i=1}^{I} ms_{ij}^2$$

Increases in the Herfindahl index generally indicate a decrease in competition and an increase of concentration among a few large firms (Hou and Robinson 2006). One advantage of Herfindahl as a concentration measure is that larger weight is given to larger firms and therefore it is a more precise tool for measuring concentration. It is the most popular summary measure combining elements of firm

numbers and inequality (Scherer and Ross 1990). However, the usefulness of the measure might be constrained depending on the definition of the market as well as the geographical scope.

Four-firm concentration

The concentration ratio (C_n) indicates whether an industry comprises a few large firms or many small firms and is calculated as the sum of the market share of the top *n* firms. The ratio measures the proportion of the size of an industry occupied by a specific number of the largest firms (Michelini and Pickford 1985). This is a simple measure that copes with inequality by stressing the position of the largest firms in the market. The Four-firm concentration ratio (C_4) is the most typical concentration ratio and consists of the percentage market share held by the four largest firms within an industry (Scherer and Ross 1990). The limitation with the use of this measure is the fact that it does not indicate the relative size of the four largest firms.

$$C_{4j} = \sum_{i=1}^{4} ms_{ij}$$

Since all of the industry structure variables are based on firm sales within an industry, sales information of all (both public and private) joint-stock firms within each four-digit NACE Rev 2 code in Sweden for the period 2005-2009 is extracted from Bureau van Dijk's database Orbis. For each year the sales information is used to estimate the total market output for each industry and thereafter each sample firm's Swedish market share, as well as the Herfindahl index and the Four-firm concentration ratio for each of the industries, is constructed in accordance with the previously outlined specifications. If necessary, sales figures from Orbis are adjusted using geographical segment information from firm accounts with the intention to reduce the risk that any international sales influence the estimates. If the sales of a subsidiary are reported within the same NACE Rev 2 code as its mother firm and are consolidated in the mother firm's accounts, only the consolidated sales of the mother firm are considered, in order to avoid that sales from the same firm are duplicated and to some degree distort the calculation of market share and the concentration measures.

High values of correlation coefficients between the Herfindahl index and the Four-firm concentration ratio obtained using U.S. data have often led to the conclusion that the choice of concentration measure is not critical. However, it has been found that U.S. data may be biased upward and that correlations are lower when applied on for instance New Zeeland data (Michelini and Pickford 1985). For our Swedish sample the two concentration measures are correlated, still we include both measures in our study in order to account for any differences. Even more important than the choice of index applied is ensuring a proper definition of the industry for which concentration is being measured. For instance, it should be noted that concentration ratios may overstate the degree of monopoly power if

competition from foreign suppliers is significant and not taken into account when defining the market. The concentration ratios may also misrepresent the extent of monopoly because of various idiosyncratic reasons (Scherer and Ross 1990). Due to limited access of information the concentration indexes are not adjusted to include potential import competition in this study. In previous empirical studies linking industry concentration with capital markets, no attention is directed towards import competition, however since most studies are conducted on the large U.S. market it could probably be assumed that imported output is insignificant compared to output produced by domestic firms. An aspect supporting that our specification of the concentration indexes are still reliable, even if not accounting for import competition, is that a majority of the industries included in our sample are Swedish industries where import competition is anticipated to be fairly low and therefore it should be negligible compared to domestic competition also in our context.

6.3 Sample characteristics

In Table 1 we report characteristics of the 80 firms and the 35 industries included in our sample. In panel A sample characteristics of the industry structure variables applied in this study are reported. It can be seen that the average market share for the years 2005-2009 ranges from 0.001 for the firm with the lowest average market share, to 0.637 for the firm with the highest average market share. The values of the average Herfindahl index also show some spread of concentration; 0.010 for the industry with lowest concentration and 0.464 for the industry with highest concentration. However, both the average market share and the average Herfindahl index have sample means in the lower range indicating that our sample is more weighted towards firms with low market power as measured by individual market share and industry concentration in terms of the Herfindahl index. The average Four-firm concentration ratios ranges between 0.148 and 0.938, reflecting that our sample includes industries of both high and low concentration when considering only the sales of the four largest sellers. The mean value of the average Four-firm concentration ratio is 0.459, and therefore the spread of concentration among the sample industries appear to be wider when applying the Four-firm concentration ratio as opposed to the Herfindahl index as a concentration measure. Still, the Herfindahl index and the Four-firm concentration ratio are quite correlated for our sample industries.[4] In panel B sample characteristics of the key dependent variables, yearly stock returns and the risk measure beta, are reported. Complimentary variables such as book-to-market value of equity, the natural logarithm of size in terms of market equity, the natural logarithm of sales and one year lagged yearly stock returns (momentum) are included in Panel B. Both for yearly stock returns and beta there is quite a dispersion of values between the firms as well as for different firm-year observations. The same holds for the firm-year observations of the book-to-market ratio. However, most of the observed

[4] The correlation between the two concentration measures is tested by applying a Spearman rank correlation test in order to see how dependent the concentration definition is on the measure applied. The correlation results are reported in Table I and Table II in Appendix B.

values of size (market equity) appear to be close to the mean value without any outrageous deviations in any firm-year. This observation is in line with the fact that most firms included in this sample currently belong to the same classification (Small Cap) on the stock exchange.

TABLE 1

Summary Statistics

This table reports summary statistics of the sample including 80 OMX Nordic Exchange Stockholm listed securities for the period between 2000 and 2009. Panel A reports summary statistics of industry structure variables such as individual market share and industry concentration measures for four-digit NACE Rev 2 industries. Panel B reports summary statistics of the variables return, beta, book-to-market ratio, ln(sales), ln(size) and momentum.

Panel A: Summary statistics of industry structure variables					
	N	Mean	SD	Min	Max
Market share	693	0.086	0.115	0.001	0.637
Herfindahl	693	0.105	0.111	0.010	0.464
Four-Firm	693	0.458	0.179	0.148	0.938
Panel B: Summary statistics of other variables					
	N	Mean	SD	Min	Max
Return	693	11.75	72.18	-96.19	821.71
Beta	693	0.928	0.477	0.107	2.464
Book-to-market	642	0.597	0.408	0.026	2.396
ln(sales)	675	13.70	1.517	9.59	18.46
ln(size)	645	13.53	1.666	9.22	19.42
Momentum	653	14.31	73.33	-96.19	821.71

The variable market share is the share of total sales each firm contributes to within an industry. Herfindahl is measured as the sum of squared market shares (in terms of sales) of all firms in an industry. Four-firm ratio is measured as the sum of the market shares of the four largest firms within an industry. All the industry structure variables in Panel A are measured as the arithmetic average during the period 2005-2009. The industry structure variables are used for the main sample period 2000-2009 with the assumption that these measures remain relatively stable over shorter periods of time. In panel B returns are yearly buy-and-hold returns for the period 2000-2009 (presented in percentage). Beta is a measure of market risk and is estimated by performing time-series regressions of each stock's monthly returns on monthly returns of the OMXAFGX index. The index is compiling all stocks listed on the OMX Nordic Exchange Stockholm and is therefore a reasonable proxy for the otherwise unobservable market portfolio. The book-to-market ratio is measured as the book value of equity to the market value of equity for each firm and year during the period 2000-2009. The variable ln(sales) is the natural logarithm of reported sales for each firm-year observation. The variable ln(size) is accordingly the natural logarithm of the market value of equity for each firm-year observation and finally the variable momentum consists of one year lagged yearly returns for the period 2000-2009. N is the number or firm-year observations available for each variable. Spearman correlation coefficients between the variables are presented in Table I, Appendix B.

