Ownership Concentration and Share Valuation

by

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Ownership Concentration and Share Valuation

Abstract

Concentrated ownership of large listed companies is widespread throughout the world, and Germany is typical in this respect. This paper proposes a method of distinguishing empirically between the beneficial and harmful effects of ownership concentration, and applies it to German data. The results show that, for most types of largest shareholder, the beneficial effects on minority shareholders of increased ownership (greater monitoring of management, and reduced incentives to exploit minority shareholders due to greater cash-flow rights) are at least as large as, and sometimes significantly larger than, the harmful effect (greater private benefits of control due to greater control rights).
1. Introduction

In most countries, the typical large listed company has concentrated rather than dispersed ownership. As La Porta et al. (1998) note, ‘dispersed ownership in large public companies is simply a myth … the finance textbook model of management faced by multitudes of dispersed shareholders is an exception and not the rule.’ Indeed, La Porta et al. (1999) find in their sample of 27 wealthy economies that it is more common for large listed companies to have a single controlling shareholder than to have dispersed ownership. Such controlling shareholders are in a position to exert a great deal of influence on the way the companies they own are operated, and thus to obtain private benefits of control at the expense of minority shareholders. These private benefits of control can take many forms. If the controlling shareholder is also a manager of the company, minority shareholders can be exploited by paying a high salary to the controlling shareholder. Alternatively, the controlling shareholder can exploit business relations between the company and other firms that she wholly owns in order to exploit minority shareholders. For example, transfer pricing can be used to shift profits from the company with minority shareholders to the firm wholly-owned by the controlling shareholder, or the company with minority shareholders can invest in assets that are then sold or leased at favourable terms to the wholly-owned firm (Johnson et al, 2000). Evidence of private benefits of control obtained by controlling shareholders has been provided for the USA by Barclay and Holderness (1989), for Sweden by Bergström and Rydqvist (1990), and for Italy by Zingales (1994). For firms with a controlling shareholder, the key conflict of interest in corporate governance is thus the one between the controlling shareholder and minority shareholders, rather than that between dispersed shareholders and professional managers who run the firm but have little or no ownership stake in it.

The conflict of interest between controlling and minority shareholders has received a great deal of interest in the recent literature on corporate governance (Shleifer and Vishny 1997, La Porta et al. 1999, Claessens et al. 2000, 2002, Faccio et al. 2001, Faccio and Lang...
The distinction between the control rights and the cash-flow rights of the controlling shareholder has been central to the analysis of this conflict of interest. From a minority shareholder’s point of view, the presence of a controlling shareholder involves both benefits and costs. Such a shareholder will partially internalise the benefits of monitoring management, and thus limit the extent to which managers can act in their own interest at the expense of shareholders in general. However, the greater are the control rights of the controlling shareholder, other things equal, the greater is her ability to influence the way the company is run, and hence the greater is her ability to obtain private benefits of control at minority shareholders’ expense. However, the greater are the cash-flow rights of a controlling shareholder – the fraction of the firm’s profits to which she is entitled – then, other things equal, the more closely are her incentives aligned with those of the minority shareholders, and hence the lower are her incentives to pursue costly policies which divert profits from minority shareholders (Jensen and Meckling, 1976). Thus the extent of the conflict of interest between controlling and minority shareholders is predicted to depend on the extent to which the former’s control rights exceed her cash-flow rights.

The control rights of ownership of firms can be separated from the cash-flow rights in two main ways. First, firms can issue classes of shares that differ in terms of their relative proportion of voting rights and dividend entitlement. Second, even if all shares have the same voting rights, then pyramiding, i.e., ownership via a chain of firms, provides another method of separating control and cash-flow rights. Suppose that possession of a simple majority of a firm’s voting rights gives complete control over the firm. Then an individual who owns 51% of firm A, which in turn owns 51% of firm B, has complete control over firm B, but is only entitled to 26.01% (51% of 51%) of firm B’s dividends, and thus has much lower cash-flow rights than control rights in firm B.

