Insider Ownership and Corporate Performance – Evidence from Germany[*]

Christoph Kaserer and Benjamin Moldenhauer

Center for Entrepreneurial and Financial Studies (CEFS)
and Department for Financial Management and Capital Markets

Technische Universität München
Arcisstr. 21
D-80290 München

www.cefs.de
www.ifm.wi.tum.de

christoph.kaserer@wi.tum.de
benjamin.moldenhauer@cefs.de

CEFS Working Papier Series, No. 1/2005

First version: September 2005, this version: September, 2006

Insider Ownership and Corporate Performance – Evidence from Germany

Abstract

In this paper we address the question whether insider ownership affects corporate performance. Evidence coming from studies dealing with Anglo-Saxon countries is rather inconclusive, especially because it seems that results are significantly affected by endogeneity. Economically, this is due to the fact that in these countries insider ownership seems to be mainly driven by management's compensation contracts. We argue that Germany is different in this regard, as insider ownership often is related to family control, stock-based compensation is less widespread and the market for corporate control used to be less developed. Starting from this presumption our data allows to make an unbiased observation as to whether insider ownership affects firm performance. Using a pooled data set of 648 firm observations for the years 2003 and 1998 we find evidence for a positive and significant relationship between corporate performance — as measured by stock price performance, market-to-book ratio and return on assets — and insider ownership. This relationship seems to be rather robust, even if we account for potential 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.

1 Introduction

Since Berle and Means (1932) and, more importantly, Jensen and Meckling (1976) a whole branch of research evolved investigating into the effects of the separation of ownership and control. A particular strand of this literature is addressing the question whether there is any measurable relationship between firm's insider ownership and corporate performance. Actually, 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 this 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 affiliation are found to be relevant 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 do 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 depends on the ownership structure, is irrelevant.[2]

However, pondering the vast corporate governance literature that emerged over

---

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

[2] See Stigler and Friedland (1983), Demsetz and Lehn (1985).

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 existing mechanisms allow 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, Germany has a corporate governance regime that is very different from the regimes 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.[3] 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 the presence of a large number of family-controlled companies and a dense network of corporate cross-holdings.[4] It is interesting in this regard that according to a recently evolving branch of 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. From this it follows that the performance-ownership relationship in Germany might be less affected by endogeneity, as this is the case with data from Anglo-Saxon markets. In fact, our findings are in accordance with this presumption.

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. Evidently, there might be some reservations as to whether the market-to-book ratio can really be taken as a proxy for firm value, especially in a Continental-European accounting context, where historical cost accounting is still important, at least for the period under consideration in this paper. Therefore, we use a broader approach by measuring corporate performance not only by the market-to-book-ratio, but also by a long-run buy-and-hold stock return as well as by the return on assets. As we obtain rather robust results, our findings are less prone to methodological objections against how corporate performance is measured.

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. These findings are confirmed when using market-to-book

---

[3]Cf., 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).

[4]For an illustration of this network as of 1996 and 2002 see Wenger and Kaserer (1998b, pp. 51-61) and Höpner and Krempel (2005, pp. 10-11). The comparison makes clear that the density of this network had been thinned out significantly during this six year period. This process has been perceivably accelerated by the tax-exemption on corporate capital gains introduced in 2001.

ratio or return on assets as performance measures. In order to account for potential 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 block ownership as well as more concentrated insider ownership to have a positive impact on corporate performance. Hence, the paper corroborates the assertion that ownership may have an autonomous influence on firm performance.

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).[5] 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 a 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 Lehns' 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 (1997) performance seems to influence ownership but not vice versa.

---

[5]Although dealing with a different context, also the interesting analysis of Schranz (1993) can be regarded as a pioneering piece of evidence supporting the positive relationship between managerial stock holdings and firm performance.

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 availability and quality often is a serious problem. Beiner, Drobetz, Schmid, and Zimmermann (2006), following the methodology of Agrawal and Knoeber (1996), model a simultaneous equation system which defines block ownership, a 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 looks 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 (2006), 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.[6]

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 to 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 (2006) 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,

---

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

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 (2006) 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 abnormal performance of family firms was affected by the family ownership pattern during a three year post-IPO period. However, 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 cannot 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) who concluded that ownership concentration is a more important factor in the German corporate governance system than banks, which originally were thought to posses a dominating role.

3 Methodology and Data

3.1 Methodology

In this study, we use two cross-sections and a pooled sample 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 primarily 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 inside 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 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 samples comprises all non-financial companies, which were member of the CDAX, the broadest index representing the German equity market, at the end of 2003 or 1998, respectively. Furthermore, the companies must have been listed in the CDAX for at least one of the two five year periods ranging from 1998 to 2003 and 1993 to 1998.[7]

In 2003 (1998), from a total of 719 (520) share classes 652 (380) firms have been left in the data set after excluding dual share classes and financial firms. Then, 362 (22) companies which were not CDAX members during the whole required five year period dropped the sample, leaving us with a total of 290 (358) companies.[8] Because of firms with missing data, the number of complete data sets varies in the range of 235 to 247 for the 2003 sub-sample and 212 to 220 for the 1998 sub-sample. Consequently, our sample captures approximately 37% (57%) of all non-financial CDAX companies as of 31.12.2003 (31.12.1998).

3.3 Definition of Variables

The ownership structure variables constitute a key element in this analysis and, hence, deserves additional attention. The shareholder structures have been taken from the 2004-I and 1999-I editions of Hoppenstedt Aktienführer.[9] Identified share-

---

[7]The condition that companies must have been CDAX members for the five years preceding the cut-off dates (31.12.2003 and 31.12.1998) is introduced because we decided to track performance over this 60 months period.

[8]Most of the 362 firms dropped from the 2003 sub-sample had their IPO after the cut-off date 31.12.1998 and hence were not listed for the five year period. Therefore, especially firms which went public during the "heyday of the new economy" were excluded from our analysis. As a consequence, our analysis refers more to the "traditional" market. Out of the 362 firms, only 86 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.

[9]For a presentation and discussion of ownership disclosure requirements in Germany cf. Becht and Böhmer (2003).

holders have been classified manually according to a proprietary scheme which is described in the following.

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). For the case of the supervisory board, only stakes owned by individuals are taken into account while stakes of e.g. corporates, which also might send representatives to the supervisory board, are not classified as insider stakes.[10] 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, where former board members with large ownership stakes often exert considerable influence on "their'" former companies without being officially in charge. Because we have no a priori reason to believe that one measure of insider ownership dominates another 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).[11]

Besides insiders, we define corporates, investment companies, banks, institutional investors, insurance companies, government, outside individuals, 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.[12] 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 these outside blockholders, respectively. These variables are introduced because there is a widespread belief that block ownership constitutes an effective monitoring mechanism. Consequently, an interdependency between insider ownership and block ownership is probable.

An overview of all variables used in this study and their descriptions is given in table 1. Firm performance is measured as buy-and-hold total stock returns over a period of 60 months (BAHR) as well as on the basis of market-to-book ratios (MTBV) and return on assets (ROA). Hence, for the 2003 (1998) cross section sample BAHRs are measured during the 60 months period from December 1998 (1993) to December 2003 (1998).[13] The ratio of market value of equity to the book value of equity is essentially the same as Tobin's Q.[14] MTBVs are measured at the end of the respective year and are computed as the sum of the market values

---

[10]For a discussion of "agents watching agents" see Woidtke (2002).