7. Regression specification

To test whether the assumed relationships stated in our hypotheses hold empirically on Swedish data we use regression analysis. By performing Fama-Macbeth (henceforth FM) cross-sectional regressions over two different sample periods, 2005-2009 and 2000-2009, we aim to establish the association between industry structure, systematic risk and expected returns in the Swedish market. The data set only includes values of market share, the Herfindahl index and the Four-firm concentration ratio from the years 2005-2009. To minimize any discrepancies in the data or temporary changes in the industry structure which are not expected to have long-lasting effects on systematic risk or average stock returns these measures are averaged over the five years. These static averages of industry concentration differ from the floating averages Hou and Robinson (2006) use when regressing stock returns on measures of industry concentration. One argument supporting our measure is that the two sample periods in this study are significantly shorter why a static average can be considered appropriate and sufficient. Additionally some practitioners, for example Sullivan (1977, 1978), apply static industry concentration measures estimated from only one specific year either at the beginning or the end of the sample period. Given this, we believe that our method of applying five year averages is more accurate than, or at least as accurate as, some of the previously applied methods.

The first hypothesis, stating that industry structure is directly related to systematic risk, is tested by performing cross-sectional regressions with beta as the dependent variable. We estimate equations of the following form:

$$\beta_{it} = \alpha + b_1 X_{it} + \sum_{n=i}^{N} b_n Z_{it} + \varepsilon_{it} \qquad (1)$$

where X_{it} represent the main independent variables; market share, Herfindahl index and Four-firm concentration ratio. These are all relative measures of market power. Inspired by Sullivan (1978), additional independent variables such as the natural logarithm of sales and compounded annual growth rate of sales, denoted by Z_{it} in the equation above, are regressed together with the industry structure variables to explain the level of systematic risk. Yearly observations of the natural logarithm of sales are intended to represent the firm's absolute power in terms of sales and the compounded annual growth rate of sales should control for the firm's growth in sales during the sample period.

To test the second hypothesis and reinforce that industry structure capture aspects of systematic risk and therefore is directly linked to stock returns, cross-sectional regressions with historical yearly returns as the dependent variable are performed. The regression equations change to the following specification:

$$R_{it} = \alpha + b_1 X_{it} + \sum_{n=i}^{N} b_n Z_{it} + \varepsilon_{it} \quad (2)$$

where X_{it} once again represents the main independent variables; market share, Herfindahl index and Four-firm concentration ratio. However, the supplementary independent variables denoted by Z_{it} are now instead in line with the ones applied in the Hou and Robinson (2006) cross-sectional study of the relationship between industry concentration and average stock returns. Each firm's beta and yearly observations of other known return determinants like book-to-market, size in terms of the natural logarithm of market equity and one year lagged returns (momentum) are tested as independent variables in various regression specifications. Regression equation (2) is altered between applying each independent variable individually in addition to combining each industry structure variable with several of the other proposed return determinants.

Since the industry structure variables originate from the period 2005-2009, the data available is more extensive for this period and therefore all regressions are originally performed using 2005-2009 as the sample period. All regressions are repeated using data for the period 2000-2009 to determine if the results are analogous when extending the sample period. Due to limited data availability, the static averages of market share, the Herfindahl index and the Four firm concentration ratio from 2005-2009 are used even when extending the sample period back to 2000 with the assumption that the average concentration in the sample industries has been fairly stable throughout the preceding ten year period. The regressions are also repeated using monthly stock returns as opposed to yearly for both of the sample periods.

8. Empirical findings

The results of the regression analysis adopted to explore the link between industry structure, economy-wide systematic risk and stock returns are presented in this section. In subsection 8.1 the empirical findings from the regression of beta as a measure of systematic risk on industry structure variables is presented. Extending beyond the assumption that beta is sufficient to explain expected returns we perform regression analysis to find out to what extent industry structure variables are directly linked to stock returns. The empirical findings of these regressions are found in subsection 8.2. Thereafter the robustness of this empirical study is discussed in section 8.3.

8.1 Industry structure and systematic risk

Table 2 reports time-series means of the regression coefficients estimated by FM cross-sectional regressions, applying regression equation (1). Panel A display results for the shorter sample period 2005-2009 (336 firm-year observations) and panel B the results for the extended sample period 2000-2009 (693 firm-year observations). The first hypothesis, suggesting a negative relationship between systematic risk and indicators of market power, is tested in regression I-III where market share, Herfindahl index and Four-firm concentration ratio are used respectively as the main independent variable. In all regressions the natural logarithm of sales is included as a complimentary measure of absolute power and the annual compounded sales growth is included as a control variable.

Based on the estimated coefficients of the industry structure variables reported in Table 2, panel A no general conclusion can be drawn about the relationship between industry structure and market risk during the period 2005-2009. The coefficients of market share, Herfindahl and Four-firm concentration ratio indicate that a slightly positive relationship exists between measures of market power and beta, however out of the three variables only the coefficient of Herfindahl is significant. One plausible explanation for these ambiguous results could be the fact that 2005-2009 is simply too short of a sample period for this type of study.

Directing attention to the results of the extended sample period 2000-2009 reported in Table 2, panel B it can be observed that all measures of industry structure are negatively related to beta. Given the high value of the t-statistics, the estimated coefficients of market share, Herfindahl and Four-firm concentration ratio are statistically significant and supporting the hypothesis that a cross-sectional negative relationship exists between market power indicators and systematic risk for Swedish firms during the period 2000-2009. Accordingly, firms with higher levels of market power should on average experience lower variation with the market.

TABLE 2

Regression Analysis for Beta

This table reports time-series means of coefficients along with t-statistics (in italics in parentheses) estimated from FM cross-sectional regressions of betas on averages of market share, Herfindahl index, Four-firm concentration ratio, ln(sales) and compounded annual sales growth for the period 2005-2009 and 2000-2009. The total number of firm-year observations included in the regression is 336 in panel A and 693 in panel B. Definition of the variables are found in the note to Table 1.