Several recent empirical studies have been based on the distinction between the control and cash-flow rights of the controlling shareholder. These studies have emphasised
pyramiding rather than shares with different voting rights as the source of the separation of these two forms of ownership rights. Faccio et al. (2001) focus on pyramiding as the method by which the controlling shareholder obtains control rights in excess of cash-flow rights in their analysis of the effect of these two forms of ownership rights on dividend payout rates in Western European and East Asian companies. In their analysis of the relationship between firm value and the control and cash-flow rights of the largest shareholder in East Asian companies, Claessens et al. (2002) consider both pyramid structures and shares with different voting rights as sources of differences between control and cash-flow rights, but pyramiding is by far the most important, since only three percent of the corporations in their sample issue shares with different voting rights.

In these two studies, as well as others that have focused on pyramiding as the source of the separation between control and cash-flow rights (Claessens et al. 2000, Faccio and Lang 2001, and La Porta et al 1999), the measurement of the control rights of controlling shareholders who exercise control via a pyramid has been based exclusively on the weakest link principle (henceforth WLP). This principle assigns control rights to the controlling shareholder on the basis of the minimum value of actual voting rights across the different links of a control chain.\(^1\) Despite its popularity in empirical studies, the WLP is an ad hoc measure with no theoretical underpinning, and thus has some potentially serious problems as a measure of the control rights of controlling shareholders. Since empirical analyses have placed such emphasis on pyramiding as the source of the separation between control and cash-flow rights, the use of the WLP to measure control rights raises a question about the robustness of the conclusions drawn about the effects of this separation.

A first contribution of this paper is to provide evidence of the effects of the separation of the control and cash-flow rights of the controlling shareholder that answers the robustness question. We propose measures of these two distinct forms of ownership rights that do not

\(^1\) Thus, if a controlling shareholder has 11% of the voting rights in firm A, and firm A has 21% of the voting rights in firm B, the ultimate owner is deemed to have control rights of 11% in firm B according to the WLP.
involve pyramiding, and hence our empirical results do not depend on ad hoc measurement using the WLP. Our results provide strong empirical support for the view that the extent of the conflict of interest between controlling and minority shareholders depends on the extent to which the controlling shareholder’s control rights exceed her cash-flow rights.

We apply our method of estimating the separate effects of the control and cash-flow rights of the controlling shareholder to German data, and thus a second contribution of the paper is to provide evidence about the role of large shareholders in German corporate governance. Such evidence is relevant for understanding corporate governance more generally, since Germany is fairly typical of the world as a whole in the extent of ownership concentration among its largest listed companies. La Porta et al. (1998) find that, for their sample of 45 countries, the mean (median) ownership of the three largest shareholders in the ten largest publicly-traded private non-financial domestic companies in each country is 46 (45) per cent, while the mean (median) ownership of the three largest shareholders in Germany is 48 (50) per cent. Most of the largest listed German companies have a single controlling shareholder: in our sample of 97 (which is discussed more fully in Section 4), 69 had a largest shareholder who owned more than 25% of the voting rights, and 46 had one owning more than 50%.

The present paper analyses a sample of large German companies, all of which have some shareholders who do not own controlling blocks of shares. Hence it is reasonable to suppose that differences in the value of shares in these companies are determined by differences in marginal shareholders’ evaluation of the cash-flow returns they receive from such shareholdings. The paper shows that, in Germany, greater holdings by the largest shareholder raise the value of corporate equity via monitoring and convergence-of-interest effects, but also lower the value of shares because of the increased ability of the largest shareholder to obtain private benefits of control at the expense of minority shareholders. Greater holdings by the second-largest shareholder also tend to raise the value of shares,
which may be due either to the effects of monitoring of management by the second-largest shareholder, or to the effects of monitoring the behaviour of the largest shareholder and thus reducing the extraction of private benefits of control. The results show that, although largest shareholders are able to gain private benefits of control at minority shareholders’ expense, the net effect of equal increases in both the control and cash-flow rights of the largest shareholder does not harm, and, depending on the type of largest shareholder, may benefit minority shareholders. Depending on the type of shareholder, a change from completely dispersed ownership of a large company to ownership by a single shareholder can double the value of the company’s shares, which provides striking evidence of the costs that shareholders in German companies with dispersed share ownership would suffer due to the lack of monitoring of management, and may explain why so few large listed German companies have completely dispersed ownership.