[11]We measure ownership at the ultimate level. Hence, stakes of insiders held through a interim holding company will be classified as MB_SB_FBM at the ultimate level. Cf. Köke (1999); Becht and Böhmer (2003).

[12]Meanwhile control rights are measured by the share of voting shares (usually ordinary shares), cash flow rights refer to the weighted portion of both voting and non-voting shares (usually preferred shares).

[13]Six values above 500% (4 in 1998 and 2 in 2003) were treated as outliers since the standardized residuals were above/below +/- 3 standard deviations in the regression analysis. Since four of the six cases showed MB_SB_FBM share over 40% (average: 35.2%) a bias in account of a positive relationship between insider ownership and performance might be introduced if any.

[14]See Gorton and Schmid (2000, p. 44).

of all share classes divided by the book value of equity capital and reserves. The market value of equity, i.e. the nominator of the fraction, by definition cannot become negative, while the book value of equity, i.e. the denominator, can do so. In those cases the MTBV can not be interpreted. Similarly, the MTBV becomes very large, if the denominator approaches zero even though the nominator might be very small. Hence, negative, zero and MTBVs above 15 were excluded from further analysis.[15] Finally, the return on assets (ROA) constitutes an accounting measure of the profitability of the firm. Since the latter two performance measures are subject to accounting distortions, which are especially important in a Continental-European accounting context, where historical cost accounting has long been prevalent,[16] we put more emphasis on the results where firm performance is measured on the basis of stock price returns.

It should be noted that our approach (focusing on stock returns), in a certain sense, is more conservative than the firm value approach (focusing on Tobin's Q) 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 at the moment when the ownership structure becomes public or changes. 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 more 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. This is even more true as theory makes no clear prediction with respect to the impact of ownership on performance.[17] 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 changes in the insider ownership structure.[18] Moreover, by using two totally different 5 year periods it is implausible that results will be affected by some kind of a fixed time effect. All market data and accounting information are drawn from the Datastream and Worldscope database.

Insert table 1

Besides ownership and performance variables a number of control variables are introduced. The level of *outside blockholdings* (BLOCK_O), i.e. the cumulated shareholdings of all outsiders which individually hold at least 5%, is used to account for possible substitutional effects between insider ownership, as an instrument to align shareholders' and management's interest, and outside block ownership, as an

---

[15]Excluded negative/zero MTBVs: 7 (1998) and 14 (2003). Excluded MTBVs above 15: 17 (1998) and 3 (2003); cf. Drobetz, Schillhofer, and Zimmermann (2004, p. 17).

[16]Cf. Edwards and Weichenrieder (2004, p. 152).

[17]For a similar argument cf. Gompers, Ishii, and Metrick (2003); they label this approach as a kind of a long-run event study.

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

instrument for effective monitoring. In addition, the *number of outside blockholders* (BLOCK_NO) takes into account that the potential for effective monitoring might decrease if the control rights are split up among an increasing number of outside parties. *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.[19] *Firm risk* (FIRM_RISK) measures the unsystematic, diversifiable portion of companies' total risk. It is measured as the residuals' sum of squares (SSE) from a regression of the individual stock returns on the returns of the market (CDAX) over the preceding 60 months. The *financial structure* (DEBT_RATIO), measured as total debt to firm value (total debt + market value of equity), reflects the disciplining effect of a higher interest burden on managements behavior.[20] 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. 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. The dummy variable *dividends* (DIV) indicates whether dividends have been paid during the respective year.[21] In the pooled sample, the *year dummy variable* (YEAR_1998) is included to account for differences between the two sub-sample periods. Industry dummy variables are used (but not presented in the results) to account for heterogeneity among eight different industries.[22] Later on in the analysis, the *number of management board members* (MB_NO), a dummy variable indicating the presence of voting restrictions (VOTE), a dummy variable indicating whether the supervisory board of a company is subject to co-determination (CODET) and the ratio of intangible to total assets (INT_ASSETS) are introduced as further independent variables.

3.4 Descriptive Statistics

According to the data the mean ownership stake of insiders (MB_SB_FBM), as measured by cash flow rights, in 2003 adds up to 29.0%; it is interesting to see that this figure is quite close to the 29.6% of insider ownership recorded for 1998. The same is true for outside blockownership which is equal to 32.0% respectively 32.6%. As can be seen from the descriptive statistics in Panel A of table 2 incumbent executive board members (MB) control on average 10.7% of their firm's shares, while incumbent supervisory board members (SB) control 9.9% on average. The equity stake of former board members (FBM) averages 8.5%. As a further result it should be emphasized that outside blockholders altogether control 32.0% on average. Finally, table 2 gives summary information about all the other variables used in this study.

---

[19]See Graham and Harvey (2001, p. 195).

[20]See Demsetz and Villalonga (2001, p. 221).

[21]Cf. Beiner, Drobetz, Schmid, and Zimmermann (2006, p. 257); Edwards and Weichenrieder (2004, pp. 155-156).

[22]Our 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 as follows in order to increase the number of cases in each category: automobile, chemicals, construction, consumers, electronics, food & beverages, industrial and utilities & transportation.

Insert table 2

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 registered with authorities ("Bundesanstalt für Finanzdienstleistungsaufsicht (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 3 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 25%. Since in our sample the distribution of the ownership stakes of corporates is even more skewed than for individual insiders,[23] the changes in disclosure rules and the increasing transparency of ownership structures over the last decade revealed most notably also smaller ownership stakes.[24] 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 2003 mean insider ownership stake of 29.0% 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 Germany than in other countries.[25] 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 that the mean freefloat in a German listed company is only 36.0% as of the year 2003.[26] 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 average freefloat should be equal to 49.7%.[27] For the US according to McConnell and Servaes (1990, p. 600) the sum of insider holdings and external blockholdings

---

[23]For corporates the mean equity stake is 19.4%, while the median is 0.0%. For insiders, the mean and median are equal to 29.0% and 21.1%, respectively.

[24]See footnote 7.

[25]This can also be seen from the fact that in our sample equity stakes of board members alone sum up to an average of 20.6% for 2003 and 22.5% for 1998.

[26]Please note that according to panel A of table 2 the average blockholding, i.e. the sum of all external equity stakes individually larger than 5%, is 32.0%. Together with insider equity holdings of 29.0% this adds up to a closely-held equity stake of 61.0% on average. Again, this figure is very close to the corresponding figure for the year 1998 given in panel B of table 2, which reveals a closely-held equity stake of 62.2%.

[27]Similar figures for the UK are reported by Faccio and Lasfer (1999).

equals 37.4%. Hence, it is still true that dispersed ownership is less important in Germany than in the Anglo-Saxon world.

Table 3 gives also an overview with respect to the ownership structure in 1998. It is quite interesting that a comparison with the figures relating to the year 2003 reveals that insider ownership has been extremely stable. As far as value weighted blockholdings are concerned, it is interesting to see that corporate owners and institutional investors increased their blockholdings substantially, while insurance companies, banks and the government reduced their blockholdings in listed companies perceivably. This confirms, to some extent, the ongoing change in the ownership structure of corporate Germany.

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 second column of table 3. In that case the average insider ownership stake is equal to 11.5% and the average freefloat increases up to 46.7%. 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 49.7% 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 4 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 positively skewed and in 44.1% of the companies the insiders own less than 10% of the company's cash flow rights.