Panel A: Sample period 2005-2009				**Panel B: Sample period 2000-2009**			
	I	II	III		I	II	III
Intercept	1.425	1.444	1.448	Intercept	1.423	1.510	1.537
	(3.24)	*(5.20)*	*(5.97)*		*(13.57)*	*(22.37)*	*(24.03)*
Market share	0.202			Market share	-0.222		
	(0.34)				*(-2.96)*		
Herfindahl		0.616		Herfindahl		-0.196	
		(0.76)				*(-7.76)*	
Four-firm			0.043	Four-firm			-0.158
			(0.19)				*(-6.53)*
ln(sales)	-0.038	-0.040	-0.039	ln(sales)	-0.037	-0.043	-0.041
	(-1.13)	*(-1.85)*	*(-1.73)*		*(-4.56)*	*(-8.39)*	*(-7.55)*
Sales growth	0.243	0.260	0.236	Sales growth	0.066	0.067	0.068
	(1.70)	*(1.89)*	*(1.74)*		*(1.82)*	*(1.93)*	*(1.94)*
Avg R^2	0.041	0.040	0.046	Avg R^2	0.029	0.028	0.029

It is not only interesting to look at the statistical significance of the relationship between the market power derived from a certain industry structure and economy-wide risk but also the economic significance implied by the estimated coefficients in Table 2, panel B. For example going from a market share of 0.001 (sample minimum) to a market share of 0.637 (sample maximum) would, all else equal, lead to a decrease in beta of 0.141 (regression coefficient multiplied by difference in market share). Applying the same reasoning to Herfindahl and the Four-firm concentration ratio gives a difference in beta of 0.083 and 0.125 respectively, between the most concentrated and the least concentrated industry. Interpreting these differences, it is suggested that holding market power or operating in an industry with high concentration may lead to reduced risk exposure of a firm in terms of a lower market beta. However, the economic effect indicated by our results is quite modest. Nevertheless, the findings for the period 2000-2009 are pronounced and highly relevant since the regression results in Table 2, panel B are qualitatively the same independent of the measure of industry structure employed; all indicate a negative relationship between industry structure variables and systematic risk as measured by beta. In accordance with this, our first hypothesis cannot be rejected for the sample period 2000-2009.

8.2 Industry structure and average stock returns

In Table 3 the time-series means of regression coefficients estimated by cross-sectional regressions on yearly stock returns, applying various specifications of regression equation (2) are presented. Panel A reports results for the shorter sample period 2005-2009 (360-381 firm-year observations depending on regression specification) and panel B reports results for the extended sample period 2000-2009 (629-693 firm-year observations depending on regression specification). In regression I-VII yearly stock returns are regressed on each of the independent variables individually, both industry structure variables and other proposed return determinants. In VIII-XIII the model is modified by adding the variables book-to-market, size, beta and one year lagged returns as independent variables to each one of the measures of industry structure.

Similar to the results presented in the previous subsection, the results when regressing measures of industry structure directly on returns, are less pronounced for the shorter sample period of 2005-2009 reported in Table 3, panel A. Once again the focus needs to be directed to the results of the extended sample period of 2000-2009 in Table 3, panel B where it can be seen that the estimated coefficients of market share, Herfindahl index and Four-firm concentration ratio are highly insignificant when regressed alone. Furthermore, as the industry structure variables are applied together with book-to-market, size, beta and one year lagged returns in regression VIII-XIII the t-statistics indicate that the coefficients of all three industry structure variables are still insignificant. Even so it can be noted that the coefficients of the industry structure variables take on positive values in those regression specifications. These signs of a positive relationship between industry structure, in terms of market power or concentration, and stock returns were not expected given the theoretical and empirical framework this study rests upon. The findings may also be thought of as slightly contradictive to the negative relationship established between industry structure and systematic risk in section 8.1 if one insists that a positive relationship exists between systematic risk as measured by beta and returns. As a consequence of the insignificance of the results in Table 3, we have no empirical evidence to support our second hypothesis. The industry structure variables, when used directly as proxies for systematic risk, do not appear to be significantly related to yearly stock returns. On average, industry structure has no explanatory power of the yearly returns generated in the capital market for the firms in this Swedish sample, neither for the period 2005-2009 nor for extended period of 2000-2009.

TABLE 3

Regression Analysis for Stock Returns

This table reports estimated time-series means of coefficients along with time-series t-statistics (in italics in parentheses) from FM cross-sectional regressions of yearly stock returns on market share, Herfindahl index, Four-firm concentration ratio, book-to-market ratio, ln(size), beta and momentum, for the period 2005-2009 and 2000-2009. The regression coefficents are stated as percentages. The total number of firm-year observations included in the regression varies between 360-381 observations in panel A and 629-693 in panel B. Definitions of the variables are found in the note to Table 1.

Panel A: Sample period 2005-2009													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Intercept	11.968	12.850	16.603	-2.546	43.339	15.533	4.936	32.382	27.282	27.419	12.637	7.380	6.843
	(0.72)	*(0.77)*	*(0.79)*	*(-0.27)*	*(1.35)*	*(1.05)*	*(0.45)*	*(0.68)*	*(0.70)*	*(0.70)*	*(0.30)*	*(0.22)*	*(0.20)*
Market share	-9.362							13.670			12.753		
	(-0.48)							*(0.45)*			*(0.40)*		
Herfindahl		-16.562							-3.333			-2.758	
		(-1.06)							*(-0.24)*			*(-0.20)*	
Four-firm			-12.009							-0.070			-5.735
			(-0.85)							*(0.00)*			*(-0.33)*
Book-to-market				26.652				28.848	27.911	27.907	29.441	29.084	29.055
				(2.00)				*(2.06)*	*(1.95)*	*(1.99)*	*(1.99)*	*(1.88)*	*(1.92)*
ln(size)					-2.322			-2.453	-1.954	-1.990	-1.406	-0.901	-0.701
					(-1.29)			*(-0.72)*	*(-0.77)*	*(-0.79)*	*(-0.45)*	*(-0.40)*	*(-0.30)*
Beta						-4.694		-2.728	-3.016	-2.998	-5.465	-5.535	-5.596
						(-1.11)		*(-0.50)*	*(-0.55)*	*(-0.55)*	*(-1.30)*	*(-1.31)*	*(-1.31)*
Momentum							0.245				0.251	0.244	0.249
							(1.87)				*(1.85)*	*(1.76)*	*(1.79)*
Avg R^2	0.011	0.007	0.011	0.039	0.021	0.015	0.089	0.102	0.086	0.094	0.201	0.177	0.188
Panel B: Sample period 2000-2009													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Intercept	13.370	14.412	13.177	1.135	21.716	6.959	10.320	1.076	-4.985	-5.886	-4.228	-9.251	-10.325
	(1.00)	*(1.11)*	*(0.93)*	*(0.10)*	*(1.01)*	*(0.54)*	*(1.21)*	*(0.04)*	*(-0.20)*	*(-0.24)*	*(-0.16)*	*(-0.41)*	*(-0.44)*
Market share	-1.917							25.802			19.170		
	(-0.09)							*(1.47)*			*(1.02)*		
Herfindahl		-10.748							9.326			6.959	
		(-0.81)							*(0.81)*			*(0.55)*	
Four-firm			0.250							12.441			6.876
			(0.03)							*(1.30)*			*(0.65)*
Book-to-market				17.637				20.635	19.920	20.215	20.682	20.501	20.623
				(1.69)				*(2.78)*	*(2.65)*	*(2.77)*	*(2.63)*	*(2.53)*	*(2.61)*
ln(size)					-0.793			-0.566	0.022	-0.301	-0.503	-0.046	-0.183
					(-0.58)			*(-0.30)*	*(0.01)*	*(-0.20)*	*(-0.27)*	*(-0.03)*	*(-0.13)*
Beta						7.071		5.962	5.336	5.720	9.792	9.525	9.831
						(0.35)		*(0.36)*	*(0.32)*	*(0.34)*	*(0.59)*	*(0.56)*	*(0.58)*
Momentum							0.276				0.286	0.284	0.280
							(3.05)				*(3.64)*	*(3.59)*	*(3.51)*
Avg R^2	0.016	0.008	0.011	0.054	0.015	0.116	0.104	0.176	0.166	0.170	0.258	0.246	0.250

Regressions I-XIII are repeated with monthly stock returns for both of the sample periods. The results of these regressions are presented in Table III, Appendix B. The findings for the sample period 2005-2009 are overall qualitatively the same when using monthly stock returns as opposed to yearly; all coefficients of the industry structure variables are insignificant. For the extended sample period of 2000-2009, the coefficients of market share, Herfindahl and Four-firm concentration ratio are positive with higher values of the t-statistics than in some of the regressions of yearly stock returns the same period. In some of the monthly regressions where additional return determinants are included, the coefficients of market share and Four-firm concentration ratio even become statistically significant. However, given the disparities surrounding these empirical findings, no general conclusion can be drawn about the industry structure variables and stock returns in order to either support or reject our second hypothesis. Based on the estimated positive regression coefficients of market share, Herfindahl and Four-firm concentration ratio for 2000-2009, we recognize that it could be that a positive relationship between market power or concentration and stock returns exists as opposed to the hypothesized negative relationship.