The relevant features of corporate governance in listed German companies are discussed in Section 2 of the paper. Section 3 discusses the predictions of a simple model of ownership concentration and share valuation. The data are described in Section 4. Section 5 contains the empirical implementation of the analysis, and the empirical results are presented and discussed in Section 6. Section 7 concludes.

2. Large shareholders’ control of corporate behaviour in Germany

As was noted in the introduction, most large listed German companies have a single shareholder who owns more than 25% of the voting equity, and about half have a single shareholder who owns more than 50%. This would appear to suggest that for a majority of large listed German corporations, the largest shareholder is in a position of complete control over the firm, and can, by appointing and dismissing senior management, ensure that the corporation is operated exactly in accordance with her wishes.

2 Franks and Mayer (2001) report that, in 1990, 85% of a sample of 171 large listed industrial companies in Germany had a single shareholder with an ownership stake of more than 25% of the share capital, and 57% had single shareholder who owned more than 50%. 
However, the role and composition of the supervisory board, and the legal rights of minority shareholders, imply that in Germany even a shareholder owning just over 50% of the voting shares in a listed company may not have complete control of its management. The German *Aktiengesetz* (Stock Corporation Act) specifies that the main function of the supervisory board, which all listed corporations are required to have, is the control of management. Responsibility for the operation of the corporation rests with the management board, members of which cannot also be members of the supervisory board. The management board is appointed and dismissed by the supervisory board, not by the shareholder meeting. If a corporation has more than 2,000 employees, one-half of its supervisory board members must be elected by its employees; and the other half is elected by its shareholders. For such corporations, the chairman of the supervisory board, who is elected either by a two-thirds majority or, if such a majority cannot be achieved, by the shareholder representatives alone, can cast a second vote to break ties in supervisory board decisions. Thus, while in principle a shareholder owning just over 50% of the voting equity can achieve full control of the company's management, in practice this requires that all shareholder representatives on the supervisory board vote as this shareholder wishes, and that the casting vote of the supervisory board chairman is used in the event of opposition by the employee representatives. Such a situation is unlikely, because of the unfavourable publicity which would be attracted by unanimous opposition by the employee representatives. It is made more unlikely by the legal rights of minority shareholders, to which we now turn.

Certain decisions concerning a corporation have to be made by a vote at the shareholders' general meeting, rather than by the management board, and some of these, such as changes in the corporation's statutes, increases or decreases in equity capital, and mergers

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3 The shareholder representatives on the supervisory board are elected, usually for the legal maximum of five years, at a general meeting of the corporation's shareholders, which must be held at least once a year. The election procedure involves a simple majority vote on the entire group of shareholder representatives. This group is usually proposed jointly by the corporation's management board and its supervisory board, but amendments to the group can be proposed by a shareholder or group of shareholders holding 10% of the voting equity.
or liquidations, usually require a 75% majority. Hence a shareholder or group of shareholders owning 25% of the voting equity can block these decisions. A shareholder or group of shareholders owning 10% of the voting equity can put any proposal to a vote at the shareholders' meeting, including an amendment to the group of shareholder representatives nominated for election to the supervisory board, as well as a vote of no confidence in particular members of the management or supervisory board. Shareholders representing either 10% or DM 2 million of the equity capital can also go to court to request a special audit, to which the court must agree if there is any evidence suggesting cause for concern. Finally, a shareholder or group of shareholders owning 5% of the voting equity can demand an extraordinary shareholders' meeting.

A number of special legal provisions apply in the case where the dominant shareholder in a corporation (as defined in the Aktiengesetz) is another corporation.\textsuperscript{4} These provisions may also apply to individuals or families who are dominant shareholders if the individual or family owns a firm which deals with the corporation in question. Unfavourable contracts may not be imposed on the corporation by its dominant shareholder unless there is adequate compensation. The management board of the corporation is required to produce a report on business carried out with the dominant shareholder, which specifies the compensation paid for any unfavourable contracts. This report is checked by both an auditor and the supervisory board of the corporation, and the results of these checks are reported to the shareholder's general meeting. Shareholders representing either 5% or € 500,000 million of the equity capital have the right to go to court to appeal against a conclusion of adequate compensation for unfavourable contracts.