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 2003 sub-sample is split into two equally-sized sub-samples using the insider ownership as discriminating variable. As reported in table 5, the mean aggregated insider ownership stake (MB_SB_FBM) in the low insider ownership group amounts to 1.7%, while it adds up to 55.9% in the high insider ownership group. We find that the sub-sample with higher insider ownership exhibits lower mean buy-and-hold returns (-12.1% vs. -2.2%), similar market to book values (2.0 vs. 2.0) and higher average return on assets (3.2% vs. 2.3%). However, these differences are

not significant. Nevertheless, the tests for differences in means, shown in table 5, highlight other interesting variations in firm characteristics.

Insert table 5

For example, low insider ownership companies have significantly higher ownership stakes held by outside blockholders (56.9%) than high insider ownership companies (7.2%). 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 who controls more than 25%; 64.7% of listed firms are even majority controlled by blockholders. Thus, it seems that outside block ownership might be a substitute to insider ownership and, hence, both ownership phenomenons 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 6.[28] Furthermore, as shown in table 5 significant differences can be found for the number of outside blockholders, firm size, the number of management board members, and the two dummy variables relating to the existence of any kind of deviations from the one-share-one-vote principle and the presence of codetermination.

Insert table 6

Examining the correlation matrix we observe that the correlations between the insider ownership variable and the three performance variables are different in signs, albeit insignificant. Interestingly, buy-and-hold returns (BAHR) are significantly correlated with market-to-book ratios (MTBV) and return on assets (ROA), indicating that these may be, in fact, alternative corporate performance measures. However, there is no significant correlation between MTBV and ROA. Moreover, table 6 gives no strong indication that results might be affected by a multi-collinearity problem. In the next sections the insider ownership-performance relationship will be analyzed in a multivariate regression framework.

4.2   Base case: OLS regression results

For the 2003 sub-sample OLS regression results are presented in table 7, where models 1 and 2 use stock returns (BAHR) as dependent variable, whereas models 3 to 6 use market-to-book ratios (MTBV) and return on assets (ROA). Since we felt the need to learn more about the appropriate measure for insider ownership in Germany, we carried out the regression analysis using the three insider ownership variables as separate regressors (i.e. MB, SB, and FBM) in models 1, 3 and 5 as well as the aggregated insider ownership variable (i.e. MB_SB_FBM) in models 2, 4 and 6. We had complete data sets for 235 to 247 companies depending on the choice of the respective performance measure. In contrast to the univariate analysis in section 4.1, in the multivariate analyses the signs of all but one (the exception is FBM in model 5) insider ownership coefficients in models 1 to 6 are positive, indicating a positive impact of insider ownership on firm performance. For

---

[28]This result should be viewed with caution since insider ownership and block ownership are partial substitutes and, not surprisingly, are highly negatively correlated. However, as more than these two shareholder groups exist, both shares must not add up to 100% and, hence, observed correlations are not totally trivial.

the stock return models 1, 2 and 2a all insider ownership coefficients turn out to be significantly different from zero at least on the 0.05 level. For the MTBV models 3 and 4 three of the four coefficients are significant at least on the 0.1 level and for the ROA models 5 and 6 only supervisory board ownership is significant (0.01 level). This yields a first, rather consistent indication that there might be an economic rationale for firm performance to be influenced by insider ownership.

Insert table 7

With regard to the explanatory power of the models it should be noted that the adjusted R^2 is close to 40%, if stock returns are used as dependent variable, and around 18%, if MTBV or ROA are used. This is in line with the view that accounting performance measures might be rather noisy for German companies.[29] Thus, we will use model 2 (aggregated insider ownership and BAHR as dependent variable) as the base case, which will be discussed in more detail. The insider ownership coefficient of 82.6 — significant at the 0.01 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 83 basis points. Among the control variables, firm size, firm risk, growth potential and dividend payments have a positive effect on stock returns, while high levels of debt turn out to have a negative impact. While the positive effects of sales growth and dividend payments may be intuitively plausible, the remaining effects deserve further discussion. As far as the negative impact of the leverage is concerned, it should be noted that this effect is not caused by the impact of the leverage on the firm's market risk. In fact, model 2a shows that even after controlling for market risk, leverage has still a negative impact on stock returns. One possible explanation for this effect 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 risk 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.

Finally, the results strongly support the presumption that board ownership and outside blockholdings are a substitute to each other. In fact, according to model 2 in table 7 the marginal rate of substitution is equal to 82.6/93.9=0.88. Hence, a change in insider ownership by 100 basis points must be accompanied by an offsetting change of 88 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 stress this result. As a corollary, it is interesting to note that the coefficient on the number of blockholders variable is significantly (0.01 level) 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

---

[29]Cf. in this regard also Edwards and Weichenrieder (2004, p. 152).

Servaes (1990) by including the squared term of board member ownership, labeled as MB_SB_FBM_SQ in model 7 of table 8. As a result, the coefficient for MB_SB_FBM becomes negative but not on a significant level. The coefficient of the squared term (MB_SB_FBM_SQ) is positive and significant at the 0.05 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.[30] 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.[31]

Insert table 8

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 sub-variables — 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 (0.01 level). This can be seen from the results of model 8 in table 8. 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 2, 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 9 to 11. In model 9, the coefficient for the average ownership share per board member (MB_SB_FBM_AV) is positive but less significant than in the base case. Nevertheless, we regard this result with caution because of the methodological issue involved: Since we are not able to obtain the number of all former board members (nor do 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. In model 10 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 0.01 and 0.05 level respectively) 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 10 appear as plausible as the base case specification of model 2 we will stick to the base case model 2 in the next section because of the advantages associated with dealing with only one - and not two - possible endogenous insider variables. Finally, in model 11 inside ownership is measured in terms of the Euro-value instead in terms of the equity share.

---

[30] We doubt the reliability of results including higher terms of insider ownership as independent variables because of the arising multi-collinearity. In our sample the VIFs for MB_SB_FBM and MB_SB_FBM_SQ reach 16.5 and 12.6 respectively indicating presence of multi-collinearity. We find no procedure to deal with this problem in McConnell and Servaes (1990).

[31] It 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 2.

The accordingly defined variable (MB_SB_FBM_EUR) turns out to be insignificant. To summarize, it does not seem that any of the variations of the insider owner-ship variable discussed before generates more reliable results than the simple insider ownership measure MB_SB_FBM used in the base case model 2 of the analysis.[32]

4.4   Base case results for the pooled sample

Based on our conclusion that the insider ownership operationalizations of model 1 and 2, i.e. the simple individual insider ownership variables MB, SB and FBM as well as the aggregated measure MB_SB_FBM, best catch the phenomenon of insider ownership, table 9 summarizes the results of these equations for all three performance measures as well as for the sub-sample 2003 (Panel A), sub-sample 1998 (Panel B) and the pooled sample (Panel C). For the sake of clarity only the coefficients of the insider ownership variables, their respective t-statistics and the adjusted R^2 are presented.