It can also be noted that in several of our regression specifications, applying both yearly and monthly returns, there are results pointing towards a positive relationship between book-to-market ratios and stock returns. The same holds for the variable momentum which consists of one year lagged stock returns. Based on our results it appears as if a positive relationship exists between one year lagged stock returns and the subsequent 12 months of stock returns, suggesting a cross-sectional momentum effect in our sample of stock returns.

8.3 Robustness

When applying a statistical approach it is essential to be aware of potential problems that may arise and hence make the regression results less reliable. By using time series means of cross-section observations we are likely to experience less collinearity among variables (Gujarati 2003). Still, to assure robustness we examine the degree of multicollinearity in the regression specifications, which is an effect that implies a high correlation between two or more independent variables in the same regression specification. It arises when the variation in one variable can be explained by other independent variables employed in the same regression, i.e. the variable has a strong linear relationship to other independent variables (Wooldridge 2006). As the degree of multicollinearity increases, the regression model estimates become unstable and the standard errors for the coefficients can get very inflated. Hence with multicollinearity eliminated, coefficients previously insignificant may become significant. We use a variance inflation factor (VIF) to check for multicollinearity between our variables in order to validate their significance and independence in relation to the other variables. By observing the tolerance value, defined as 1/VIF, we find that market share is highly significant in explaining industry concentration, why we chose not to include market share and the

concentration variables in the same regressions. Doing so could bias the results by affecting the standard errors and t-statistics since the variables to some extent measure the same effect.

Heteroskedasticity can arise as a result of the presence of outliers in the sample, which can alter the regression results substantially especially if the sample size is small (Gujarati 2003). Due to our use of unbalanced panel data the possibility to control for heteroskedasticity in our main regressions is limited. Still, when generating the variable beta through time-series regressions, we can control for heteroskedasticity by using robust standard errors. The heteroskedasticity-robust standard errors provide a method for computing t-statistics that are asymptotically t-distributed independent on the actual presence of heteroskedasticity (Wooldridge 2006).

A last attempt to increase the robustness of our results is the reiteration of all combinations of regressions equation (2) using monthly instead of yearly observations of stock returns for both of the sample periods. Since the results are qualitatively similar to when using yearly stock returns this is assumed to increase the credibility of the model specification to some extent.

9. Discussion

In this section we intend to interpret our empirical findings in light of the earlier presented theoretical background and discuss them in connection to findings of previous empirical studies. Furthermore, we will discuss the limitations of our study and the construction of the data set used. Thereafter suggestions of how this study can inspire further research related to the link between industry structure and capital markets will be given.

9.1 Interpretation of empirical findings

The findings in this study provide insight into the link between product markets and capital markets. With the support of microeconomic theory, industrial organization literature and financial empirical studies an attempt has been made to give measures of industry structure a risk-based interpretation. This study is unique in the sense that no previous acknowledged study on the interaction between industry structure and the dynamics of the stock market has been made using Swedish data. Our sample includes stocks of 80 firms divided between 35 various industries and even though this can be considered a quite modest sample, we believe that some of the results found in this study are relevant.

The results of our first regression analysis are in line with Sullivan's (1978) findings that firms in concentrated industries and large firms, in terms of absolute sales, have lower betas than small firms operating in competitive environments. From previous studies it is known that these findings can be interpreted as powerful firms being able to influence or more successfully react to major economy-wide changes and macroeconomic events, leaving them less susceptible to systematic risk. Clearly, these firms could possess the ability to react to shocks and limit the variability in their cash flows as a result of the industry structure they operate within. Even though a negative relationship between beta and the industry structure variables can be established for our sample of firms for the period 2000-2009, it remains a fact that beta has been heavily debated as a measure to fully capture systematic risk. There are many empirical studies dismissing beta as a return determinant but since expected returns have been proven to be difficult to estimate and model, the lack of relationship can not explicitly be assigned to beta. Rather, several factors influence the accuracy of empirical studies and it must be remembered that even if it may not be optimal when it comes to explaining stock returns, beta will always be a measure of stocks' co-variability with the movements of the general market. Therefore beta can still be argued to be a measure of market risk even though the relationship to expected returns might not transfer into the results of all empirical studies. Furthermore, according to a recent study within the field of applied corporate finance it was found that many firms still implement CAPM to estimate their cost of capital, stressing that beta remains an important variable when assessing the risk investors are willing to accept in practice (Graham and Harvey 2002). Given these properties, we

conclude that the empirical findings of a negative relationship between industry structure variables and beta can indeed be supported by a risk based interpretation.

The second round of regressions was aiming at testing whether individual market share and the measures of industry concentration could proxy directly for fundamental risk; suggestively cash flow risk, distress risk or innovation risk. Due to this we expected a negative relationship between the industry variables and stock returns in the cross-section. The empirical results from our second regression analysis do not support a direct use of industry structure variables as proxies for risk in terms of being related to cross-sectional average stock returns.

At first glance our findings of a non-existing or possibly even a positive relationship between industry structure variables and stock returns appear to challenge Hou and Williams' (2006) study where a negative relationship between industry concentration and expected stock returns is found even after controlling for known return determinants. Even though the intuitive interpretation in previous studies on U.S. data is that industry structure is somehow linked to systematic risk, our results must not necessarily be seen as a failure. Our Swedish sample of 80 firms is dominated by stocks with small values of market equity. Small stocks which receive relatively little coverage may be less efficiently priced than large ones (Bodi, Kane and Marcus 2009). If the limited information flows about small firms create an incentive for investors to hold stocks of large firms, some smaller stocks could be associated with illiquidity. If the stocks of smaller firms are less efficiently priced they are likely to incorporate other information than risk into to the prices and hence different industry structures could imply different levels of market risk exposure without this being fully translated into the stock returns. If the Swedish capital markets fail to price some of the small stocks in our sample efficiently, both the insignificance and the indication of an opposite relationship in our results could be explained as a distortion caused by mispricing in an inefficient market.

