

Insider Ownership and Corporate Performance – Evidence from Germany*

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Abstract

In this paper we address the question whether there is any empirical relationship between corporate performance and insider ownership. Most studies deal with Anglo-Saxon countries, where it seems that results are significantly affected by an endogeneity problem. This problem is due to the fact that in these countries insider ownership seems to be mainly driven by compensation contracts. We argue that Germany might be different in this regard. In fact, insider ownership seems to be rather stable over time. Starting from this presumption our data will allow to make an unbiased observation as to whether insider ownership affects firm performance. Using a data set of 245 companies for the year 2003 we find evidence for a positive and significant relationship between corporate performance, as measured by stock price performance as well as by Tobin's Q, and insider ownership. This relationship seems to be rather robust, even if we account for endogeneity by applying a 2SLS regression approach. Moreover, we also find outside blockownership as well as more concentrated insider ownership to have a positive impact on corporate performance. Overall the results indicate that ownership structure might be an important variable explaining the long term value creation in the corporate sector.

Keywords:

Ownership Structure, Shareholder Structure, Insider Ownership, Firm Performance, Corporate Governance, Agency Costs

JEL classification code: G32

1 Introduction

Since the pathbreaking study of Berle and Means (1932), which was the first to put light on the fact that large American corporations were usually not run by their owners, a whole branch of research evolved investigating into the effects of the separation of ownership and control. However, the implications of the findings of Berle and Means remained almost unnoticed for a long time before Jensen and Meckling (1976) developed their “theory of the firm”, and thereby explicitly modelled the effects of the dispersion of ownership and control. The studies of Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990) have been among the first to empirically test the effects of managerial equity ownership (i.e. insider ownership) on firm value. Since then several studies have been published on that issue.

Two important results emerge from this branch of literature. First, most of these studies provide evidence that insider ownership actually affects firm value, although the relationship seems not to be monotonic. A positive impact of insider ownership on firm value can be explained by the so-called *convergence-of-interest hypothesis*, stating that larger equity shares of insiders should be associated with higher market valuations due to lower agency costs. In contrast, a negative relation can be explained by the so-called *entrenchment hypothesis*, predicting that insider ownership above a certain threshold will have a value destroying effect due to the upcoming conflict between large blockholders (in this case the management) and the dispersed shareholders. These two hypotheses serve as an explanation for the bell-shaped relationship between insider ownership and firm value found by McConnell and Servaes (1990) or the piecewise-linear relationship discovered by Morck, Shleifer, and Vishny (1988) in their previous study.

However, a serious theoretical objection against the approach used in these studies has been put forward by Demsetz (1983). He argues that insider ownership is endogenously determined and, hence, cannot be a determinant of firm value. His arguments are supported by the evidence presented in Demsetz and Lehn (1985), where firm size, volatility, return on assets and industry evolve as adequate explanatory variables for the ownership structure of US corporations. Hence, it may well be that low levels of managerial ownership turn out to be an optimal incentive arrangement in those firms whose firm value tends to be lower than in other companies, where higher levels of insider ownership are optimal. As long as one cannot control for the variables being responsible for this relationship, i.e. there is *unobserved firm heterogeneity*, the detected correlation between ownership and firm performance might just be spurious.

Therefore, more recent studies pay special attention to this problem of *endogeneity*. In fact, the second important result emerging from the pertinent literature indicates that by using more advanced econometric methods that allow to partially control for endogeneity it seems that firm performance is not affected by managerial ownership.¹ However, some doubts are left preventing these results from being accepted as a final outcome. Evidently, in a perfect frictionless capital market competitive forces would make sure that every company puts a value maximizing ownership structure in place. By definition, insider ownership would be endogenous and presumably determined, among other factors, by the company’s performance. Under such a theoretical perspective the question itself, whether firm performance

¹For a comprehensive overview of these studies see Demsetz and Villalonga (2001, pp. 231-233).

depends on the ownership structure, is nonsense.

However, pondering on the vast corporate governance literature that emerged over the last decade may challenge this theoretical perspective. Several questions arise in this context. First of all, do corporate governance regimes really allow market forces to put value maximizing ownership structures in place? Isn't it true that in many countries, including the US, several mechanisms exist allowing managers to shelter themselves from the market for corporate control? And, finally, isn't it true that ownership structure often is rather inert, making a flexible adjustment to changing market conditions unlikely? From these questions it follows immediately that more evidence on the ownership-performance relationship is needed, especially under different corporate governance regimes.

This study makes a contribution to the literature exactly under this perspective. First, as a code law country, the whole German corporate governance regime is very different from that governing common law countries. As a stylized fact, in code law countries investor protection regularly is lower and the market for corporate control is more hampered.² This is particularly true for Germany, as Franks and Mayer (1990) or Wenger and Kaserer (1998a) have pointed out. Therefore, it might well be that ownership structure does not flexibly adapt to pressures coming from investors searching for value gains. This inertia in the ownership structure is enhanced by the fact that blockholdings have been of particular importance in Germany. These blockholdings were due to presence of a large number of family-controlled companies and to a dense network of corporate cross-holdings.³ It is interesting in this regard to note that according to a recently evolving branch of the literature, which pays particular attention to a special case of insider ownership by looking at the impact of family ownership on firm performance, new evidence has been found corroborating the presumption that ownership structure matters to performance.

The second contribution of this paper is more technical, but nevertheless interesting. Almost all papers investigating the relationship between ownership structure and firm performance aim to measure the latter by Tobin's Q, i.e. by putting the market value of a company in relation to the replacement value of its assets. In practice, however, Tobin's Q is approximated by a firm's market-to-book ratio. We have strong reservations whether the market-to-book ratio can really be taken as a proxy for firm value, at least in a Continental-European accounting context, where historical cost accounting is still important. Therefore, we measure firm performance by the stock price return.

Our results indicate that there is a significantly positive relationship between insider ownership and firm performance as measured by stock price performance over a five year period. In order to account for possible endogeneity we employ an instrumental variable two-stage least squares regression approach. It turns out that results seem not to be driven by endogeneity. Moreover, we also find outside blockownership as well as more concentrated insider ownership to have a positive impact on corporate performance. Hence, the paper is in line with the perception that ownership may have an autonomous influence on firm performance.

²Cf., among others, La Porta, Lopez-de Silanes, Shleifer, and Vishny (2000), La Porta, Lopez-de Silanes, and Shleifer (1999), and La Porta, Lopez-de Silanes, Shleifer, and Vishny (1998).

³For a detailed description of this network as of 1996 cf. Wenger and Kaserer (1998b, pp. 51-61); There is some indication that the density of this network has been reduced over the last 4 years. Cf. Höpner and Krempel (2005, pp. 10-11).

The rest of the paper is organized as follows. Section 2 gives a brief literature review. Section 3 explains the research design as well as the data set, while section 4 presents the results. Section 5 concludes.

2 A Brief Review of the Literature

As has been mentioned, the first studies investigating into the relationship between insider ownership, as measured by top-managements' shareholdings, and firm value have been those of Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990). Both papers found a significant, non-monotonic relationship. The most important theoretical objection against the approach used in these studies has been put forward by Demsetz (1983) and Demsetz and Lehn (1985). Basically, they argue that in competitive capital market environment market forces will make sure that every company chooses its value maximizing ownership structure. Hence, inside ownership is an endogenously determined variable and any observed correlation of ownership and firm value is, basically, meaningless. In fact, the relationship of inside ownership with firm value might be due to some firm characteristics that are unobservable for the econometrician. As a consequence, an endogeneity problem arises, because ownership structure and firm value are determined simultaneously. In fact, Demsetz and Lehn (1985) show that ownership structure of US companies is plausibly determined by firm size, stock price volatility, industry affiliation, and some other variables. According to their view this corroborates the understanding that ownership structure is endogenously determined. Himmelberg, Hubbard, and Palia (1999) extend Demsetz and Lehn's results by using a fixed effects panel data model and instrumental variables to control for possible unobserved firm heterogeneity. They conclude, that most variation in managerial ownership is explained by unobserved firm heterogeneity and that managerial ownership does not affect firm performance to an econometrically observable extent. Research presented by Loderer and Martin (1997) points in the same direction. They construct a simultaneous equation system for a set of companies involved in acquisitions which handles performance and insider ownership as endogenous variables. As a result, insider ownership does not have a predictive effect on performance in their model, but the other way round performance has a negative effect on insider ownership. Cho (1998), after being able to replicate the results of Morck, Shleifer and Vishny, builds a simultaneous equation system consisting of three equations where insider ownership, performance and investment are treated as endogenous variables. Similarly to Loderer and Martin performance seems to influence ownership but not vice versa.