Insert table 9

As can be seen, the results for the 1998 sub-sample confirm the results from the 2003 sub-sample. Moreover, for MTBV and ROA as performance measures, the number of significant positive coefficients is even larger than in the 2003 models. Moreover, results become even more conclusive when using the pooled sample as in Panel C; this may be an indication that the lack of significance of some coefficients obtained in the two preceding sub-sample estimations may be due to the relatively small sample size. In the pooled models (n=447 to 467), which also includes a year dummy variable controlling for a potential fixed time effect, all insider ownership coefficients in the stock return model are positive and significant on the 0.01 level. Furthermore, the coefficients of the aggregated insider ownership variable are pos-itive and significant at least on the 0.05 level for all three alternative performance measures. None of the coefficients turns out to be negative. To summarize, these results corroborate the view that results are rather robust in the sense that they point in the same direction regardless of the performance measure and the time pe-riod under investigation. Hence, as far as the German capital market is concerned, a positive relationship between insider ownership and corporate performance is likely to exist. Our findings are in line with recent research by Barontini and Caprio (2005) who do not find evidence for the hypothesis that family control hampers firm per-formance in Continental Europe.

4.5   Robustness of results

4.5.1   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 com-mon approach to construct a simultaneous equation system in order to account for

---

[32]This also holds if we use MTBV or ROA as performance variables instead of BAHR. However, results will not be reported here.

the potentially reciprocal dependence of insider ownership and firm performance.[33] 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:

$$Corporate\ performance = f(Insider\ ownership, firm\ characteristics) \quad (1)$$

$$Insider\ ownership = g(Corporate\ performance, firm\ characteristics) \quad (2)$$

Equation (1), the corporate performance equation, is the base case equation from section 4.2. Hence, the OLS results for model 12 in table 10 are the known results from our base case, i.e. model 2 in table 7. 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 13 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 companies with a large number of management board members (MB_NO) and in codetermined companies (CODET).[34] 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,[35] we use the set of all exogenous variables from model 12 and 14 as instrumental variables for the endogenous variables in model 13 and 15. The OLS- and 2SLS regression results for both equations are shown in table 10.

Insert table 10

As the insider ownership variable in model 13 still has a positive coefficient (significant at the 0.05 level) while the corporate performance variable in model 15 is close to zero, we do not find evidence for the hypothesis that the OLS results might be strongly biased through the potential endogeneity of insider ownership.[36] Thus,

---

[33] Similar simultaneous equation systems were used, among others, by Agrawal and Knoeber (1996), Cho (1998) Davies, Hillier, and McColgan (2005), and Beiner, Drobetz, Schmid, and Zimmermann (2006) to address the potential endogeneity effect.

[34] German 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).

[35] Cf. Himmelberg, Hubbard, and Palia (1999, p. 379).

[36] As a corollary it should be noted that the results of equation 13 indicate that insider ownership is more effective in value creation than external blockholdings, as the ratio of both coefficients is equal to 1.6.

our results conflict with the evidence presented by e.g. 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 (2006) who also find a positive impact of insider ownership on corporate performance, even by accounting for potential 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 one could address the question to what extent current insider ownership is explained by former insider ownership. More specifically, we have repeated the estimation of model 14 in table 10 by adding a lagged insider ownership variable, measured as of the end of the year 1998 for the 2003 sub-sample and as of the end of the year 1993 for the 1998 sub-sample. Although we do not present the results in detail here, the reader should note that in this way it can be shown that this variable adds perceivable explanatory power to the regression and is highly significant. Hence, current insider ownership structure depends significantly on former insider ownership confirming the view of the stickiness of this variable.

4.5.2 Change in ownership and corporate performance

The base case scenario has stipulated a linear relationship between the level of insider ownership and corporate performance, as measured by the variables BAHR, MTBV, and ROA. As a consequence, if the level of insider ownership is increased in a particular company, corporate performance should improve. In order to test this hypothesis, the base case regression for the 2003 sub-sample as given by model 2 is reestimated by substituting the insider ownership variable with a variable measuring the change in insider ownership over the preceding 5-year-period. Hence, MGMT_CHANGE reflects the absolute change of the variable MB_SB_FBM from 1998 to 2003.[37]

It is very interesting to see that an increase in insider ownership has a significant positive impact on the stock price performance of the company. Moreover, also in economic terms the relationship is not that much different from the one obtained under the base case scenario given in model 2. The sign and the significance of the other regressors remains basically unchanged. This confirms the results obtained under the base case specifications. However, it should be noted that results are not stable, if MTBV is used as the corporate performance variable, as we do not get a significant relationship with the change in insider ownership in this case. Similar is true for the accounting performance variable ROA. This fits into the already presented picture that the relationship between insider ownership and corporate performance is less robust, if corporate performance is measured by the variables MTBV or ROA.

<center>Insert table 11</center>

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) who justify their treatment of ownership

---

[37]It should be noted that this equation could only be estimated for the 2003 sub-sample since ownership structure data were only available at the end of the years 1998 and 2003.

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 sub-samples are not different on a significant level, ownership probably is not endogenous. Weighing all these 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.

4.6 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.[38] 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 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 pooled 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), who 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.

---

[38]Cf. Barnhart, Marr, and Rosenstein (1994) and Bøhren and Ødegaard (2004).

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 648 firm years for the years 2003 and 1998 we find robust evidence corroborating the presumption that insider ownership has a positive impact on corporate performance. This result holds regardless of the performance measure used, although evidence is most supportive when using stock price performance as opposed to market-to-book ratios or return on assets. Moreover, the sign and significance of the relationship does not change, even if we account for endogeneity by applying a 2SLS regression approach. Finally, 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.

References

Agrawal, A. and C. R. Knoeber (1996). Firm performance and mechanisms to control agency problems between managers and shareholders. *Journal of Financial and Quantitative Analysis 31*(3), 377–197.

Anderson, R. C. and D. M. Reeb (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *The Journal of Finance 58*(3), 1301–1327.

Barnhart, S. W., M. W. Marr, and S. Rosenstein (1994). Firm performance and board composition: Some new evidence. *Managerial and Decision Economics 15*(4), 329–340.

Barontini, R. and L. Caprio (2005). The effect of ownership structure and family control on firm value and performance. Evidence from Continental Europe. European Corporate Governance Institute (ECGI) - Finance Working Paper No. 88/2005.

Becht, M. and E. Böhmer (2003). Voting control in German corporations. *International Review of Law and Economics 23*(1), 1–29.

Beiner, S., W. Drobetz, M. M. Schmid, and H. Zimmermann (2006). An integrated framework of corporate governance and firm valuation. *European Financial Management 12*(2), 249–283.

Berle, A. A. and G. C. Means (1932). *The Modern Corporation and Private Property*. New York: Harcourt, Brace and World.

Bhagat, S. and R. H. Jefferis, Jr. (2002). *The Econometrics of Corporate Governance Studies*. Cambridge, London: The MIT Press.

Bøhren, Ø. and B. A. Ødegaard (2004). Governance and performance revisted. European Corporate Governance Institute (ECGI) - Finance Working Paper No. 28/2003.

Börsch-Supan, A. and J. Köke (2002). An applied econometricians' view of empirical corporate governance studies. *German Economic Review 3*(3), 295–326.

Bott, C. (2002). *Aktionärsstruktur, Kontrolle und Erfolg von Unternehmen*. Gabler Edition Wissenschaft. Deutscher Universitäts-Verlag.

Burkart, M., F. Panunzi, and A. Shleifer (2003). Family firms. *The Journal of Finance 58*(5), 2167–2201.