Another possible explanation as to why the direct relationship between industry structure and stock returns in our sample could potentially be positive instead of negative is based on the profitability aspect. In this study we hypothesized that powerful firms operating in concentrated industries could through different channels deliberately insulate themselves from some economy-wide risk due to the higher levels of profitability they are assumed to experience. The expectation of this effect was in turn predicted to flow over into the capital market leading to powerful firms and firms in concentrated industries having lower average stocks returns. However, the study made by Haugen and Baker (1996) indirectly implies an alternative relationship between features of industry structures in terms of profitability and subsequent returns expected by the investors. The authors assume that currently profitable firms have greater growth potential at least until competition forces profits to normal levels. Based on this assumption they find that the greater the potential for growth in profits and dividends of a firm is, the greater the expected future return of the stock would be. Given that some powerful firms

operate behind substantial barriers to entry it can be speculated to what extent these firms will constantly earn abnormal profits and therefore generate higher rates of return than firms operating in more competitive markets. According to this view, the relationship between profitability, industry structure, and expected returns is not risk born but instead a consequence of common investor beliefs.

Furthermore, indications of a positive relationship between book-to-market ratios and following stock returns are found in the regression analysis of our sample. Therefore we conclude that the book-to-market value of equity has some degree of explanatory power of stock returns generated by our sample firms throughout the period of 2000-2009. These empirical findings stress the book-to-market effect that has been found in several acknowledged studies previously, nevertheless it remains an issue that no general interpretation can be given this effect. Either the ratio can be viewed as a risk related indicator of the prospects of a firm in line with Fama and French (1992) or the effect is simply a consequence of investors overreacting to information about firms as suggested by Lakonishok, Schleifer and Vishny (1994). In our results a momentum effect in stock returns can also be observed which according to Jegadeesh and Titman (2002) would be interpreted as investors being rewarded for other aspects than systematic risk exposure.

The lack of empirical evidence for the size-effect in our sample might not be too surprising when analyzing it in the light of that most of our firms are firms with low market capitalization and hence the variation of size in our sample is too limited to show any impact on the cross-section of stock returns.

When interpreting the results it is important to emphasize the fact that a majority of asset pricing studies rely on the assumption that the capital market is efficient when using risk proxies to explain stock returns. Since future expected returns can not be observed in the real capital market, all studies based on historical data attempts to model the levels of expected returns based on realized returns and the fact remains that realized ex-post returns can differ substantially from ex-ante expected returns.

9.2 Discussion of limitations

For the purpose of this study, several considerations, which are essential in order for this study to be performed, are made and therefore as a natural consequence there are aspects to elaborate on that can have impacted our results. Compared to previous empirical studies we apply a shorter sample period due to limited resources as well as data availability. This serves to make the data sample more sensitive to extraordinary effects during the chosen period. One measure taken to level out these potential effects is the use of averages when constructing the industry structure variables. The actual concentration within an industry is itself considered to be relatively static over shorter time periods why the use of a static average should not be misrepresentative. Moreover, some of the firms in our sample have not been listed throughout the whole sample period and for some firms accounting

information for all years is not available hence we have constructed a set of unbalance panel data. Unbalanced panel data impose restrictions on the ability to perform certain robustness checks of the regression model.

Another fact that could be argued to be a limitation is that the data set was not given but has been constructed manually and involves some compromises on which firms to include. For example, for firms that were considered to be more dependent on international markets in terms of sales it was not believed to be appropriate to apply a Swedish concentration estimate, hence they were not included. Even though conglomerates, in addition to international firms, are excluded we cannot completely mitigate the risk that omitted unobserved effects that is associated with geographical spread or product spread impact the results. The data set was constructed using formal databases and where information was not judged to be sufficient, annual reports were used as a supplementing source. All sources used were to the best of our knowledge critically evaluated; still we acknowledge that there may be other methods applicable for constructing a data set for this type of study. Compared to the alternative of only receiving and accepting a complete data set, our approach may in some aspects be more trustworthy as a result of us knowing and understanding the true composition of the data set.

There are some well-known limitations with the different concentration measures applied. For example, the Herfindahl index does not consider the size of the largest firms within an industry, whereas the Four-firm concentration ratio does not incorporate the relative size of the largest firms. In this study we also disregard a potential import-variable when constructing the Herfindahl and the Four-firm concentration ratio due to limited access of information. In accordance with previous studies not adjusting for import, we assume that this does not bias our results. Besides, most industries in our sample are not considered to be characterized by high levels of imports and therefore effects of any import competition on the concentration measures should not be major. Within literature dealing with industry structure, other factors are presented which are not considered in our model, but that might affect the resulting structure of an industry. Cartels, monopolies created by the government, illegal employment, taxes, subsidies and other public sector activity are examples of elements that serve to alter the competition and therefore the structure of industries.

Even though we have adopted the formal industry classification system NACE Rev 2 there are some known limitations with the system itself due to that evaluations have been done in order to assign each firm an industry code. The NACE Rev 2 industry classification is made in accordance with main economic activity of firms and the more digits used the more specified the industry classification will be. As the Swedish competition authority points out it is always an issue when trying to classify firms of various natures into industries. There are also offsetting concerns when choosing the number of digits used when applying classification codes. On one hand it is desirable to use fine-grained industry classifications so that firms in unrelated lines of business are not grouped together. On the other hand,

being too narrow in the classification may lead to that the some firms are arbitrarily grouped into a distinct industry (Hou and Robinson 2006). We found the use of four digit NACE Rev 2 codes suitable since they are designed to incorporate the core activity of a firm.

Overall, the analysis of the sample could produce results that are heavily dependent upon particular conditions in a few industries and are not necessarily representative of the larger economy. When performing a quantitative study, the generalization ability depends on the number of observations in the sample. Considering the fact that we study the Swedish market, our departure point is already relatively narrow. The final sample consists of 80 listed firms which are fewer than in previous studies, but this could be considered reasonable when taking into account the total number of listed firms on the OMX Nordic Exchange Stockholm together with the fact that too international firms and conglomerates do not qualify. Since our final sample mainly consists of firms listed on the Small Cap, it might be considered as imperfectly representative for the Swedish market and therefore limit general conclusion. As a consequence of the narrow sample we argue that the relationships found in this study are valid given our data and assumptions.

9.3 Further research

With this study, we attempt to introduce a new research approach on Swedish data. Taking this into consideration there is great potential and need for further research of the link between the industry structure of product markets and the dynamics of capital markets.

Since the theory behind a risk based relationship between industry structure and capital markets is partly derived from the firms' behavior during business cycle variations it would be interesting to study the impact of market share and industry seller concentration in bull and bear markets. This way it could better be observed how well the theory about price setting ability, resulting profitability and the hedging against cash flow variability holds. In order to fairly test this a longer sample period may be recommended.

Another suggestion in order to strengthen the assumptions that lie behind a risk based interpretation would be to first test empirically how profitability, barriers to entry and innovation activity is related to industry concentration. This could be measured by using data on profitability, number of firms entering and exiting a certain industry and R&D expenditure for each individual sample firm. Regressions could be performed to establish a relationship between these suggested variables and the industry structure variables with the intention to further reinforce the theoretical framework of this study. Due to time constraints and missing or complex data, these relationships were not possible to investigate in the scope of our study.