Sufficiently large groups of minority shareholders therefore have legal rights which enable them to subject actions of the large shareholder to scrutiny both by votes at the shareholders' meeting and by the appointment of special auditors. This feature of the German

\textsuperscript{4} §17 of the Aktiengesetz defines a dominant shareholder as one holding more than 50% of the voting equity. The relevant provisions are set out in §§311-318 of the Aktiengesetz.
corporate governance system, together with the role played by the supervisory board, make it plausible to suppose that the degree of control of a large shareholder in a listed German corporation over its behaviour, and thus his or her ability to enjoy private benefits of control, does not reach a maximum once such a shareholder owns just over 50% of the voting equity. Rather, a large shareholder's degree of control is likely to increase until the proportion of voting equity held exceeds 75% (at which point minority shareholders can no longer block any decisions), and may even increase as the proportion of voting equity owned exceeds 90% or 95% (as the other rights of minority shareholders disappear). The legal provisions applying to majority corporate shareholders may mean that they are more limited in their degree of control over the behaviour of the corporations which they own than are other types of large shareholders.

3. Theoretical aspects of the relationship between ownership concentration and share valuation

In this section we briefly discuss the relationships that we expect to observe between the ownership concentration of a company and its share valuation. These relationships are derived from a simple static model set out in the section A.1 of the Appendix. The value of corporate equity is assumed to be determined by the minority shareholders in the company, whose only benefit from the ownership of shares is the dividends they receive, and who are assumed to anticipate correctly the costs and benefits to them of owning shares in a company in which the largest shareholder may exert some control over its actions. The assumption that the value of shares to minority shareholders depends only on the payments received from a company as a result of owning shares in it means that an extension to a dynamic framework which would allow for capital gains is straightforward. It is not, however, essential for our empirical application of the analysis: this only requires that differences between firms' share values are due to differences in expected payments to minority shareholders. Minority holders of shares with voting rights may also expect to obtain an additional return because these
voting rights have a probability of being pivotal in control contests, and our empirical application assumes that this voting premium component of share values is constant across firms. Since Franks and Mayer (2001) find that in Germany minority shareholders obtain virtually zero abnormal returns in share block transactions, it is unlikely that the voting premium is a significant component of the returns to minority shareholders in practice.

We assume that the gross profits of a company depend on the extent to which its management is subject to monitoring by shareholders. We suppose that the amount of such monitoring depends separately on both the control rights and the cash-flow rights of the largest shareholder, because the extent of monitoring of management by the largest shareholder is the result of two factors. Monitoring is costly for the largest shareholder, so the higher this shareholder’s cash-flow rights the greater are the benefits of monitoring for the largest shareholder, and hence the greater is the extent of such monitoring. Given the effort expended by the largest shareholder on monitoring, the effect on management depends on the largest shareholder's ability to dismiss a poorly-performing management, and this will be greater the higher are this shareholder’s control rights. It is also possible that some minority shareholders may own a sufficiently large fraction of the corporation's equity to provide them with incentives to monitor the management, so that we allow for the possibility that the extent of shareholder monitoring also depends on the control rights of the second-largest shareholder.

The control rights of the largest shareholder give her some ability to exploit minority shareholders. To model this, we assume that the largest shareholder can, at a cost, divert some part of gross profits away from other shareholders. This cost of diversion can be thought of as the cost of managerial effort needed to conceal transactions and justify activities which only benefit the largest shareholder, or as the cost to the firm of operating in a way which allows the largest shareholder to divert profits, rather than in the most efficient way. We make

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5 The assumption that diversion of profits is inefficient is standard in the literature on the private benefits of control, e.g. Pagano and Röell (1998).
a number of assumptions about the diversion cost (see the Appendix for details), which enable us to characterise the largest shareholder’s best choice of profit diversion, and hence dividends, as a function of this shareholder’s control and cash-flow rights, and the control rights of the second-largest shareholder, which are taken to be exogenously given. The justification for taking the ownership variables as exogenous in the empirical analysis is discussed in Sections 5 and 6.