Chami, R. (1999). What's different about family businesses? University of Notre Dame and IMF Institute - Working Paper.

Chen, C. R., W. Guo, and V. Mande (2003). Managerial ownership and firm valuation: Evidence from Japanese firms. *Pacific-Basin Finance Journal 11*(3), 267–283.

Cho, M.-H. (1998). Ownership structure, investment, and the corporate value: An empirical analysis. *Journal of Financial Economics 47*, 103–121.

Davies, J. R., D. Hillier, and P. McColgan (2005). Ownership structure, managerial behavior and corporate value. *Journal of Corporate Finance 11*(4), 645–660.

Demsetz, H. (1983). The structure of ownership and the theory of the firm. *Journal of Law & Economics 26*(2), 375–390.

Demsetz, H. and K. Lehn (1985). The structure of corporate ownership: Causes and consequences. *Journal of Political Economy 93*(6), 1155–1177.

Demsetz, H. and B. Villalonga (2001). Ownership structure and corporate performance. *Journal of Corporate Finance 7*(3), 209–233.

Drobetz, W., A. Schillhofer, and H. Zimmermann (2004). Corporate governance and expected stock returns: Evidence from Germany. *European Financial Management 10*(2), 267–293.

Edwards, J. S. S. and M. Nibler (2000). Corporate governance in Germany: The role of banks and ownership concentration. *Economic Policy 15*(31), 239–267.

Edwards, J. S. S. and A. J. Weichenrieder (2004). Ownership concentration and share valuation. *German Economic Review 5*(2), 143–171.

Ehrhardt, O. and E. Nowak (2003). Private Kontrollrenten in deutschen Unternehmen. *Die Betriebswirtschaft 63*(4), 363–377.

Ehrhardt, O., E. Nowak, and F.-M. Weber (2006). Running in the family — The evolution of ownership, control, and performance in German family-owned firms 1903-2003. Swiss Finance Institute Research Paper No. 06-13.

Faccio, M. and M. A. Lasfer (1999). Managerial ownership, board structure and firm value: The UK evidence. Working Paper.

Franks, J. and C. Mayer (1990). Capital markets and corporate control: A study of France, Germany and the UK. *Economic Policy 5*(10), 189–231.

Franks, J. and C. Mayer (2001). Ownership and control of German corporations. *The Review of Financial Studies 14*(4), 943–977.

Gompers, P., J. Ishii, and A. Metrick (2003). Corporate governance and equity prices. *The Quarterly Journal of Economics 118*(1), 107–155.

Gorton, G. and F. A. Schmid (2000). Universal banking and the performance of German firms. *Journal of Financial Economics 58*(1–2), 29–80.

Graham, J. and C. Harvey (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics 60*, 187–243.

Himmelberg, C. P., R. G. Hubbard, and D. Palia (1999). Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics 53*(3), 353–384.

Höpner, M. and L. Krempel (2005). Ein Netzwerk in Auflösung: Wie die Deutschland AG zerfällt. In *MPIfG-Jahrbuch 2003/04*, pp. 9–14. Köln: Max-Planck-Institut für Gesellschaftsforschung.

Jensen, M. C. and W. H. Meckling (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics 3*(4), 305–360.

Köke, J. (1999). New evidence on ownership structures in Germany. ZEW Discussion Paper No. 60/1999.

La Porta, R., F. Lopez-de Silanes, and A. Shleifer (1999). Corporate ownership around the world. *The Journal of Finance 54*(2), 471–517.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (1998). Law and finance. *Journal of Political Economy 106*(6), 1113–1155.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (2000). Investor protection and corporate governance. *Journal of Financial Economics 58*(1), 1–25.

Loderer, C. and K. Martin (1997). Executive stock ownership and performance: Tracking faint traces. *Journal of Financial Economics 45*(2), 223–255.

McConaughy, D. L., M. C. Walker, G. V. Henderson, Jr., and C. S. Mishra (1998). Founding family controlled firms: Efficiency and value. *Review of Financial Economics 7*(1), 1–19.

McConnell, J. J. and H. Servaes (1990). Additional evidence on equity ownership and corporate value. *Journal of Financial Economics 27*(2), 595–612.

Morck, R., A. Shleifer, and R. W. Vishny (1988). Management ownership and market valuation: An empirical analysis. *Journal of Financial Economics 20*, 293–315.

Schmid, M. (2003). Managerial incentives and firm valuation: Evidence from Switzerland. Working Paper.

Schranz, M. (1993). Takeovers improve firm performance: Evidence from the banking industry. *Journal of Political Economy 101*(2), 299–326.

Stigler, G. J. and C. Friedland (1983). The literature of economics: The case of Berle and Means. *Journal of Law & Economics 26*, 237–268.

Villalonga, B. and R. Amit (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics 80*(2), 385–417.

Wenger, E. and C. Kaserer (1998a). German banks and corporate governance: A critical view. In K. J. Hopt, H. Kanda, M. J. Roe, E. Wymeersch, and S. Prigge (Eds.), *Comparative Corporate Governance - The State of the Art and Emerging Research*, pp. 499–536. Oxford University Press.

Wenger, E. and C. Kaserer (1998b). The German system of corporate governance — A model which should not be imitated. In S. W. Black and M. Moersch (Eds.), *Competition and Convergence in Financial Markets — The German and Anglo-American Models*, Amsterdam et al., pp. 41–78.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica 48*, 817–838.

Woidtke, T. (2002). Agents watching agents? Evidence from pension fund ownership and firm value. *Journal of Financial Economics 63*(1), 99–131.

Table 1: Definition of Variables

Code	Description
BAHR	Buy-and-hold stock returns, measured over the preceding 60 months (i.e., from 12/1998 to 12/2003 and 12/1993 to 12/1998).
MTBV	Market-to-Book-Value (MTBV), measured as market value of equity (sum of all share classes) divided by the book value of equity as of 31.12.2003 and 31.12.1998.
ROA	Return on assets (ROA) in percent, measured as (((PAT + INTEREST × (1-TAX)) / TOTAL ASSETS)-1) × 100; with PAT = published after tax profit, INTEREST = total interest charges, TAX = tax rate, and TOTAL ASSETS = average (year beginning/end) of total assets for the years 2003 and 1998.
MB	Cumulated shareholdings (all voting and non-voting share classes) of all active members of the management board ("Vorstand") and their families in percent (as of 31.12.2003 and 31.12.1998).
SB	Cumulated shareholdings of all active members of the supervisory board ("Aufsichtsrat") and their families in percent (as of 31.12.2003 and 31.12.1998).
FBM	Cumulated shareholdings of all former members of the management and supervisory board and their families in percent (as of 31.12.2003 and 31.12.1998).
MB_SB_FBM	The sum of MB, SB and FBM (as of 31.12.2003 and 31.12.1998).
MB_SB_FBM_SQ	The squared value of MB_SB_FBM (as of 31.12.2003).
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 (as of 31.12.2003).
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 (as of 31.12.2003).
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 (as of 31.12.2003).
MB_SB_FBM_AV	Average shareholdings per board member calculated as MB_SB_FBM divided by the number of active members of both boards, including employees' representatives (as of 31.12.2003).
MB_SB_FBM_NO	Number of registered insider shareholders (as indicated in Hoppenstedt Aktienführer) as a measure of concentration of insider ownership (as of 31.12.2003).
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 (as of 31.12.2003).
MB_SB_FBM_LAG	Lagged value of MB_SB_FBM as of 31.12.1998 for the 2003 sub-sample and as of 31.12.1993 for the 1998 sub-sample.
MGMT_CHANGE	The absolute change in the the variable MB_SB_FBM sum from 31.12.2003 to 31.12.1998 and from 31.12.1998 to 31.12.1993, respectively.
BLOCK_O	Cumulated shareholdings of all outside blockholders, who each hold a stake of at least 5 percent (as of 31.12.2003 and 31.12.1998).
BLOCK_NO	Number of outside blockholders, who each hold a stake of at least 5 percent (as of 31.12.2003 and 31.12.1998).
LN_ASSETS	Size of the company, measured as the natural logarithm of total assets (as of 31.12.2003 and 31.12.1998).
FIRM_RISK	Firm specific risk, measured as the sum of squared residuals (SSE) from a regression of individual stock returns on market returns (CDAX) over the preceding 60 months (i.e., from 12/1998 to 12/2003 and 12/1993 to 12/1998).
BETA	Firm's market risk, measured as the coefficient of a regression of individual stock returns on market returns (CDAX) over the preceding 60 months (i.e., from 12/1998 to 12/2003 and 12/1993 to 12/1998).
DEBT_RATIO	Debt ratio, proxied as the ratio of book value of total debt divided by the sum of book value of total debt and market value of equity (as of 31.12.2003 and 31.12.1998).