Another approach is to extend the sample data and increase the number of observations in order to attempt to strengthen the results. One example could be an inclusion of more import-depending

industries and hence also introduce an import controlling variable in the model. In accordance with this an alternative could be to extend the research focus to include the entire Nordic market. We do also encourage future researchers to perform extended tests on different groupings of firms. Due to the limited size of our sample, we have only presented results for firm-level regressions; however we recommend empirical testing of portfolios sorted on industry or concentration in order to make further interesting observations about how industry structure is related to movements in the capital market.

Moreover, this thesis focuses solely on how systematic risk is affected by industry structure nevertheless it would be interesting to also study how industry structure possibly influences idiosyncratic risk. For example Bowman (1980) finds that firms with higher average profit rates tend to have lower variance i.e. idiosyncratic risk and in line with this it could be that cash flow smoothing activities serve to limit the idiosyncratic risk of a firm. The link between industry structure and idiosyncratic risk is not within the scope of this essay and therefore we consider it to be a topic for future research.

Finally, we believe that it would be suitable to extend our study by testing how the industry structure variables may be correlated to the other potential return predictors applied in this study. Some effects of the industry structure variables might already be incorporated into the financial return predictors, for example the book-to-market ratio. Conclusively, based on the poor existence of studies made within the field, we encourage elaboration on our models and urge further research on industry structure in order to further disclose the significance of industry structure when evaluating performance in capital markets.

10. Concluding remarks

With this empirical study we do not attempt to reject other models of risk and expected stock returns, but instead narrow the gap between features of the product market and the dynamics of the capital markets. Similar attempts have been made using U.S. data however in this study we have chosen to approach the question from a new perspective, using a data sample of 80 firms listed on the OMX Nordic Exchange Stockholm, operating within 35 various Swedish industries.

The empirical findings of this study give indications about the existence of a link between industry structure characteristics, represented by overall level of industry concentration or individual market share of a firm, and the capital markets' dynamics in a Swedish setting. Nevertheless, the results point in somewhat different directions and it remains ambiguous through what channels the market power induced by a certain industry structure might influence levels of risk or returns generated in the stock market.

To conclude, we recognize a negative relationship between beta and the employed industry structure variables for the sample period of 2000-2009, indicating that firms with high market share or in concentrated industries to some extent are able to influence or more successfully react to macro-economic events, leaving them less vulnerable to economy-wide risk than smaller firms in less concentrated industries. To anchor the relationship between industry structure and systematic risk we test if the indicators of market power could proxy directly for systematic risk to some extent which would be reflected in a negative relationship between our industry structure variables and average stock returns. However, no reliable significant relationship can be established between the industry structure variables and the cross-section of average stock returns and if such a relationship does exist in the Swedish market it is in the light of our results speculated to be positive rather than negative. Finally, the observed variation in our results can potentially be caused by the fact that the stocks of small firms in our sample are illiquid as a result of mispricing in an inefficient capital market or the fact that levels of expected returns are approximated by ex-post realized returns which can deviate substantially from ex-ante expected returns.

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Appendices

A. Sample and industry structure variables

A1. List of firms included in the final sample and average market share of each firm

A2. Firms divided into industries with their respective NACE Rev 2 code and average concentration measures

A3. Division between and interpretation of the different degrees of concentration

B. Tables

TABLE I: *Correlation between industry structure variables, other variables and yearly stock returns*

TABLE II: *Correlation between industry structure variables, other variables and monthly stock returns*

TABLE III: *Regression Analysis for Stock Returns*

A. Sample and industry structure variables

A1. List of firms included in the final sample and average market share of each firm

ID	Firm	Market share	ID	Firm	Market share
1	A-COM AB	0.010	41	INTOI AB	0.028
2	INTELLECTA AB	0.011	42	KNOW IT AB	0.069
3	BILIA AB	0.059	43	NOVOTEK AB	0.010
4	BERGS TIMBER	0.006	44	PREVAS AB	0.029
5	RÖRVIK TIMBER AB	0.035	45	PROACT IT GROUP AB	0.036
6	CLAS OHLSON AB	0.120	46	NETONNET AB	0.201
7	HEMTEX AB	0.051	47	MULTIQ INTERNATIONAL AB	0.027
8	JEEVES INFORMATION SYSTEMS AB	0.003	48	AXFOOD AB	0.208
9	MOBYSON AB	0.008	49	BEIJER ELECTRONICS AB	0.032
10	OEM INTERNATIONAL AB	0.023	50	ELEKTRONIK GRUPPEN BK AB	0.059
11	MALMBERGS ELEKTRISKA AB	0.010	51	LAGERCRANTZ GROUP AB	0.055
12	ACANDO AB	0.059	52	NOTE	0.126
13	MODUL 1 DATA AB	0.014	53	ACADEMEDIA AB	0.065
14	MEKONOMEN AB	0.048	54	REJLERKONCERNEN AB	0.042
15	BJORN BORG AB	0.007	55	SWECO AB	0.179
16	KAPPAHL HOLDING AB (PUBL)	0.056	56	ÅF	0.185
17	NEW WAVE GROUP AB	0.037	57	BE GROUP AB	0.091
18	RNB RETAIL AND BRANDS AB	0.044	58	VENUE RETAIL GROUP AB	0.124
19	SWEDOL AB	0.040	59	MSC KONSULT AB	0.001
20	ATRIUM LJUNGBERG AB	0.037	60	SOFTRONIC AB	0.006
21	BRINOVA FASTIGHETER AB	0.009	61	FAGERHULT AB	0.212
22	CASTELLUM AB	0.067	62	JM AB	0.061
23	CATENA AB	0.004	63	NCC AB	0.185
24	DIOS FASTIGHETER AB	0.009	64	BIOVITRUM AB (PUBL)	0.131
25	FABEGE AB	0.075	65	MIDELFART SONESSON AB	0.114
26	FASTIGHETS AB BALDER	0.012	66	PROBI	0.005
27	HEBA FASTIGHETS AB	0.006	67	POOLIA AB	0.101
28	HUFVUDSTADEN AB (PUBL)	0.040	68	PROFFICE AB	0.287
29	KLÖVERN AB	0.026	69	UNIFLEX AB	0.083
30	KUNGSLEDEN AB	0.068	70	ELANDERS	0.368
31	WALLENSTAM AB	0.039	71	LAMMHULTS DESIGN GROUP AB	0.015
32	FAST PARTNER AB	0.011	72	PROFILGRUPPEN AB	0.126
33	SAGAX	0.008	73	DORO	0.028
34	WIHLBORGS FASTIGHETER AB	0.029	74	FENIX OUTDOOR AB	0.488
35	TICKET TRAVEL GROUP AB	0.103	75	NIBE	0.393
36	ADDNODE AB	0.051	76	DUROC AB	0.046
37	CONNECTA AB	0.051	77	PHONERA AB	0.004
38	CYBERCOM GROUP EUROPE AB	0.071	78	TELE2 AB	0.226
39	ENEA AB	0.052	79	TELIASONERA AB	0.637
40	HIQ INTERNATIONAL AB	0.067	80	KABE AB	0.035