An integrated approach, where insider ownership is treated as only one of seven corporate governance mechanisms, is taken by Agrawal and Knoeber (1996) who present evidence of interdependence among these mechanisms in a large sample of US firms. The positive effect of insider ownership on firm performance, which was found if each mechanism was examined separately, disappears in the integrated model, broadly supporting Demsetz' theory of the optimal use of control mechanisms. A similar procedure is later taken by Bhagat and Jefferis (2002). They are able to find evidence for their hypothesis that takeover defenses, takeovers, management turnover, corporate performance, capital structure, and ownership structure are interrelated and, thus, should be examined in a system of simultaneous equations. However, they admit that "such a system of equations is nontrivial" and even looks less feasible for studies about non US markets, where data availabil-

ity and quality often represent a serious problem. Beiner, Drobetz, Schmid, and Zimmermann (2005), following the methodology of Agrawal and Knoeber (1996), model a simultaneous equation system which defines block ownership, a constructed firm-specific corporate governance index, board size, outside representation of the board, and leverage as relevant corporate governance mechanisms besides insider ownership. Using a sample of 109 Swiss listed companies they find evidence for the widespread hypothesis of a positive relationship between corporate governance and performance.

Recently, a new branch in the literature has evolved which investigates into the effects of family-control. Evidently, family ownership has to be seen mostly as a special case of insider ownership and therefore this new family business literature is quite relevant for the insider ownership issue as well. This is even more true for Germany, where family businesses traditionally attracted a lot of attention given their predominate economic role. For the US, recently Anderson and Reeb (2003) show that family ownership is present in a third of all S&P 500 companies and that family firms outperform non-family firms, thus suggesting that family ownership is an effective organizational structure. Villalonga and Amit (2005), looking at all Fortune 500 companies during 1994-2000, come to the conclusion that family ownership creates value for the case that the founder serves as CEO or as chairman of the family firm. We argue that family ownership is stickier than equity ownership of hired managers. Therefore, as it is quite unrealistic to assume that this type of ownership adjusts continuously to changing market conditions, it may be improbable that family ownership is endogenously determined, except in the very long run. Actually, these results are at least challenging from a perspective, where insider ownership and corporate value are simultaneously determined.⁴

While previous results are predominantly derived from US data, also some international evidence exists. For the UK, Davies, Hillier, and McColgan (2005) find that the insider ownership-corporate value relationship is co-deterministic giving further evidence to the work of Himmelberg, Hubbard and Palia or Cho. For Japan, Chen, Guo, and Mande (2003) are able to find a positive relation between insider ownership and firm performance, if they control for fixed effects. Their results are stable to the treatment of insider ownership and Tobin's Q (as a measure of firm performance) as endogenous variables in a simultaneous equation system. For Switzerland, Beiner, Drobetz, Schmid, and Zimmermann (2005) also find a significantly positive effect of managerial ownership on firm valuation. Their findings also remain stable, if insider ownership is integrated in a simultaneous equation system, thus suggesting that the influence of insider ownership on performance does actually exist.

Given the fact that results coming from code law countries tend to be in conflict with US evidence, the presumption arises that the relationship between ownership structure and corporate performance might be influenced by the corporate governance regime. Therefore, it is very interesting that some studies dealing with German family firms corroborate the view that ownership matters for firm value. For instance, by looking at the long run performance (1903-2003) of a matching sample of 62 family and 62 non-family firms, Ehrhardt, Nowak, and Weber (2004) show that family businesses outperform non-family firms in operating performance, but not with respect to stock price performance. In an earlier study of 105 IPOs of German family-owned firms Ehrhardt and Nowak (2003) found that the long run

⁴Further studies about family firms are e.g. McConaughy, Walker, Henderson, and Mishra (1998), Chami (1999) or Burkart, Panunzi, and Shleifer (2003).

abnormal performance of family firms was affected by the family ownership pattern during a three year post-IPO period. Bott (2002), who analyzes the effects of announcements of changes in shareholder structures with regard to shareholder concentration and shareholder identity, does not find convincing evidence that stock market reactions to those announcements depend on the identity of the shareholders.

Besides founding family ownership, the concentration of share ownership has attracted some German research recently. For example, Edwards and Weichenrieder (2004) show that for most types of large shareholders the benefits of concentrated ownership through greater monitoring of management and reduced agency conflicts equal or sometimes even significantly outweigh the harmful effects of concentration, e.g. private benefits through exploitation of minority shareholders. Hereby, they especially distinguish between control rights and cash flow rights, which usually differ when non-voting share classes exist. While looking at control rights seems appropriate for the examination of monitoring effects, cash flow rights seem to be the right measure for the investigation of alignment of interest effects. Hence, we define share ownership as the portion of cash flow rights throughout this study, because intuitively the monitoring effect of block ownership can not be assumed to be present in the case of managerial ownership. The results of Edwards and Weichenrieder are in line with prior findings of Edwards and Nibler (2000) which concluded that ownership concentration is a more important factor in the German corporate governance system than banks, which originally were thought to possess a dominating role.

3 Methodology and Data

3.1 Methodology

In this study, we will use a cross-section of German listed companies to examine current shareholder structures and the phenomenon of insider ownership. Though being aware of the problems arising from the use of mere cross-sectional data, we decided to use them because of the following reasons: First, since insider ownership in Germany experienced little attraction in research until now, we thought that it is still necessary to better understand shareholder structures at large and to learn more about the appropriate measurement of insider ownership before going into a deeper analysis. Second, since the historical availability of shareholder structure data in Germany is rather limited, the construction of a large and comprehensive panel data set faces an enormous effort. Furthermore, it is not clear if such an effort would be rewarded, because poor data quality might pose natural limits to the examination of low frequency (e.g. yearly) shareholder structure data. Third, as we will show in section 4 insider ownership tends to be rather sticky, limiting the insights from a panel data analysis.

We will address our research question in a three step analysis. In a first step, explicit attention is paid to the descriptive statistics. This is done in section 3.4, where a comparison with prior findings for the German market is presented. In a second step, section 4 presents the results of an OLS-regression estimation in order to gain a more extensive understanding about the effectiveness of insider ownership as a corporate governance mechanism. Finally, we follow the contemporary research trend to build a simultaneous equation system to treat insider ownership

and performance as endogenous variables. In this way we should be able to control for endogeneity in our data set.

3.2 Sample Selection

The universe for the cross sectional sample comprises all companies, which were member of the CDAX at the end of 2003 and 1998, i.e. in existence during the past five years.⁵ The way how the final sample was derived is shown in table 1.

Insert table 1

From a total of 520 share classes 245 firms have been left in the data set after excluding secondary share classes, financial firms, firms with missing data, and another 86 companies, which are not listed in the CDAX as of 31.12.2003, we were left with a total of 294 companies.⁶ However, complete data sets are available for only 238 companies. Consequently, our sample captures 51,5% of all and 62,6% of all non-financial CDAX companies as of 31.12.1998.

3.3 Definition of Variables

The ownership structure variables constitute a key element in this analysis and, hence, deserve additional attention. The shareholder structures has been taken from the 2004-I edition of Hoppenstedt Aktienführer. Identified shareholders have been classified manually according to a proprietary scheme which is further described in table 2.

Insert table 2

In line with common research all members of both boards, i.e. the management board ("Vorstand") and the supervisory board ("Aufsichtsrat"), as well as their families are defined as being insiders (coded as MB and SB). In addition, we also identify a third group of "quasi-insiders", in which we classified all former members of the boards and their families (FBM). For this reason the insider definition used in this study deviates from that normally used in the literature. Nevertheless, this may be reasonable as in this way we account for a peculiarity of German companies, were former board members with large ownership stakes often execute considerable influence on "their" former companies without being officially in charge. Because we are ignorant of the appropriate measure for insider ownership in Germany we will test these single measures individually as well as in combination, where total insider ownership is defined as the total equity stake controlled altogether by the three insider groups (MB_SB_FBM).