SALES_G	Annual sales growth, measured over the preceding 3 years (i.e., from 12/2000 to 12/2003 and 12/1995 to 12/1998).
DIV	Dummy variable: 1, if the company paid dividends during the year and 0 otherwise (2003 and 1998).
YEAR_1998	Dummy variable: 1, if the observation belongs to the 1998 sub-sample and 0 otherwise.
INDUSTRY DUMMIES	8 dummy variables (7 of them used in the 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 and 31.12.1998).
VOTE	Level of voting restrictions; 0 if no non-voting preference shares are issued and 1 divided by the ratio of ordinary share capital to preference share capital if non-voting preference shares are outstanding (as of 31.12.2003 and 31.12.1998).
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 (as of 31.12.2003 and 31.12.1998).
INT_ASSETS	Ratio of total intangible assets divided by total assets (as of 31.12.2003 and 31.12.1998).

Table 2: Descriptive Statistics

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
Panel A: 2003 (n=290)						
BAHR	285	-7.140	-22.584	85.251	-99.873	424.392
MTBV	238	2.024	1.537	1.671	0.233	11.212
ROA	251	2.747	3.695	10.317	-50.880	40.002
MB	290	0.107	0.000	0.216	0.000	0.873
SB	290	0.099	0.000	0.218	0.000	0.990
FBM	290	0.085	0.000	0.211	0.000	0.990
MB_SB_FBM	290	0.290	0.211	0.307	0.000	0.990
BLOCK_O	290	0.320	0.174	0.366	0.000	1.000
BLOCK_NO	290	1.080	1.000	1.188	0.000	6.000
LN_ASSETS	261	12.875	12.514	2.036	7.000	18.990
FIRM_RISK	286	1.504	0.731	1.954	0.015	12.060
DEBT_RATIO	253	0.318	0.280	0.269	0.000	0.939
SALES_G	260	-0.009	-0.022	0.368	-1.000	5.138
DIV	258	0.600	1.000	0.491	0.000	1.000
MB_NO	283	3.270	3.000	1.782	1.000	14.000
VOTE	290	0.119	0.000	0.292	0.000	1.000
CODET	285	0.320	0.000	0.466	0.000	1.000
INT_ASSETS	259	0.089	0.050	0.104	0.000	0.518
Panel B: 1998 (n=358)						
BAHR	240	23.184	3.316	84.529	-97.482	478.920
MTBV	319	3.054	2.257	2.340	0.482	14.809
ROA	281	5.449	4.854	9.097	-34.440	81.629
MB	358	0.141	0.000	0.247	0.000	0.988
SB	358	0.085	0.000	0.208	0.000	0.948
FBM	358	0.070	0.000	0.202	0.000	0.986
MB_SB_FBM	358	0.296	0.205	0.313	0.000	0.988
BLOCK_O	358	0.326	0.150	0.374	0.000	1.000
BLOCK_NO	358	0.910	1.000	1.043	0.000	6.000
LN_ASSETS	349	12.560	12.274	1.900	8.540	18.720
FIRM_RISK	244	0.536	0.356	0.624	0.005	4.740
DEBT_RATIO	342	0.204	0.152	0.201	0.000	0.832
SALES_G	327	0.169	0.065	0.566	-1.000	6.105
DIV	329	0.690	1.000	0.463	0.000	1.000
MB_NO	354	3.250	3.000	1.894	1.000	17.000
VOTE	358	0.139	0.000	0.305	0.000	1.000
CODET	256	0.290	0.000	0.457	0.000	1.000
INT_ASSETS	347	0.061	0.015	0.100	0.000	0.616

The definitions of all variables can be found in table 1.

Table 3: Ownership Structures - Cash Flow Rights in Percent

Mean Ownership Share	Unweighted			Weighted[a]	
Ownership Group	1998	2003		1998	2003
Freefloat	36.5	36.0		53.2	46.7
MB_SB_FBM	29.6	29.0		11.6	11.5
Corporates	23.6	19.4		9.1	15.2
Investment Companies	1.2	4.7		0.2	0.6
Banks	2.6	2.9		4.4	2.4
Institutionals	1.7	2.8		2.8	9.3
Insurance Companies	1.2	1.2		5.5	3.8
Government	2.5	1.2		11.9	6.3
Outsider Individuals	0.5	0.8		0.6	2.1
Treasury Shares	0.0	0.7		0.0	1.1
Employees	0.4	0.3		0.2	0.2
Others	0.3	0.9		1.1	0.9
Total[b]	100.0	100.0		100.0	100.0

MB_SB_FBM denotes the cumulated shareholdings of all active and former management and supervisory board members (including their families). Cf. table 1.

[a] Weighted by market value of equity. Average of monthly market values of equity during 1998 and 2003 respectively.

[b] Numbers may not add up to 100.0 due to rounding.

Table 4: Insider Ownership Deciles (2003)

	N	Mean Market Value of Equity (in EUR million)	Mean Freefloat Portion (in Percent)[a]
$0\% \leq$ MB_SB_FBM $< 10\%$	128	3,155	33.9
$10\% \leq$ MB_SB_FBM $< 20\%$	16	163	54.0
$20\% \leq$ MB_SB_FBM $< 30\%$	13	300	51.7
$30\% \leq$ MB_SB_FBM $< 40\%$	22	2,425	53.9
$40\% \leq$ MB_SB_FBM $< 50\%$	26	1,311	44.2
$50\% \leq$ MB_SB_FBM $< 60\%$	31	992	39.0
$60\% \leq$ MB_SB_FBM $< 70\%$	17	241	27.8
$70\% \leq$ MB_SB_FBM $< 80\%$	13	113	26.2
$80\% \leq$ MB_SB_FBM $< 90\%$	11	62	14.7
$90\% \leq$ MB_SB_FBM $< 100\%$	13	216	4.4
All Inside Ownership Deciles	290	1,859	36.0

For the definition of the variables cf. table 1.