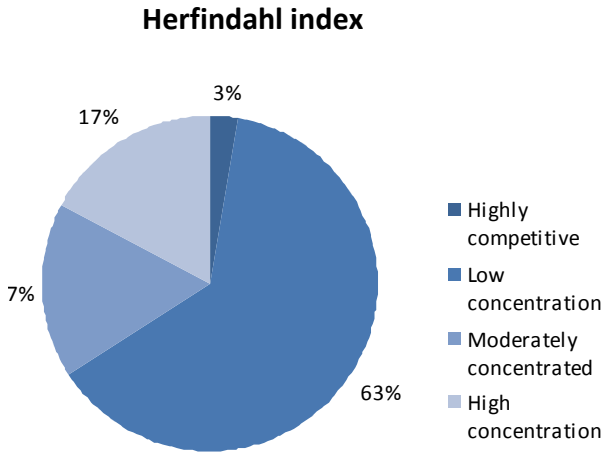
A2. Firms divided into industries with their respective NACE Rev 2 code and average concentration measures

NACE Rev 2	Industry Definition	Herfindahl	Four-firm
1413	**Manufacture of other outerwear**	0.3027	0.8087
	Fenix Outdoor AB		
1610	**Sawmilling and planing of wood**	0.0175	0.1667
	Bergs Timber		
	Rörvik Timber AB		
2120	**Manufacture of pharmaceutical preparations**	0.1078	0.5683
	Biovitrum AB (publ)		
	Midelfart Sonesson AB		
	Probi		
2442	**Aluminum production**	0.1919	0.8087
	Profilgruppen AB		
2521	**Manufacture of central heating radiators and boilers**	0.3955	0.9285
	Nibe		
2611	**Manufacture of electronic components**	0.0770	0.4634
	Beijer Electronics AB		
	Elektronik gruppen BK AB		
	Lagercrantz group AB		
	Note		
2620	**Manufacture of computers and peripheral equipment**	0.0734	0.4630
	MultiQ International AB		
2630	**Manufacture of communication equipment**	0.1327	0.5830
	Doro		
2740	**Manufacture of electric lighting equipment**	0.0901	0.4989
	Fagerhult AB		
2841	**Manufacture of metal forming machinery**	0.3956	0.7158
	Duroc AB		
2920	**Manufacture of bodies for motor vehicles; manufacture of trailers and semi-trailers**	0.4636	0.7464
	Kabe AB		
2932	**Manufacture of other parts and accessories for motor vehicles**	0.0427	0.3152
	Mekonomen AB		
3109	**Manufacture of other furniture**	0.1760	0.5812
	Lammhults Design group AB		
4120	**Construction of residential and non-residential buildings**	0.1072	0.6141
	JM AB		
	NCC AB		

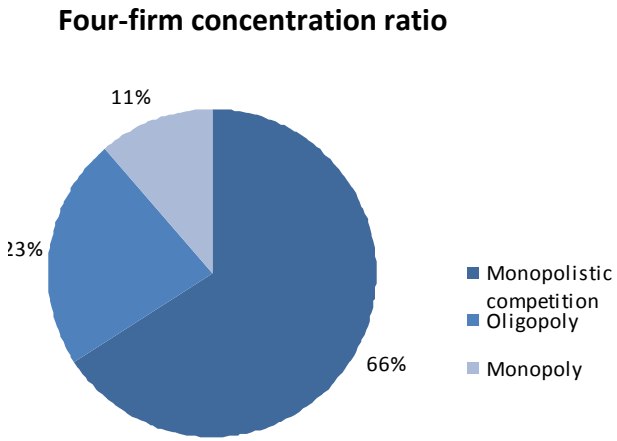
4511	**Sale of cars and light motor vehicles** Bilia AB	0.0162	0.1943
4643	**Wholesale of electrical household appliances** Malmbergs Elektriska AB	0.0287	0.2522
4651	**Wholesale of computers, computer peripheral equipment and software** Jeeves Information systems AB Mobyson AB OEM International AB	0.0233	0.2502
4661	**Wholesale of agricultural machinery, equipment and supplies** Swedol AB	0.0482	0.3298
4672	**Wholesale of metals and metal ores** BE group AB	0.0845	0.4859
4711	**Retail sale in non-specialised stores with food, beverages or tobacco predominating** Axfood AB	0.0757	0.4128
4754	**Retail sale of electrical household appliances in specialized stores** Netonnet AB	0.0721	0.4334
4759	**Retail sale of furniture, lighting equipment and household articles n.e.c.** Clas Ohlson AB Hemtex AB	0.0208	0.2197
4771	**Retail sale of clothing in specialised stores** Björn Borg AB Kappahl holding AB New Wave group AB RNB Retail and Brands AB	0.0757	0.3728
4772	**Retail sale of footwear and leather goods in specialised stores** Venue Retail group AB	0.0847	0.4412
5819	**Other publishing activities** Elanders	0.1665	0.6272
5829	**Other software publishing** Acando AB Modul 1 data AB	0.0332	0.2718
6190	**Other telecommunications activities** Phonera AB Tele2 AB TeliaSonera AB	0.4611	0.9376
6201	**Computer programming activities** MSC konsult AB Softronic AB	0.0874	0.3778
6209	**Other information technology and computer service activities** Addnode AB	0.0689	0.4258

	Connecta AB		
	Cybercom group Europe AB		
	Enea AB		
	HiQ International AB		
	Intoi AB		
	Know IT AB		
	Novotek AB		
	Prevas AB		
	Proact IT group AB		
6831	**Real estate agencies**	0.0611	0.4266
	Atrium Ljungberg AB		
	Brinova fastigheter AB		
	Castellum AB		
	Catena AB		
	Diös fastigheter AB		
	Fabege AB		
	Fastighets AB Balder		
	Heba fastighets AB		
	Hufvudstaden AB (publ)		
	Klövern AB		
	Kungsleden AB		
	Wallenstam AB		
	Fast partner AB		
	Sagax		
	Wihlborgs fastigheter AB		
7111	**Architectural activities**	0.0779	0.4642
	Rejlerkoncernen AB		
	Sweco AB		
	ÅF		
7300	**Advertising and market research**	0.0097	0.1480
	A-com AB		
	Intellecta AB		
7810	**Activities of employment placement agencies**	0.1088	0.5334
	Poolia AB		
	Proffice AB		
	Uniflex AB		
7911	**Travel agency acitivities**	0.0672	0.4454
	Ticket travel group AB		
8559	**Other education nec**	0.0778	0.3807
	Academedia AB		

A3. Division between and interpretation of the different degrees of concentration



Herfindahl index	Industry structure	Number of industries
H < 0.01	Highly competitive	1
H < 0.10	Low concentration	22
0.10 < H < 0.18	Moderately concentrated	6
H > 0.18	High concentration	6



Four-firm concentration	Industry structure	Number of industries
C4 < 0.5	Monopolistic competition	23
0.5 < C4 < 0.8	Oligopoly	8
C4 > 0.8	Monopoly	4

B. Tables

TABLE I

Correlation between industry structure variables, other variables and yearly stock returns

This table reports Spearman rank cross-sectional correlation coefficients for the period 2005-2009 in panel A and for the period 2000-2009 in panel B. Definitions of the variables are found in the note to Table 1.