Besides insiders, we define non-financial corporates, investment companies, banks, insurance companies, other institutional investors, government, outside individuals,

⁵The condition that companies must have been CDAX members for the past five years is introduced because we decided to track performance over this period.

⁶Most of the 86 companies were either acquired by another listed companies or delisted after a squeeze-out. We are aware of the fact that this criterion may induce a sample selection bias into our analysis. However, since only few of these companies actually went bankrupt and we did not find any signs of systematic differences of these firms compared to the sample firms, we think that the potential bias is manageable from an econometric point of view.

treasury shares (of course not a real owner type), employees, and others as relevant outside ownership groups. As a result, for each company an ownership structure by owner type becomes available, where the individual variables express the percentage share owned by the respective groups. As mentioned in section 2, we decided to use cash flow instead of control rights for measuring ownership.⁷ Alongside ownership type variables also two ownership concentration variables, BLOCK_O and BLOCK_NO, are computed, indicating the cumulative share owned by all outside blockholders owning at least 5% and the number of those outside blockholders, respectively. These variables are introduced because there is a widespread believe that block ownership constitutes an effective monitoring mechanism. Consequently, an interdependency between insider ownership and block ownership is probable.

An overview of all key variables used in this study and their descriptions is given in table 3. Firm performance is measured as Tobin's Q (Q_AV) as well as on the basis of historical stock returns (SR_AV). As suggested by Chung and Pruitt (1994), Agrawal and Knoeber (1996), and Beiner, Drobetz, Schmid, and Zimmermann (2005) we use the "simple" Tobin's Q. Hence, Tobin's Q is calculated as the market value of the firm divided by its book value. The market value is calculated as the sum of the market value of equity⁸ plus the book value of debt. The book value of the firm is approximated by the book value of total assets. It should be noted that according to the definition of Tobin's Q the denominator should be the replacement cost of total assets. Following other studies we proxy the unobservable replacement costs by the book value. However, as has already been pointed out there are strong objections against this procedure in a Continental-European accounting context, where historical cost accounting is still prevalent.⁹ Hence, we put much more emphasis on the results where firm performance is measured on the basis of stock price returns.

It should be noted that this approach, in a certain sense, is more conservative than the firm value approach used in the US literature. To see this, assume that for whatever reason there is a positive relationship between insider ownership and firm performance. If the market is completely aware of this relationship, stock prices would react accordingly right in the moment when the ownership structure becomes public. Hence, as long as there is no change in the ownership structure no under- or outperformance would be observable, even though insider controlled companies would be economically successful. Under these conditions our approach would not be able to detect any relation between insider ownership and firm performance. However, if the market does not fully reflect the benefits of insider control right from the beginning, stock price returns would convey partial information about the market's assessment of the benefits of insider ownership. It seems plausible that the market is affected by such learning effects, especially if longer periods are taken into consideration. However, the longer the period of observation the more likely it is that even a rather sticky ownership variable is subject to changes and, hence, the stock price movement would be affected by such changes. For that reason we chose an observation period of 5 years, being sufficiently long in order to account for the market's learning effects, but sufficiently short not to be too much affected by

⁷Meanwhile control rights are measured by the share of voting shares (usually ordinary shares), cash flow rights also include potential non-voting shares (usually preferred shares).

⁸To reduce fluctuations in the market value of equity, we followed Beiner, Drobetz, Schmid, and Zimmermann (2005, p. 25) by computing the market value of equity as the mean of daily observations during 2003.

⁹For similar objections cf. Edwards and Weichenrieder (2004, p. 152).

changes in the insider ownership structure.¹⁰ Finally, it should be noted that stock returns are calculated as the arithmetic average of 60 monthly total returns from December 1998 to December 2003. All market data and accounting information are drawn from the Datastream and Worldscope database.

Insert table 3

Besides ownership and performance variables a number of control variables are introduced. *Firm Size* (LN_ASSETS), measured by the natural logarithm of total assets, is included to account for the fact that insider ownership in very large corporations is less widespread. Moreover, governance mechanisms might be different in large companies. The *growth potential* (SALES_G), which is expected to be captured in the market valuation of equity, is proxied by the average annual sales growth over the past three years, i.e. 2001 - 2003. We include it in our analysis to differentiate higher market valuations arising from higher growth potential from those that might be the result of lower agency costs due to the alignment of interest among management and other shareholders. *Firm specific risk* (SIGMA) measures the standard deviation of 60 monthly stock returns. The dummy variable *dividends* (DIV) indicates whether dividends have been paid during 2003. The *financial structure* (LEVERAGE), measured as total debt to firm value, reflects the disciplining effect of higher interest burdens on managements' behavior. Differences in market valuation due to variations in *operating performance* were accounted for by including the return on assets (ROA), calculated as the ratio of operating profit to the average of total assets as of year end 2002 and 2003. Finally, industry dummy variables are used to account for heterogeneity among eight different industries¹¹.

3.4 Descriptive Statistics

According to the data the mean ownership stake of insiders, as measured by cash flow rights, adds up to 27,8%. As can be seen from the summary statistics in table 4 incumbent executive board members control on average 9,6% of their firm's shares, while incumbent supervisory board members control 10,4% on average. The equity stake of former board members averages 7,8%. As a further result it should be emphasized that outside blockholders, i.e. all non-insiders that control a stake of at least 5% each, dispose of 33,0% on average. Finally, table 4 gives summary information about all the other variables used in this study.

Insert table 4

As can be seen from table 5 there are no remarkable differences among six of the eight industry categories. However, the insider ownership pattern in the food&beverages- as well as in the utilities-industry is quite different from other industries. In fact, the former has an unusual high insider ownership share of 49,8%,

¹⁰A similar approach has been used in some recent corporate governance studies, e.g. Drobetz, Schillhofer, and Zimmermann (2004) .

¹¹Our industry classification differs from the current scheme used by Deutsche Börse AG which classifies Prime Standard companies into 18 different industries, since the new classification scheme differs from the one in place at the end of 1998. Furthermore, we reduced the number of industry categories in place as of end 1998 by grouping from 15 to 8 non-financial categories in order to increase the number of cases in each category

while in the latter the opposite is true with an insider share of 5,7%. Presumably, this result is driven by a size effect and small group sizes of the food&beverages (n = 11) and utilities industry (n = 17). Moreover, it should be noted that utilities in Germany in many cases are formerly state owned companies. Anyhow, it can be stated that insider ownership is a widespread phenomenon in listed German companies.

Insert table 5

As has already been emphasized, there is only a very small number of studies analyzing the ownership structure of German companies. For instance, Bott (2002, pp. 279-280) reports that as measured by the number of directly held share blocks, as registered with the BaFin at the end of 1999, individuals represent the most important shareholder group in as much as they account for 33,1% of all registered share blocks. Franks and Mayer (2001, p. 947), investigating a sample of 171 German firms in 1990, find that family groups are the second most important owner group behind other corporates. The difference to our results, which are reported in table 6 and where corporates rank only second after insiders, could be explained by the fact that in 1990 disclosure of ownership stakes was only mandatory at the excess of control thresholds beyond 20%. Since in our sample the distribution of the ownership stakes of corporates is even more skewed than for individual insiders¹², the changes in disclosure rules and the increasing transparency of ownership structures over the last decade revealed most notably also smaller ownership stakes. This may be the reason why insider ownership has become more visible over the last years. The same effect may explain the relatively low mean ownership stake for individuals of 10,8%, which was found by Köke (1999, p. 16) for listed corporations over the period 1994 to 1998.

The mean insider ownership stake of 27,8% in our sample is relatively large compared with findings from other countries. For instance, Morck, Shleifer, and Vishny (1988, p. 297) find a mean combined stake of all board members of 10,6% for listed US firms, which is close to the 12,1% which were found by Cho (1998, p. 107). According to Davies, Hillier, and McColgan (2005, p. 651) the mean ownership stake held by the management of UK firms is 13,0%, while the same figure is equal to 17,3% for Switzerland, according to Schmid (2003, p. 39). Although the insider ownership definition used in these studies is slightly different from the definition used in this paper, as we include former board members, it is nevertheless safe to say that insider ownership plays a more important role in German than in other countries.¹³ Moreover, the peculiarity of the shareholder structure in Germany becomes even more pronounced, if all blockholdings by current or former board members as well as by other external individuals, companies or the government are summed up. In that case it turns out accordingly that the mean freefloat in a German listed company is only 39,2%.¹⁴ Davies, Hillier, and McColgan (2005, p. 651) report that for the average UK firm the sum of management shareholdings plus external blockholdings is equal to 50,3%; from that one can conclude that the

¹²For corporates the mean equity stake is 19,3%, while the median is 0,0%. For individuals, the mean and median are equal to 27,8% and 17,0%, respectively.