[a] Unweighted cash flow rights.

Table 5: Difference in Means Tests (2003)

	Full Sample (n=290)	High MB_SB_FBM (n=145)	Low MB_SB_FBM (n=145)	t-statistics	
MB_SB_FBM	0.290	0.559	0.017		
BAHR	-7.140	-12.097	-2.221	0.955	
MTBV	2.024	2.030	2.018	-0.055	
ROA	2.747	3.198	2.307	-0.684	
BLOCK_O	0.320	0.072	0.569	15.801	***
BLOCK_NO	1.080	0.550	1.610	8.497	***
LN_ASSETS	12.875	12.295	13.443	4.738	***
FIRM_RISK	1.504	1.667	1.344	-1.398	
DEBT_RATIO	0.318	0.336	0.301	-1.050	
SALES_G	-0.009	0.022	-0.038	-1.318	
DIV	0.600	0.590	0.610	-0.355	
MB_NO	3.270	3.010	3.510	2.380	**
VOTE	0.119	0.148	0.089	-1.735	*
CODET	0.320	0.190	0.440	4.705	***
INT_ASSETS	0.089	0.090	0.088	-0.183	

*, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed; equal variances assumed); for the definition of the variables cf. table 1.

Table 6: Pearson Correlation Matrix (2003)

	BAHR		MTBV		ROA		MB_SB_FBM		BLOCK_O		BLOCK_NO		LN_ASSETS		FIRM_RISK		DEBT_RATIO		SALES_G
BAHR																			
MTBV	0.294	***																	
ROA	0.309	***	0.055																
MB_SB_FBM	-0.011		0.006		0.005														
BLOCK_O	0.159	***	0.093		0.031		-0.678	***											
BLOCK_NO	-0.054		-0.100		0.051		-0.507	***	0.525	***									
LN_ASSETS	0.306	***	0.099		0.197	***	-0.304	***	0.110		0.181	***							
FIRM_RISK	-0.348	***	0.063		-0.200	***	0.060		-0.161	***	-0.115		-0.367	***					
DEBT_RATIO	-0.326	***	-0.349	***	-0.279	***	0.088		-0.143	**	0.095		0.079		0.091				
SALES_G	0.103		-0.070	**	0.149	**	0.088		-0.075		-0.039		0.005		-0.081		0.021		
DIV	0.461	***	0.126	**	0.273	***	-0.061		-0.061		0.042		0.483	***	-0.419	***	-0.161	**	0.012

The definitions of all variables can be found in table 1; *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed).

Table 7: OLS-Regression Results – I (2003)

Dependent Variable	BAHR			MTBV		ROA	
Model No.	(1)	(2)	(2a)	(3)	(4)	(5)	(6)
Intercept	-137.945 (-1.728) *	-140.738 (-1.747) *	-148.980 (-1.978) **	-0.685 (-0.673)	-0.822 (-0.830)	-6.214 (-1.135)	-5.112 (-0.908)
MB	67.875 (2.265) **			0.797 (1.516)		3.859 (0.934)	
SB	91.900 (2.338) **			0.859 (1.965) **		9.189 (2.842) ***	
FBM	82.465 (2.383) **			1.421 (1.912) *		-0.581 (-0.184)	
MB_SB_FBM		82.590 (2.622) ***	54.478 (2.019) **		1.080 (2.205) **		3.979 (1.317)
BLOCK_O	93.402 (3.367) ***	93.867 (3.342) ***	62.062 (2.508) **	1.107 (2.383) **	1.128 (2.433) **	0.773 (0.392)	0.653 (0.320)
BLOCK_NO	-11.152 (-2.885) ***	-10.985 (-2.837) ***	-11.265 (-2.850) ***	-0.126 (-1.544)	-0.123 (-1.502)	0.734 (1.141)	0.736 (1.151)
LN_ASSETS	9.415 (2.645) ***	9.738 (2.708) ***	13.003 (3.418) ***	0.175 (2.450) **	0.186 (2.703) ***	0.794 (2.234) **	0.734 (2.036) **
FIRM_RISK	5.175 (0.494)	4.726 (0.452)	12.225 (1.077)	0.231 (2.708) ***	0.222 (2.564) **	-0.219 (-0.376)	-0.188 (-0.304)
DEBT_RATIO	-79.910 (-4.359) ***	-80.448 (-4.227) ***	-93.968 (-5.412) ***	-1.978 (-4.838) ***	-2.024 (-5.153) ***	-11.533 (-3.766) ***	-11.027 (-3.501) ***
SALES_G	28.175 (1.924) *	26.629 (1.804) *	22.271 (1.579)	0.333 (1.947) *	0.302 (1.745) *	3.996 (1.605)	3.970 (1.582)
DIV	61.620 (3.940) ***	60.492 (3.907) ***	57.011 (4.126) ***	0.220 (0.952)	0.187 (0.835)	2.253 (1.597)	2.400 (1.684) *
BETA			-40.029 (-3.078) ***				
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
n	247	247	247	235	235	246	246
R^2	0.406	0.404	0.434	0.231	0.227	0.243	0.221
R^2 adj.	0.362	0.366	0.394	0.171	0.174	0.186	0.170

Heteroscedasticity robust White (1980) estimators are used. The definitions of all variables can be found in table 1. *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed). In our base case model 2, four of the eight industry dummies (including the intercept) enter the regression model on a significant level of at least 0.05. We believe the model to be rather stable to variations in the selection of the control variables, since the variance inflation factors (VIFs) of all variables are below 4.0; excluding the industry dummies all VIFs are below 2.6 (not shown in the table).

Table 8: OLS-Regression Results – II (2003)

Dependent Variable	BAHR									
Model No.	(7)		(8)		(9)		(10)		(11)	
Intercept	-99.631		-109.954		-149.507		-120.092		-73.145	
	(-1.488)		(-1.547)		(-1.900)	*	(-1.533)		(-1.125)	
MB_SB_FBM	-77.025						101.220			
	(-1.104)						(3.023)	***		
MB_SB_FBM_SQ	188.738									
	(2.056)	**								
MB_SB_FBM_0to5			-92.188							
			(-0.227)							
MB_SB_FBM_5to25			-52.321							
			(0.502)							
MB_SB_FBM_25to100			138.756							
			(2.707)	***						
MB_SB_FBM_AV					548.478					
					(2.359)	**				
MB_SB_FBM_NO							-17.013			
							(-2.135)	**		
MB_SB_FBM_EUR									-0.004	
									(-1.335)	
BLOCK_O	72.449		76.192		83.595		82.980		53.585	
	(2.981)	***	(2.922)	***	(3.346)	***	(2.954)	***	(2.893)	***
BLOCK_NO	-9.102		-8.817		-11.307		-9.267		-15.622	
	(-2.323)	**	(-2.107)	**	(-2.850)	***	(-2.243)	**	(-3.292)	***
LN_ASSETS	7.849		8.312		11.224		8.805		7.705	
	(2.444)	**	(2.485)	**	(2.912)	**	(2.482)	**	(2.373)	**
FIRM_RISK	4.714		5.234		2.448		6.156		4.922	
	(0.515)		(0.523)		(0.285)		(0.589)		(0.413)	
DEBT_RATIO	-80.980		-82.698		-84.098		-83.212		-79.858	
	(-4.556)	***	(-4.596)	***	(-4.803)	***	(-4.407)	***	(-3.853)	***
SALES_G	27.965		26.560		27.635		25.790		29.212	
	(1.869)	*	(1.808)	*	(1.848)	*	(1.776)	*	(1.964)	**
DIV	66.068		65.364		57.904		62.384		61.269	
	(4.169)	***	(3.946)	***	(4.206)	***	(4.018)	***	(3.537)	***
Industry Dummies	Yes		Yes		Yes		Yes		Yes	
n	247		247		247		247		247	
R^2	0.427		0.417		0.413		0.413		0.372	
R^2 adj.	0.388		0.373		0.375		0.372		0.331	

Heteroscedasticity robust White (1980) estimators are used. The definitions of all variables can be found in table 1. *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed). 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). In model 7 the VIFs for MB_SB_FBM and MB_SB_FBM_SQ are 16.5 and 12.6 respectively (not shown) indicating the presence of multi-collinearity.