Panel A: Sample period 2005-2009

	Market share	Herfindahl	Four-firm	ln(size)	ln(sales)	Book-to-market	Beta	Momentum	Return (y)
Market share	1.000								
Herfindahl	0.439	1.000							
Four-firm	0.443	0.878	1.000						
ln(size)	0.454	0.015	0.223	1.000					
ln(sales)	0.726	0.126	0.217	0.753	1.000				
Book-to-market	-0.192	-0.121	-0.022	-0.115	-0.136	1.000			
Beta	-0.085	-0.069	-0.166	-0.237	-0.184	-0.041	1.000		
Momentum	0.028	0.004	0.010	-0.028	-0.026	-0.008	-0.023	1.000	
Return (y)	0.008	0.000	-0.010	-0.137	-0.107	0.146	-0.080	0.278	1.000

Panel B: Sample period 2000-2009

	Market share	Herfindahl	Four-firm	ln(size)	ln(sales)	Book-to-market	Beta	Momentum	Return (y)
Market share	1.000								
Herfindahl	0.432	1.000							
Four-firm	0.455	0.875	1.000						
ln(size)	0.452	0.035	0.217	1.000					
ln(sales)	0.676	0.117	0.239	0.743	1.000				
Book-to-market	-0.117	-0.103	-0.001	-0.219	-0.075	1.000			
Beta	-0.091	-0.052	-0.151	-0.175	-0.186	-0.116	1.000		
Momentum	0.068	0.002	0.038	0.110	0.081	-0.085	-0.116	1.000	
Return (y)	0.066	-0.004	0.027	-0.109	-0.016	0.223	-0.140	0.225	1.000

TABLE II

Correlation between industry structure variables, other variables and monthly stock returns

This table reports Spearman rank cross-sectional correlation coefficients for the period 2005-2009 in panel A and for the period 2000-2009 in panel B. Definitions of the variables are found in the note to Table 1.

Panel A: Sample period 2005-2009

	Market share	Herfindahl	Four-firm	ln(size)	ln(sales)	Book-to-market	Beta	Momentum	Return (m)
Market share	1.000								
Herfindahl	0.443	1.000							
Four-firm	0.445	0.882	1.000						
ln(size)	0.442	0.004	0.204	1.000					
ln(sales)	0.725	0.128	0.216	0.720	1.000				
Book-to-market	-0.194	-0.122	-0.017	-0.132	-0.111	1.000			
Beta	-0.083	-0.078	-0.174	-0.238	-0.169	-0.014	1.000		
Momentum	0.018	0.003	0.007	0.051	-0.015	-0.087	-0.041	1.000	
Return (m)	0.021	0.005	0.011	-0.011	0.011	0.060	-0.017	0.062	1.000

Panel B: Sample period 2000-2009

	Market share	Herfindahl	Four-firm	ln(size)	ln(sales)	Book-to-market	Beta	Momentum	Return (m)
Market share	1.000								
Herfindahl	0.433	1.000							
Four-firm	0.451	0.878	1.000						
ln(size)	0.450	0.035	0.217	1.000					
ln(sales)	0.672	0.121	0.239	0.723	1.000				
Book-to-market	-0.125	-0.103	-0.005	-0.227	-0.058	1.000			
Beta	-0.090	-0.056	-0.152	-0.191	-0.180	-0.082	1.000		
Momentum	0.043	-0.001	0.020	0.066	0.029	-0.052	-0.063	1.000	
Return (m)	0.044	-0.003	0.021	-0.007	0.032	0.089	-0.057	0.081	1.000

TABLE III

Regression Analysis for Stock Returns

This table reports estimated time-series means of coefficients along with time-series t-statistics (in italics in parentheses) from FM cross-sectional regressions of monthly stock returns on market share, Herfindahl index, Four-firm concentration ratio, book-to-market ratio, ln(size), beta and momentum, for the period 2005-2009 and 2000-2009. The regression coefficients are stated as percentages. The total number of firm-month observations included in the regression varies between 4459-4676 observations in panel A and 7883-8584 in panel B. Definitions of the variables are found in the note to Table 1.

Panel A: Sample period 2005-2009													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Intercept	0.807	0.846	0.676	0.150	0.522	1.049	0.700	-0.027	-0.306	-0.458	0.099	-0.398	-0.575
	(1.00)	*(1.00)*	*(0.64)*	*(0.18)*	*(0.21)*	*(2.00)*	*(0.93)*	*(-0.01)*	*(-0.11)*	*(-0.17)*	*(0.03)*	*(-0.15)*	*(-0.22)*
Market share	0.402							0.905			1.423		
	(0.31)							*(0.56)*			*(0.86)*		
Herfindahl		-0.052							0.358			0.448	
		(-0.03)							*(0.21)*			*(0.25)*	
Four-firm			0.363							0.881			0.986
			(0.34)							*(0.83)*			*(0.94)*
Book-to-market				1.403				1.533	1.458	1.498	1.640	1.558	1.589
				(2.46)				*(2.70)*	*(2.41)*	*(2.52)*	*(2.95)*	*(2.59)*	*(2.68)*
ln(size)					0.025			0.014	0.040	0.022	-0.020	0.024	0.006
					(0.15)			*(0.07)*	*(0.21)*	*(0.12)*	*(-0.10)*	*(0.13)*	*(0.03)*
Beta						-0.226		-0.119	-0.134	-0.125	-0.074	-0.077	-0.064
						(-0.45)		*(-0.23)*	*(-0.26)*	*(-0.24)*	*(-0.14)*	*(-0.15)*	*(-0.12)*
Momentum							0.029				0.018	0.018	0.019
							(1.15)				*(0.71)*	*(0.75)*	*(0.79)*
Avg R^2	0.011	0.017	0.018	0.023	0.029	0.025	0.023	0.090	0.094	0.093	0.112	0.116	0.114
Panel B: Sample period 2000-2009													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Intercept	0.343	0.468	0.043	-0.496	1.700	1.260	0.458	-0.630	-1.156	-1.235	-0.369	-0.870	-0.953
	(0.48)	*(0.67)*	*(0.05)*	*(-0.64)*	*(0.87)*	*(2.71)*	*(0.78)*	*(-0.30)*	*(-0.55)*	*(-0.60)*	*(-0.18)*	*(-0.42)*	*(-0.47)*
Market share	2.176							2.603			2.341		
	(1.60)							*(2.06)*			*(1.87)*		
Herfindahl		0.656							1.276			1.224	
		(0.52)							*(1.06)*			*(1.04)*	
Four-firm			1.085							1.638			1.502
			(1.31)							*(2.13)*			*(2.00)*
Book-to-market				1.927				1.677	1.612	1.651	1.689	1.626	1.659
				(3.97)				*(3.85)*	*(3.62)*	*(3.73)*	*(4.02)*	*(3.75)*	*(3.84)*
ln(size)					-0.083			0.032	0.085	0.041	-0.004	0.043	0.004
					(-0.65)			*(0.23)*	*(0.61)*	*(0.30)*	*(-0.03)*	*(0.32)*	*(0.03)*
Beta						-0.784		-0.386	-0.466	-0.424	-0.164	-0.224	-0.191
						(-0.91)		*(-0.47)*	*(-0.56)*	*(-0.51)*	*(-0.20)*	*(-0.27)*	*(-0.23)*
Momentum							0.057				0.058	0.057	0.059
							(3.03)				*(3.24)*	*(3.23)*	*(3.33)*
Avg R^2	0.016	0.015	0.017	0.032	0.027	0.075	0.035	0.146	0.145	0.145	0.169	0.169	0.169