¹³This can also be seen from the fact that in our sample equity stakes of board members alone sum up to an average of 20,0%.

¹⁴Please note that according to table 4 the average blockholding, i.e. the sum of all external equity stakes individually larger than 5%, is 33,0%. Together with insider equity holdings of 27,8% this adds up to a closely-held equity stake of 60,8% on average.

average freefloat should be equal to 49.7%.¹⁵ For the US according to McConnell and Servaes (1990, p. 600) the sum of insider holdings and external blockholdings equals 37,4%. Hence, it is still true that dispersed ownership is less important in Germany than in the Anglo-Saxon world.

Insert table 6

From these figures it seems that dispersed ownership is unexpectedly low, even in the US or UK. However, it should be noted that these figures are unweighted means and, hence, systematic differences in small and large companies are not taken into account. In fact, the picture becomes substantially different, if market-cap-weighted means are calculated, as has been done in the third column of table 6. In that case the average insider ownership stake is equal to 11,3% and the average freefloat increases up to 45,5%. Evidently, managerial ownership is the more relevant the smaller the market capitalization of a company. Although a comparable figure is, to our knowledge, not available for the US or UK, it can be safely assumed that the market-cap-weighted mean freefloat would be substantially higher than the 62.7% reported above. In fact, Himmelberg, Hubbard, and Palia (1999, p. 362) find an average total managerial ownership stake of 13,4% for companies whose sales exceed \$ 188 million while smaller companies show significantly higher insider ownership stakes between 25,4% (\$ 22 million \leq sales \leq \$ 188 million) and 32,0% (sales \leq \$ 22 million). Although these results do not include external blockholdings, it can be expected that even for such external stakes a clear size-effect exists.

A more precise picture of the size-effect can be gathered from table 7 where sample companies are grouped according to their insider ownership share. As indicated the distribution of the insider ownership variable MB_SB.FBM is heavily skewed and in 44,9% of the companies the insiders own less than 10% of the company's cash flow rights.

Insert table 7

4 Empirical Results

4.1 A first look at ownership and performance

We start with a simple two-sample t-test in order to gather some basic information about the relationship between insider ownership and performance. For that purpose the sample is split into two sub-samples using the insider ownership as discriminating variable. The results are reported in table 8. We find that the sub-sample with higher insider ownership exhibits a higher average Tobin's Q (1,27 vs. 1,21) but a lower average monthly stock return (0,2% vs. 0,4%). However, these differences are not significant. Nevertheless, the tests for differences in means, shown in table 8, highlight other interesting varieties in firm characteristics.

Insert table 8

For example, low insider ownership companies have a highly significant higher ownership share held by outside blockholders (58,6%) than high insider ownership

¹⁵Similar figures for the UK are reported by Faccio and Lasfer (1999).

companies (8,1%). This underlines the widespread existence of outside blockholdings and is in line with the evidence found by Becht and Böhmer (2003, p. 8) that 82,3% of listed German firms have a minority blockholder which controls more than 25%; 64,7% of listed firms are even majority controlled. Thus, it seems that outside block ownership might be a substitute to insider ownership and, hence, both ownership phenomena have to be taken into account in the analysis. This assumption is further supported by the significant negative correlation between outside blockholdings and insider ownership, as reported in table 9. Furthermore, significant differences can be found for firm size, firm age, the number of management board members, the affiliation in a stock index and the existence of any kind of deviations from the one-share-one-vote principle.

Insert table 9

Examining the correlation matrix we observe that contradicting albeit insignificant correlations between the insider ownership variable and both performance variables exist. In the next sections the insider ownership-performance relationship will be analyzed in a multivariate regression framework.

4.2 Base case: OLS regression results

OLS regression results are presented in table 10, where models 1 and 2 use Tobin's Q (Q_AV) as dependent variable, whereas models 3 and 4 use stock returns (SR_AV). Since we felt the need to learn more about the appropriate measure for insider ownership in Germany we carried out the regression analysis with the three insider ownership variables individually (i.e. MB, SB, and FBM) in models 1 and 3 and with the aggregated insider ownership variable (i.e. MB_SB_FBM) in models 2 and 4. We had complete data sets for only 238 of the 245 sample companies, which constitutes our final sample size for all regression analyses. In contrast to the univariate analysis in section 3.4, in the multivariate analyzes the signs of all insider ownership coefficients in models 1 to 4 are positive, indicating a positive impact of insider ownership on firm value. However, not all of the coefficients turn out to be significantly different from zero. For the aggregate insider ownership variable, i.e. MB_SB_FBM, we get a significant result in both regression specifications. This yields a first indication that there might be an economic rationale for firm performance to be influenced by insider ownership.

Insert table 10

With regard to the explanatory power of the models it should be noted that the adjusted R^2 is equal to 52%, if stock returns are used as dependent variable, and equal to 30%, if Tobin's Q is used. This is in line with the view that Tobin's Q cannot be appropriately calculated for German companies.¹⁶ Thus, we will use model 4 as the base case, which will be discussed in more detail. The insider ownership coefficient of 0,009 - significant at the 0,05 level - states that on average an increase in insider ownership by 100 basis points results in an increase of the five year stock price performance of 54 basis points. Among the control variables for firm characteristics, firm size (LN_ASSETS), growth potential ($SALES_G$), stock price volatility ($SIGMA$), dividend payments (DIV), and the return on assets (ROA)

¹⁶Cf. in this regard also Edwards and Weichenrieder (2004, p. 152).

have a positive effect on stock returns, while high levels of debt (LEVERAGE) turn out to have a negative impact (all significant at the 0,01 level). While the positive effects of sales growth, dividend payments and return on assets may be intuitively plausible, the remaining effects deserve further discussion. One possible explanation for the negative effect of high debt levels might be that small and highly leveraged firms experienced more serious devaluations in their stock prices during the market downturn from 2001 to 2003. On the other hand, the positive sign of the coefficient of firm specific risk, measured by the standard deviation of stock returns, could signify that those firms which managed to recover from their drops in market values of equity showed higher return variations than those which did not. Furthermore, we find in our data that a firm's market risk, as measured by its beta, is positively associated with total stock price risk.¹⁷ Finally, the results strongly support the presumption that board ownership and outside blockholdings are a substitute to each other. In fact, according to model 4 in table 10 the marginal rate of substitution is equal to $0,009/0,012=0,75$. Hence, a change in insider ownership by 100 basis points must be accompanied by an offsetting change of 75 basis points in external blockholdings in order not to have any impact on firm performance. In a very strict sense it follows from this that external blockholdings are more effective in terms of value creation. However, given the variance in the data one should not insist on this result. As a corollary, it is interesting to note that the coefficient on the number of blockholders variable is significantly negative. This is in line with the view that the benefits of outside control decrease the more dispersed blockholdings are.

4.3 Variations to the base case

After assuming a pure linear specification of the impact of insider ownership on performance in the previous section, we now investigate the possibility of alternative specifications. We search for the curvilinear relationship found by McConnell and Servaes (1990) by including the squared term of board member ownership, labelled as MB_SB_FBM_SQ in model 5 of table 11. As a result, the coefficient for MB_SB_FBM becomes slightly negative but not on a significant level. The coefficient of the squared term (MB_SB_FBM_SQ) is positive but not on a significant level. Thus, we fail to find the bell-shape relationship found by McConnell and Servaes where insider ownership above a certain threshold becomes value destroying.¹⁸ This is quite interesting, as the result is not in accordance with the view that large insider stakes are harmful to outside shareholders because of their expropriation via the consumption of private benefits by insiders.¹⁹

Insert table 11

¹⁷The correlation coefficient (Pearson) between SIGMA, as a measure of total stock price risk, and beta, calculated from a regression on 60 monthly CDAX returns, is 0,634 and significant at the 0,01 level.