Other things equal, the effect of increases in the largest shareholder’s control rights on the returns to minority shareholders is theoretically ambiguous, as equation (A.10) in the Appendix shows. Minority shareholders will suffer to the extent that these increased control rights increase profit diversion, but will benefit to the extent that increased control rights result in greater monitoring and lower costs of profit diversion. If empirical estimates show that share valuation decreases when the largest shareholder’s control rights increase, this is consistent with the greater diversion effect outweighing the other two effects, so that the net effect of increases in the largest shareholder’s control rights is harmful to minority shareholders.

Other things equal, the effect of increases in the largest shareholder’s cash-flow rights on the returns to minority shareholders is theoretically clear-cut, as equation (A.11) in the Appendix shows. These higher cash-flow rights benefit minority shareholders, by increasing monitoring of management and by raising the cost to the largest shareholder of diverting profits. Thus we expect to find evidence that increases in these cash-flow rights increase share valuation.

Other things equal, the effect of increases in the second-largest shareholder’s control rights on the returns to minority shareholders is also theoretically ambiguous, as equation (A.12) in the Appendix shows. Minority shareholders will benefit to the extent that these increased control rights increase the monitoring of management and reduce the diversion of profits by the largest shareholder, but they will suffer to the extent that increased control
rights increase the cost of profit diversion. Empirical evidence that share valuation increases when the second-largest shareholder’s control rights increase is consistent with the beneficial effect for minority shareholders of greater holdings by the second-largest shareholder outweighing the harmful effect, although it is not possible to identify how much of such a beneficial effect would be due to monitoring management and how much to increasing the costs of profit diversion by the largest shareholder.

It is clear from the above discussion that the magnitude of any marginal effects of increases in the largest shareholder's control and cash-flow rights which operate via greater monitoring of management cannot be identified from estimates of the marginal effects of such increases on share values, because the increased control and cash-flow rights have effects on share valuation which operate both by influencing monitoring and by other routes. However, the following argument suggests a way of estimating the total effect of greater monitoring of management which results from increased ownership by the largest shareholder. If the ownership of a company is completely dispersed, then even the largest shareholder has such tiny control rights that it is not possible for her to divert any profits from other shareholders, but there will be no monitoring of management by shareholders. If the largest shareholder has all the control and all the cash-flow rights, then no profits will be diverted, since all profits accrue to the largest shareholder anyway, and the largest shareholder will have the correct incentives to undertake efficient monitoring of management, since she internalises all the benefits of so doing. In the former case, the equity value of a company reflects the absence of both profit diversion and monitoring of management, while in the latter case it reflects the absence of profit diversion and the presence of efficient monitoring of management. Hence the difference between the value of equity in these two cases, other things equal, provides an estimate of the value of efficient monitoring of management relative to no monitoring of management.

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6 See the Appendix for the precise assumptions about the marginal cost of profit diversion required to justify this argument.
4. Data

The data we use consists of a sample of 97 listed corporations, taken from Nibler (1998). Nibler collected very detailed data on the equity voting rights in 158 of the largest 200 non-financial German firms in 1992 (measured by turnover), as well as data on some accounting variables and a number of other characteristics of these firms. For most firms, Nibler measured the equity voting rights exercised by different owners at the 1991 shareholders’ general meeting: for a small number of firms this information was not available for 1991 and so was taken from either the 1990 or 1992 general meeting. One of the criteria used by Nibler to select the 158 firms in his sample was that there should have been no significant changes in a firm’s ownership structure over the period 1988-1992, so the use of 1990 or 1992 information in a small number of cases does not introduce any errors.