Table 9: OLS-Regression Summary Results – III (2003, 1998 and Pooled Sample)

Dependent Variable	BAHR	MTBV	ROA
Panel A: 2003	n=247	n=235	n=246
MB	67.875 (2.265) **	0.797 (1.516)	3.859 (0.934)
SB	91.900 (2.338) **	0.859 (1.965) **	9.189 (2.842) ***
FBM	82.465 (2.383) **	1.421 (1.912) *	-0.581 (-0.184)
MB_SB_FBM	82.590 (2.622) ***	1.080 (2.205) **	3.979 (1.317)
R^2 adj.	0.362 0.366	0.171 0.174	0.186 0.170
Panel B: 1998	n=220	n=212	n=215
MB	56.734 (1.554)	1.849 (1.706) *	5.556 (1.695) *
SB	70.968 (2.579) ***	1.282 (1.658) *	11.217 (1.947) *
FBM	75.251 (2.259) ***	-0.178 (-0.329)	7.773 (2.210) **
MB_SB_FBM	69.304 (2.580) ***	0.841 (1.299)	8.630 (2.632) ***
R^2 adj.	0.334 0.339	0.142 0.117	0.086 0.085
Panel C: Pooled Sample	n=467	n=447	n=461
MB	63.499 (2.694) ***	1.517 (2.318) **	3.488 (1.162)
SB	79.678 (3.059) ***	1.146 (2.835) ***	9.061 (2.471) **
FBM	79.574 (3.243) ***	0.785 (1.523)	2.609 (0.980)
MB_SB_FBM	75.747 (3.490) ***	1.079 (2.768) ***	5.258 (2.090) **
R^2 adj.	0.352 0.354	0.160 0.160	0.128 0.118

Only the coefficients of the insider ownership variables and their respective t-statistics as well as the number of cases and R^2 adj. are presented. All regression equations include the same control variables (LN_ASSETS, FIRM_RISK, DEBT_RATIO, SALES_G, DIV) and 7 industry dummies as the regression models in tables 7 and 8 but are not presented for the sake of clarity. 2003 and 1998 sub-samples pooled. Equations include a year dummy to account for differences between the sub-sample periods. Heteroscedasticity robust White (1980) estimators are used. The definitions of all variables can be found in table 1. *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed).

Table 10: Simultaneous Equation System – OLS- and 2SLS-Regression Results (Pooled Sample)

Dependent Variable	BAHR				MB_SB_FBM			
Model No.	(12) OLS		(13) 2SLS		(14) OLS		(15) 2SLS	
Intercept	-138.029		-289.245		0.810		0.767	
	(-3.947)	***	(-2.880)	***	(8.346)	***	(6.802)	***
MB_SB_FBM	75.747		239.348					
	(4.435)	***	(2.395)	**				
BAHR					0.000[a]		0.000[b]	
					(3.899)	***	(0.165)	
BLOCK_O	63.030		146.035		-0.526		-0.513	
	(4.570)	***	(2.855)	***	(-18.235)	***	(-16.927)	***
BLOCK_NO	-3.858		4.427		-0.045		-0.048	
	(-1.059)		(0.689)		(-4.723)	***	(-4.771)	***
LN_ASSETS	10.947		16.367		-0.021		-0.015	
	(5.057)	***	(3.978)	***	(-2.564)	**	(-1.293)	
FIRM_RISK	3.063		2.961		0.002		-0.000	
	(0.809)		(0.708)		(0.241)		(0.043)	
DEBT_RATIO	-75.739		-67.262		-0.017		0.047	
	(-5.147)	***	(-3.952)	***	(-0.404)		(-0.758)	
SALES_G	31.356		32.913		-0.026		-0.011	
	(3.925)	***	(3.721)	***	(-1.189)		(-0.412)	
DIV	52.304		51.547					
	(6.441)	***	(5.727)	***				
YEAR_1998	4.583		7.412		-0.024		-0.022	
	(0.653)		(0.936)		(-1.245)		(-1.109)	
MB_NO					-0.009		-0.010	
					(-1.349)		(-1.466)	
VOTE					-0.017		-0.006	
					(-0.602)		(-0.187)	
CODET					-0.067		-0.073	
					(-2.866)	***	(-2.805)	***
INT_ASSETS					-0.230		-0.212	
					(-2.187)	**	(-1.955)	*
Industry Dummies	Yes		Yes		Yes		Yes	
n	467		447		473		238	
R^2	0.376		0.323		0.663		0.634	
R^2 adj.	0.354		0.299		0.649		0.602	

The definitions of all variables can be found in table 1. *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed).
[a] The exact value is $4.696 \ 10^{-4}$.
[b] The exact value is $7.519 \ 10^{-5}$.

Table 11: Change in Insider Ownership – OLS-Regression Results (2003)

Dependent Variable	BAHR		MTBV		ROA	
Model No.	(16)		(17)		(18)	
Intercept	-53.157		0.247		-1.580	
	(-1.012)		(0.275)		(-0.360)	
MGMT_CHANGE	81.532	***	0.459		-0.296	
	(2.765)		(1.233)		(-0.109)	
BLOCK_O	70.627	***	0.707	*	-1.286	
	(3.518)		(1.845)		(-0.712)	
BLOCK_NO	-14.537	***	-0.173	**	0.533	
	(-3.317)		(-2.032)		(0.862)	
LN_ASSETS	6.444	**	0.145	**	0.599	*
	(2.384)		(2.136)		(1.853)	
FIRM_RISK	4.996		0.227	**	-0.172	
	(0.505)		(2.572)		(-0.259)	
DEBT_RATIO	-82.660	***	-2.024	***	-10.874	***
	(-4.695)		(-5.161)		(-3.427)	
SALES_G	29.328	**	0.328	**	4.082	
	(2.134)		(2.004)		(1.633)	
DIV	60.549	***	0.194		2.455	*
	(-4.116)		(0.860)		(1.686)	
Industry Dummies	Yes		Yes		Yes	
n	247		235		246	
R^2	0.420		0.214		0.215	
R^2 adj.	0.382		0.161		0.164	

OLS-regression coefficients. Heteroskedasticity robust White (1980) t-statistics reported in parentheses. *, ** and *** indicate significance on the 0.10, 0.05 and 0.01 level (2-tailed). For a definition of the variables see table 1.