¹⁸We doubt the reliability of results including higher terms of insider ownership as independent variables because of the arising multicollinearity. In our sample the VIFs for MB_SB_FBM and MB_SB_FBM_SQ reach 15,9 and 12,1 respectively indicating presence of multicollinearity. We find no procedure to deal with this problem in McConnell and Servaes (1990).

¹⁹It should be noted that we also included higher terms of MB_SB_FBM as done by Davies, Hillier, and McColgan (2005) without obtaining more promising results than those found in our base case model 4.

We also checked whether it would be possible to replicate the piecewise-linear relationship found by Morck, Shleifer, and Vishny (1988) or Cho (1998). Dividing the insider ownership variable in three subvariables — one for low (MB_SB_FBM_0to5), medium (MB_SB_FBM_5to25) and high (MB_SB_FBM_25to100) insider ownership stakes — using the thresholds of 5% and 25% as proposed by Morck, Shleifer and Vishny, only the coefficient for insider ownership above 25% turned out to be significant, even though at the 0,1 level only. This can be seen from the results of model 6 in table 11. Even by looking at several different combinations of the thresholds we have not been able to improve the results. Hence, the linear relationship between insider ownership and firm performance, as used in model 4, seems to represent still the most convincing specification.

Suggestions to alter the insider ownership variable to reflect the concentration of insider ownership or the dollar value of the ownership share were implemented in models 7 and 8, respectively. In model 7a, the coefficient for the average ownership share per board member (MB_SB_FBM_AV) was positive (0,076) and even more significant than in the base case. Nevertheless, we regard this result with caution because of the methodic issue involved: Since we are not able to obtain the number of all former board members (nor we think that this would be especially useful), the divisor of the average insider ownership variable contains the share of all active and former board members while the denominator does only reflect all active board members. Basically, the result of model 7a may be a consequence of the result already obtained in model 3 of table 10, where we have seen that the impact of former board member stakes tends to be stronger than those of incumbent board members. In model 7b we take a different approach to account for the concentration of insider ownership: Besides the cumulated shareholdings of insiders (MB_SB_FBM) we include the number of those registered insider shareholders (MB_SB_FBM_NO) as an additional explanatory variable. The result is similar to those previously found for the case of blockholders: While MB_SB_FBM is positive, MB_SB_FBM_NO is negative (both significant at the 0,05 level) indicating that the positive effect declines, if the insider ownership share is spread across an increasing number of insiders. Even though the results of model 7b appear as plausible as the base case specification of model 4 we will stick to the base case model 4 in the next section because of the advantages associated with dealing with only one - and not two - possible endogenous insider variables. Finally, in model 8 inside ownership is measured in terms of the Euro-value instead in terms of the equity share. The accordingly defined variable (MB_SB_FBM_EUR) turns out to be insignificant. To summarize, it doesn't seem that any of the variations of the insider ownership variable discussed before generates more reliable results than the simple insider ownership measure MB_SB_FBM used in the base case model 4 of the analysis.

4.4 The possible impact of endogeneity

In the OLS regression analysis insider ownership was implicitly assumed to be an exogenous variable. Because of the objections raised by Demsetz and Lehn (1985) and many others, which have been discussed in section 2, we follow the common approach to construct a simultaneous equation system in order to account for the potentially reciprocal dependence of insider ownership and firm performance.²⁰

²⁰Similar simultaneous equation systems were used, among others, by Agrawal and Knoeber (1996), Cho (1998) Davies, Hillier, and McColgan (2005), and Beiner, Drobotz, Schmid, and Zimmermann (2005) to address the potential endogeneity effect.

Specifically, we estimate a simultaneous equation system treating insider ownership and corporate value as endogenous variables using the two-stage least squares (2SLS) method. Our systems consists of the following two equations:

$$\begin{aligned} \text{Corporate value} = & & (1) \\ f(\text{Insider ownership}, \text{firm characteristics}) \end{aligned}$$

$$\begin{aligned} \text{Insider ownership} = & & (2) \\ g(\text{Corporate value}, \text{firm characteristics}) \end{aligned}$$

Equation (1), the corporate value equation, is the base case equation from section 4.2. Hence, the OLS results for model 9 in table 12 are the known results from our base case, i.e. model 4 in table 10. But treating insider ownership as an endogenous variable, while we further assume the other control variables to be exogenously determined, the 2SLS results in model 10 differ from those of the OLS regression.

Equation (2), the insider ownership equation, treats corporate performance, measured by stock returns, as an endogenous variable. To meet the specification condition for simultaneous equation systems we exclude the dividend payment variable (DIV) from equation (2), since we do not believe that insiders would choose their share participation level according to expected dividend payments. In addition to the other control variables from equation (1), we include four new variables which we expect to have an impact on the level of insider ownership. We expect insider ownership to be lower in codetermined companies (CODET) and in companies with a large number of management board members (MB_NO).²¹ In contrast, we believe that the existence of non-voting shares (VOTE), which facilitates the insiders to gain control rights in excess of their cash flow rights, and a high ratio of intangible assets to total assets (INT_ASSETS), a measure for discretionary power of management, will favorably influence the extent of insider ownership. Since it can be plausibly argued that insider ownership and corporate performance share common determinants,²² we use the set of all exogenous variables from model 9 and 11 as instrumental variables for the endogenous variables in model 10 and 12. The OLS- and 2SLS regression results for both equations are shown in table 12.

Insert table 12

As the insider ownership variable in model 10 still has a positive coefficient (significant at the 0,1 level) while the corporate value variable in model 12 has a negativ though insignificant coefficient, we do not find evidence for the hypothesis that the OLS results might be strongly biased through the possible endogeneity of insider ownership.²³ Thus, our results conflict with the evidence presented by e.g.

²¹German codetermination law requires that in companies of a certain size half of the supervisory board members must be representatives of the employees. Since this narrows the scope of managerial actions the managers might be restrained from owning larger stakes in such types of companies. Cf. Gorton and Schmid (2000).

²²Cf. Himmelberg, Hubbard, and Palia (1999, p. 379).

²³As a corollary it should be noted that the results of equation 10 indicate that insider ownership is more effective in value creation than external blockholdings, as the ratio of both coefficients is equal to 1.5.

Agrawal and Knoeber (1996) and Cho (1998), who show that a positive impact of insider ownership on corporate value is a mere result of failing to control for endogeneity. In contrast, our findings are roughly in line with those of Beiner, Drobetz, Schmid, and Zimmermann (2005) who also find a positive impact of insider ownership on corporate performance, even when they account for the possible endogeneity of insider ownership.

As a final piece of evidence against endogeneity in the insider ownership variable the stickiness of this variable should be emphasized. For that purpose the question is addressed to what extent current insider ownership is explained by former insider ownership. More specifically, model 11 in table 12 is estimated once again as an OLS-regression. This corresponds to model 13 in table 13. Thereafter, insider ownership measured as of the end of the year 1998 is used as an additional independent variable. As can be seen from the results of model 14 in table 13, this variable adds perceivable explanatory power to the regression and is highly significant. Hence, current insider ownership structure depends significantly on former insider ownership corroborating the view of the stickiness of this variable.

Insert table 13

To sum up, the results presented in this study corroborate the view that under the German corporate governance environment insider ownership may, to some extent, be resistant to market mechanisms. This view is supported by the argument of Edwards and Nibler (2000, p. 252) which justify their treatment of ownership concentration as exogenous variable by the observation that "... the ownership structures of many large German firms [...] do not change much over time". Later, Edwards and Weichenrieder (2004) test for endogeneity by dividing their sample in two parts, one with and one without changes in ownership structure. They infer that because the results for the two subsamples are not different on a significant level, ownership probably is not endogenous. Weighing all known arguments and evaluating the empirical evidence, it may be plausible to treat insider ownership as an exogenous variable, at least for Germany. Under this perspective this study provides interesting evidence on the impact of insider ownership on firm performance.

4.5 Problems and Subjects of Further Research

It is well known that 2SLS-estimations are quite sensitive to the specification of the equation system. The theory for choosing instrumental variables is poor and variations in the choice of instruments can significantly effect the results.²⁴ This is a severe problem of all empirical studies dealing with simultaneous equation systems. As pointed out by Himmelberg, Hubbard, and Palia (1999, p. 379) *'instrumental variables for managerial ownership are difficult to find. The basic problem is that for any variable that plausibly determines the optimal level of managerial ownership, it is also possible to argue that the same variable might plausibly affect Tobin's Q [as a measure for corporate value].'* Hence, it was argued here that endogeneity is not only a question of how the results of an ordinary OLS-equation compare to the results of an appropriate 2SLS-estimation. It is also a question of economic and empirical reasoning. Given that it could have been showed that insider ownership is a rather inert variable, endogeneity may be perceived as less imminent than in the US data. There, insider ownership is much more related to firm performance, as it

²⁴Cf. Barnhart, Marr, and Rosenstein (1994) and Bøhren and Ødegaard (2004).

is to a large extent the result of compensation contracts. This is still very different from the German situation.

Of course, future research should still address the issue of endogeneity. One way to do so is to extend the cross-sectional data set to a low frequency unbalanced panel data set. This would allow to use lagged variables as more plausible instruments and to increase the sample size in a pooled cross section analysis. This procedure is also suggested by Börsch-Supan and Köke (2002), which provide a comprehensive review of the problems involved in empirical corporate governance studies.

5 Conclusion

This paper addressed the question whether there is any empirical relationship between corporate performance and insider ownership. Although agency theory provides some good reasons why such a relationship should exist, empirical evidence is rather fuzzy in this regard. One reason is that most studies deal with Anglo-Saxon countries, where it seems that results are significantly affected by an endogeneity problem. This problem is due to the fact that in these countries insider ownership seems to be mainly driven by compensation contracts. Evidently, in such a case firm performance and insider ownership are simultaneously determined.

This paper deals with the German capital market. This is important for the following reasons. First, insider ownership in Germany is a widespread phenomenon that is only partially influenced by the fact that firms grant stock based compensation packages. In fact, insider ownership seems to be rather stable over time in Germany. Second, it seems that there is much more cross-sectional variation in the ownership structure in Germany as compared to the US. Starting from this presumption the results in this paper make a contribution to the literature for the following two reasons. First, if it is true that the relationship between firm performance and insider ownership is not significantly affected by endogeneity, the data will allow to make an unbiased observation as to whether insider ownership affects firm performance. Second, this study is among the first to give a comprehensive overview on the ownership structure of German corporations. Using a data set of 245 companies for the year 2003 we find evidence for a positive and significant relationship between corporate performance, as measured by stock price performance as well as by Tobin's Q, and insider ownership. This relationship seems to be rather robust. Specifically, the sign and significance of the relationship does not change, even if we account for endogeneity by applying a 2SLS regression approach. Moreover, we also find outside block ownership as well as more concentrated insider ownership to have a positive impact on corporate performance. Overall the results indicate that ownership structure might be an important variable explaining the long term value creation in the corporate sector.

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Table 1: Sample Selection from the CDAX^a

Number of share classes represented in the CDAX as of 31.12.1998	520
./.. Number of secondary share classes	60
Number of companies represented in the CDAX as of 31.12.1998	460
./.. Number of financial companies (i.e. investment companies, mortgage banks, credit banks, insurance companies)	80
Number of non-financial companies represented in the CDAX as of 31.12.1998	380
./.. Number of non-financial companies which are not represented in the CDAX as of 31.12.2003	86
Number of non-financial companies represented in the CDAX as of 31.12.1998 and 31.12.2003	294
./.. Number of companies for which several key variables could not be determined due to limited data availability	49
Final Sample Size	245

^a The CDAX includes the shares of all domestic companies listed in Prime Standard and General Standard. The index represents the German equity market in its entirety, i.e. all companies listed on FWB Frankfurter Wertpapierbörse (Frankfurt Stock Exchange).

Table 2: Ownership Structure Classification Scheme^a

Category (CODE)	Description
Managerial Ownership / Insider Ownership	
Management board member (MB)	Active member of the management board (“Vorstand”) including family members
Supervisory board member (SB)	Active member of the supervisory board (“Aufsichtsrat”) including family members
Former board member (FBM)	Former member of the management and supervisory board including family members
Outsider Block Ownership	
Corporates	Non-financial company
Investment companies	Investment companies (i.e. venture capital and buyout companies)
Banks	Mortgage, credit or investment bank (for own account)
Institutionals	Institutional Investors (asset management companies, pension funds, banks (for third party account), etc.)
Insurance companies	Insurance companies
Government	German municipal, state and federal government
Outside Individuals	Individual persons which are not insiders
Treasury Shares	Shares hold by the company itself (limited to 10% in § 71 Abs. 2 AktG)
Employees	Employees of the company excluding members of the boards
Others	All shareholders which can not be assigned to another category
Outsider Dispersed Ownership	
Freefloat	Freefloat portion of the shares calculated as 100% less sum of the shareholdings of all other categories

^a The scheme was developed for this specific research project and is characterized by the explicit consideration of insider ownership. Other, more common classification schemes only use the categories “private households”, “individuals” or “families” without further distinguishing among different types of individuals (e.g. outsiders and insiders) and, hence, are not appropriate for our research purpose.

Table 3: Definition of Variables

Code	Description
MB	Cumulated shareholdings (all voting and non-voting share classes) of all active members of the management board ("Vorstand") and their families as of 31.12.2003 in percent.
SB	Cumulated shareholdings (all voting and non-voting share classes) of all active members of the supervisory board ("Aufsichtsrat") and their families as of 31.12.2003 in percent.
FBM	Cumulated shareholdings (all voting and non-voting share classes) of all former members of the management and supervisory board and their families as of 31.12.2003 in percent.
MB_SB_FBM	The sum of MB, SB and FBM.
MB_SB_FBM_SQ	The squared value of MB_SB_FBM.
MB_SB_FBM_0to25	Variable for piecewise-linear regression (see Morck, Shleifer, and Vishny (1988, p. 298)). MB_SB_FBM is between 0 and 5 percent.
MB_SB_FBM_5to25	Variable for piecewise-linear regression (see Morck, Shleifer, and Vishny (1988, p. 298)). MB_SB_FBM is between 5 and 25 percent.
MB_SB_FBM_25to100	Variable for piecewise-linear regression (see Morck, Shleifer, and Vishny (1988, p. 298)). MB_SB_FBM is higher than 25 percent.
MB_SB_FBM_AV	Average shareholdings per board member calculated as MB_SB_FBM divided by the number of active members of both boards.
MB_SB_FBM_NO	Number of registered insider shareholders (as indicated in Hoppenstedt Aktienführer) as a measure of concentration of insider ownership.
MB_SB_FBM_EUR	Euro-value of the MB_SB_FBM shareholdings calculated as MB_SB_FBM multiplied by the average of monthly market values of equity during 2003.
MB_SB_FBM_98	MB_SB_FBM as of 31.12.1998.
BLOCK_O	Cumulated shareholdings of all outside blockholders, who each hold a stake of at least 5 percent.
BLOCK_NO	Number of outside blockholders, who each hold a stake of at least 5 percent.
Q_AV	Tobin's Q. Proxied as the relation of market value of equity (monthly average of 2003) and book value of total liabilities to the book value of total assets.
SR_AV	Arithmetic mean of monthly geometric returns over the last 60 months (1999 - 2003).
LN_ASSETS	Size of the company, measured as the natural logarithm of total assets (2003).
SALES_G	Sales growth p.a. over the last 3 years (2001 - 2003).
SIGMA	Firm specific risk measured by the standard deviation of monthly stock returns over the last 60 months (1999 - 2003).
DIV	Dummy Variable: 1, if the company paid dividends during 2003 and 0 otherwise.
LEVERAGE	Leverage ratio. Proxied as the ratio of book value of total liabilities to market value of equity.
ROA	Return on assets. Ratio of operating profit to total assets (average of total assets of 2002 and 2003).
INDUSTRY DUMMIES	8 dummy variables (7 of them used in the OLS-regressions), based on a modified industry classification used for the CDAX in 1998.
MB_NO	Number of members of the management board as of 31.12.2003.
VOTE	Dummy Variable: 1, if any deviation from the one share one vote principle is given (e.g. the existence of preference shares, voting restrictions etc.) as of 31.12.2003 and 0 otherwise.
CODET	Dummy variable that equals 1 if the company is subject to the codetermination law (i.e. the half of the supervisory board members are representatives of the employees) and 0 otherwise.
INT_ASSETS	Ratio of total intangibles divided by total assets (2003).

Table 4: Summary Statistics^a

	N	Mean	Median	Std. Dev.	Minimum	Maximum
MB	245	0,096	0,000	0,203	0,000	0,870
SB	245	0,104	0,000	0,216	0,000	0,960
FBM	245	0,078	0,000	0,205	0,000	0,990
MB_SB_FBM	245	0,278	0,170	0,298	0,000	0,990
BLOCK_O	245	0,330	0,190	0,364	0,000	1,000
BLOCK_NO	245	1,106	1,000	1,165	0,000	6,000
Q_AV	245	1,244	1,058	0,615	0,429	5,791
SR_AV	245	0,003	0,005	0,015	-0,048	0,070
LN_ASSETS	245	12,951	12,592	2,049	6,997	18,989
SALES_G	243	0,039	0,009	0,257	-0,445	2,181
SIGMA	245	0,134	0,115	0,071	0,031	0,448
DIV	241	0,618	1,000	0,487	0,000	1,000
LEVERAGE	245	0,359	0,338	0,290	0,000	0,987
ROA	245	-0,001	0,016	0,126	-0,852	0,467
MB_NO	245	3,453	3,000	1,800	1,000	14,000
VOTE	245	0,196	0,000	0,398	0,000	1,000
CODET	245	0,343	0,000	0,476	0,000	1,000
INT_ASSETS	245	0,093	0,051	0,107	0,000	0,518

^a The definitions of all variables can be found in table 3.

Table 5: Insider Ownership^a across Industries^b

Industry	N	Mean	Median	Std. Dev.	Minimum	Maximum
Automobile	16	0,262	0,115	0,298	0,000	0,770
Chemicals	27	0,222	0,000	0,252	0,000	0,670
Construction	23	0,297	0,030	0,330	0,000	0,870
Consumers	54	0,354	0,395	0,300	0,000	0,990
Electronics	37	0,279	0,180	0,261	0,000	0,990
Food & Beverages	11	0,498	0,590	0,326	0,000	0,950
Industrial	60	0,252	0,025	0,317	0,000	0,960
Utilities & Transportation	17	0,057	0,000	0,139	0,000	0,460
All Industries	245	0,278	0,170	0,298	0,000	0,990

^a Insider ownership is defined as the total equity stake of incumbent and former board members including their families. This corresponds to the variable MB_SB_FBM defined in table 3.

^b The industry classification differs from the current scheme used by Deutsche Börse AG which classifies Prime Standard companies into 18 different industries, since the new classification scheme differs from the one in place at the end of 1998. Furthermore, the number of industry categories was reduced by grouping from 15 to 8 non-financial categories.

Table 6: Ownership Structures (Cash Flow Rights in Percent)

Ownership Group	Mean Ownership Share	
	Unweighted	Weighted by Market Value of Equity ^a
Freefloat	36,5	47,8
MB_SB_FBM ^b]	27,8	11,7
Corporates	19,3	13,8
Investment Companies	4,8	0,6
Banks	3,2	2,4
Institutionals	3,1	9,4
Insurance Companies	1,4	3,7
Government	1,3	6,4
Outsider Individuals	0,9	2,1
Treasury Shares	0,8	1,2
Others	0,8	0,9
Employees	0,2	0,2
Total	100,0	100,0

^a Average of monthly market values of equity during 2003.

^b For the definition of this variable cf. table 3.

Table 7: Insider Ownership Deciles^a

	N	Mean Market Value of Equity (in EUR million)	Mean Freefloat Portion (in Percent)
0% < MB_SB_FBM ≤ 10%	110	3.079	35,4
10% < MB_SB_FBM ≤ 20%	16	163	48,6
20% < MB_SB_FBM ≤ 30%	10	283	50,3
30% < MB_SB_FBM ≤ 40%	16	2.689	52,1
40% < MB_SB_FBM ≤ 50%	25	1.303	43,5
50% < MB_SB_FBM ≤ 60%	27	1.000	38,9
60% < MB_SB_FBM ≤ 70%	14	267	27,1
70% < MB_SB_FBM ≤ 80%	11	124	26,0
80% < MB_SB_FBM ≤ 90%	7	76	13,7
90% < MB_SB_FBM ≤ 100%	9	268	4,1
All Inside Ownership Deciles	245	1.856	36,5

^a For the definition of the variables cf. table 3.

Table 8: Differences of Means Tests^{a,b}

	Full Sample (n = 245)	High MB_SB_FBM (n = 124)	Low MB_SB_FBM (n=121)	t-statistics	
MB_SB_FBM	0,278	0,534	0,015		
BLOCK_O	0,330	0,081	0,586	15,061	***
BLOCK_NO	1,106	0,637	1,587	6,973	***
Q_AV	1,244	1,274	1,213	-0,781	
SR_AV	0,003	0,002	0,004	0,925	
LN_ASSETS	12,951	12,385	13,530	4,544	***
SALES_G	0,039	0,055	0,023	-0,968	
SIGMA	0,134	0,140	0,128	-1,329	
DIV	0,620	0,620	0,620	-0,089	
LEVERAGE	0,359	0,368	0,350	-0,478	
ROA	-0,001	0,001	-0,002	-0,172	
MB_NO	3,450	3,210	3,700	2,158	**
VOTE	0,200	0,240	0,150	-1,842	*
CODET	0,340	0,230	0,450	3,725	***
INT_ASSETS	0,093	0,111	0,103	0,200	

^a *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed; equal variances assumed).

^b For the definition of the variables cf. table 3.

Table 9: Pearson/Spearman Correlation Matrix^{a,b,c}

	SR_AV	Q_AV	MB_SB_FBM	BLOCK_O	BLOCK_NO	LN_ASSETS	SALES_G	SIGMA	DIV	LEVERAGE	ROA	
SR_AV												
Q_AV	0,347	**	-0,102	0,049	-0,109	0,291	**	-0,162	*	0,39	**	0,497
MB_SB_FBM	0,332	**	0,016	0,031	-0,042	0,018	0,105	0,025	0,062	0,062	**	0,257
BLOCK_O	-0,031		-0,677	-0,750	**	-0,331	**	0,059	-0,038	0,054		-0,019
BLOCK_NO	0,053		-0,492	**	0,741	0,194	**	-0,174	**	-0,035		-0,070
LN_ASSETS	-0,131	*	-0,289	**	**	0,218	**	-0,099	0,080	0,091		-0,078
SALES_G	0,253	**	-0,134	*	0,149	0,077	**	-0,321	**	0,483	**	0,280
SIGMA	-0,261	**	0,134	*	-0,072	0,077	**	-0,271	**	0,363	**	0,293
DIV	0,034		0,042	-0,178	**	-0,335	**	-0,479	**	-0,489	**	-0,315
LEVERAGE	0,392	**	-0,030	-0,036	0,058	0,452	**	0,109	*	-0,121		0,429
ROA	-0,454	**	0,052	-0,053	0,137	0,062	*	0,122	*	-0,159	*	-0,316
	0,402	**	0,008	-0,105	-0,106	0,299	**	-0,369	**	0,403	**	

^a Pearson correlation coefficient (parametric) are shown below the diagonal and Spearman rank correlation coefficients (non parametric) are shown above the diagonal.

^b The definitions of all variables can be found in table 3.

^c *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed).

Table 10: OLS-Regression Results (I)^{a,b,c,d,e}

Dependent Variable	Q_AV		SR_AV	
	(1)	(2)	(3)	(4)
Model No.				
Intercept	0,727 (1,567)	0,662 (1,455)	-0,025 (-2,765)	-0,025 (-2,861)
MB	0,336 (1,560)		0,009 (1,663)	
SB	0,261 (1,180)		0,007 (1,459)	
FBM	0,609 (2,490)	**	0,010 (2,235)	**
MB_SB_FBM		0,42 (2,144)	**	0,009 (2,141)
LN_ASSETS	0,019 (0,699)	0,023 (0,881)	0,002 (3,242)	0,002 (3,416)
SALES_G	- 0,012 (-0,118)	-0,045 (-0,439)	0,011 (1,780)	0,011 (1,768)
SIGMA	2,055 (2,852)	2,019 (2,791)	0,075 (4,210)	0,075 (4,252)
DIV	0,028 (0,352)	0,021 (0,242)	0,010 (4,255)	0,009 (4,328)
LEVERAGE	- 0,825 (-6,834)	-0,828 (-6,734)	-0,021 (-6,843)	-0,021 (-6,850)
BLOCK_O	0,325 (2,224)	0,338 (2,327)	0,012 (3,818)	0,012 (3,863)
BLOCK_NO	0,001 (0,030)	0,002 (0,067)	-0,001 (-1,919)	-0,001 (-1,916)
ROA	0,997 (1,933)	0,968 (1,879)	0,028 (2,800)	0,028 (2,787)
Industry Dummies	Yes	Yes	Yes	Yes
n	238	238	238	238
R ²	0,303	0,294	0,524	0,523
R ² adj.	0,246	0,244	0,485	0,489

^a Heteroskedasticity robust White (1980) estimators are used.

^b The definitions of all variables can be found in table 3.

^c *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed).

^d In our base case model 4, four of the eight industry dummies (including the intercept) enter the regression model on a significant level of at least 0,05.

^e We believe the model to be rather stable to variations in the selection of the control variables, since the VIFs of all variables are below 3,7 (not shown in the table).

Table 11: OLS-Regression Results (II)^{a,b,c,d,e}

Dependent Variable	SR_AV									
	(5)		(6)		(7a)		(7b)		(8)	
Model No.										
Intercept	-0,022 (-2,578)	***	-0,023 (-2,590)	***	-0,029 (-3,546)	***	-0,024 (-2,831)	***	-0,018 (-2,489)	***
MB_SB_FBM	-0,005 (-0,541)						0,011 (2,568)	**		
MB_SB_FBM_SQ	0,016 (1,588)									
MB_SB_FBM_0to5			-0,079 (-0,850)							
MB_SB_FBM_5to25			0,018 (0,678)							
MB_SB_FBM_25to100			0,012 (1,990)	*						
MB_SB_FBM_AV					0,076 (2,655)	***				
MB_SB_FBM_NO							-0,001 (-2,130)	**		
MB_SB_FBM_EUR									0,000 (0,726)	
LN_ASSETS	0,001 (3,054)	***	0,001 (3,085)	***	0,002 (3,978)	***	0,002 (3,485)	***	0,001 (3,041)	***
SALES_G	0,010 (1,785)	*	0,010 (1,766)	*	0,010 (1,922)	*	0,010 (1,729)	*	0,012 (1,791)	*
SIGMA	0,077 (4,435)	***	0,078 (4,382)	***	0,072 (4,355)	***	0,077 (4,432)	***	0,070 (3,998)	***
DIV	0,010 (4,539)	***	0,010 (4,491)	***	0,009 (4,465)	***	0,01 (4,421)	***	0,009 (4,132)	***
LEVERAGE	-0,021 (-6,868)	***	-0,021 (-7,074)	***	-0,022 (-7,171)	***	-0,021 (-6,948)	***	-0,021 (-6,403)	***
BLOCK_O	0,010 (3,339)	***	0,010 (3,296)	***	0,012 (4,343)	***	0,011 (3,649)	***	0,008 (3,219)	***
BLOCK_NO	-0,001 (-1,6906)	*	-0,001 (-1,448)		-0,001 (-1,793)	*	-0,001 (-1,814)	*	-0,002 (-2,608)	**
ROA	0,028 (2,818)	***	0,028 (2,919)	***	0,027 (2,750)	***	0,027 (2,795)	***	0,026 (2,508)	**
Industry Dummies	Yes		Yes		Yes		Yes		Yes	
n	238		238		238		238		238	
R ²	0,528		0,527		0,535		0,530		0,510	
R ² adj.	0,491		0,489		0,502		0,494		0,473	

^a Heteroskedasticity robust White (1980) estimators are used.

^b The definitions of all variables can be found in table 3.

^c *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed).

^d Variations of the insider ownership thresholds in equation 6 were performed. However, the results are not shown because none of these variations delivered considerably better results than those by using the 5% and 25% thresholds originally used by Morck, Shleifer, and Vishny (1988).

^e In model 5 the VIFs for MB_SB_FBM and MB_SB_FBM_SQ are 15,9 and 12,1 respectively indicating the presence of multicollinearity.

Table 12: Simultaneous Equation System (OLS- and 2SLS-Regression Results)^{a,b}

Dependent Variable	SR_AV				MB_SB_FBM			
	(9) OLS		(10) 2SLS		(11) OLS		(12) 2SLS	
Intercept	-0,025 (-3,189)	***	-0,633 (-2,488)	**	0,895 (6,529)	***	0,814 (4,987)	***
MB_SB_FBM	0,009 (2,195)	**	0,046 (1,943)	*				
SR_AV					1,879 (1,752)	*	-1,107 (-0,289)	
LN_ASSETS	0,002 (3,285)	***	0,003 (2,877)	***	- 0,023 (-2,113)	**	-0,013 (-0,902)	
SALES_G	0,011 (3,632)	***	0,004 (0,866)		0,126 (2,502)	**	0,166 (2,340)	**
SIGMA	0,075 (5,658)	***	0,096 (4,725)	***	- 0,557 (-2,459)	**	-0,390 (-1,215)	
DIV	0,009 (4,875)	***	0,010 (4,131)	***				
LEVERAGE	-0,021 (-7,662)	***	-0,023 (-6,633)	***	0,068 (1,313)		0,000 (-0,004)	
BLOCK_O	0,012 (3,795)	***	0,03048 (2,514)	**	- 0,522 (-12,614)	***	-0,515 (-11,255)	***
BLOCK_NO	-0,001 (-1,678)	*	0,001 (0,389)		- 0,044 (-3,414)	***	-0,046 (-3,396)	***
ROA	0,028 (4,077)	***	0,032 (3,767)	***	- 0,191 (-1,606)		-0,097 (-0,568)	
CODET					- 0,059 (-1,768)	*	-0,066 (-1,902)	*
VOTE					0,024 (0,738)		0,035 (0,971)	
MB_NO					- 0,011 (-1,194)		-0,015 (-1,548)	
INT_ASSETS					- 0,155 (-1,205)		-0,181 (-1,226)	
Industry Dummies	Yes		Yes		Yes		Yes	
n	238		238		238		238	
R ²	0,523		0,437		0,642		0,634	
R ² adj.	0,489		0,396		0,611		0,602	

^a The definitions of all variables can be found in table 3.

^b *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed).

**Table 13: Endogeneity of Insider Ownership
(OLS-Regression Results)^{a,b,c}**

Dependent Variable	MB_SB_FBM				
	Model No.	(13) OLS		(14) OLS	
Intercept		0,895 (7,442)	***	0,569 (4,626)	***
SR_AV		1,879 (1,856)	*	2,368 (2,587)	***
MB_SB_FBM_98				0,335 (6,182)	***
LN_ASSETS		- 0,023 (-2,280)	**	- 0,011 (-1,193)	
SALES_G		0,126 (2,619)	***	0,150 (3,198)	***
SIGMA		- 0,557 (-2,529)	**	- 0,596 (-2,553)	**
LEVERAGE		0,068 (1,379)		0,082 (1,904)	*
BLOCK_O		- 0,522 (-16,628)	***	- 0,442 (-11,724)	***
BLOCK_NO		- 0,044 (-3,669)	***	- 0,029 (-2,605)	***
ROA		- 0,191 (-1,996)	**	- 0,2302 (-2,367)	**
CODET		- 0,059 (-1,910)	*	- 0,052 (-1,898)	*
VOTE		0,024 (0,895)		- 0,005 (-0,211)	
MB_NO		- 0,011 (-1,369)		- 0,011 (-1,580)	
INT_ASSETS		- 0,155 (-1,232)		-0,173 (-1,566)	
Industry Dummies		Yes		Yes	
n		238		238	
R ²		0,642		0,712	
R ² adj.		0,611		0,688	

^a Heteroskedasticity robust White (1980) estimators are used.

^b The definitions of all variables can be found in table 3.

^c *, ** and *** indicate significance on the 0,10, 0,05 and 0,01 level (2-tailed).