Since our concern is with the effects of concentrated ownership on the market value of shares, we had to eliminate the unlisted firms from Nibler’s sample of 158, which resulted in a sample of 97 companies. For these corporations we supplemented Nibler’s data by collecting information on the cash-flow rights of the largest shareholder, the ratio of market value of equity to book value of equity, and some additional balance-sheet ratios. The cash-flow rights of the largest shareholder (CF1) were measured as the fraction of total dividends paid in 1991 received by this shareholder. We obtained this figure using the proportions of voting and non-voting equity which were owned by the largest shareholder, and the dividend paid to voting

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7 Information on shareholder participation is not published in business reports, but until recently could be obtained from local register courts (Handelsregister) at the headquarters of the various firms. Note that a recent change of the law drops the requirement to publish participation information in the minutes of the shareholder meeting.

8 We also decided to eliminate a handful of companies for which Nibler claims a stable ownership structure during the period 1988-1991 but for which Jenkinson and Ljungqvist (1999) provide evidence for an ongoing control contest during that period. Note that all our qualitative results are robust with respect to including the respective firms.
and non-voting shares, in 1991. 9 26 of the companies in our sample issued non-voting as well as voting shares, which implies that if we were to use the proportion of the voting equity owned by the largest shareholder to measure her control rights, 71 of the companies would have largest shareholders with identical control and cash-flow rights. We therefore measured the control rights of the largest shareholder as the proportion of equity voting rights actually exercised by this shareholder at the annual shareholder meeting. This measure (CR1) is given by adjusting the proportion of the voting equity owned by the largest shareholder by the fraction of the total voting equity which was actually represented at the meeting.10 The correlation between CR1 and CF1 for the 97 companies is 0.87. The second-largest shareholder’s control rights were measured as the proportion of equity voting rights actually exercised by this shareholder at the annual shareholder meeting (CR2).

The ratio of the market value of equity (on 31-12-91) to the book value of equity (hereafter MTB) is used as an approximate measure of the relationship between the market value of the firm’s share capital to the economic value of the equity-financed assets it employs.11 An alternative measure, which is frequently used in the literature, is the market capitalisation of debt and equity divided by the face value of debt and equity. There are two reasons why we do not use this measure. The practical reason is that only a tiny portion of German firms' debt is traded and therefore most of this debt lacks a market price. The theoretical reason is that we are interested in firm performance from a minority shareholder's point of view. Given a firm's risk characteristics, the appropriate measure of expected return on equity for such a shareholder is the capitalisation value per unit of equity capital used in the firm.

9 In Germany non-voting shares typically receive a slightly higher dividend than voting shares. In the relevant period payments to shareholders had to take the form of dividends: until very recently share repurchases have been legally prohibited.
10 Note that in Germany a voting shareholder, or his or her proxy, must be physically present at the annual shareholder meeting: voting by mail is not allowed.
11 A more satisfactory measure would be Tobin’s Q, in which the denominator is the replacement cost of the firm’s equity capital. However, the replacement cost of assets employed is unavailable for German corporations. In Germany all assets are valued at historic cost in companies' balance sheets, and upward revaluation is not permitted.
For eight of the corporations in our sample, only non-voting shares were listed: for these firms the total market value of equity was calculated by using the price of non-voting shares for all shares. We tested the robustness of the results reported below by re-estimating the regressions excluding these eight firms. Our main results are not sensitive to whether these firms are included.

Listed corporations account for a much smaller proportion of total economic activity in Germany than in the USA on the UK. Edwards and Fischer (1994, pp. 86-7) estimate that in 1986 listed corporations accounted for about 11% of total turnover in Germany compared to about 30% of total turnover in the UK. In 1989 the market value of listed corporations was about 25% of GDP in Germany compared to about 69% of GDP in the USA (Sinn and Sinn 1992, p. 114). In 1991 the total number of listed corporations in Germany was only 563. Our sample, which contains most of the largest listed non-financial German corporations, therefore accounts for a large proportion of the economic activity carried out by listed corporations in Germany in 1991.

Table 1: Sample statistics for key variables

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of market to book value of equity (MTB), per cent</td>
<td>200.52</td>
<td>166.88</td>
<td>113.73</td>
<td>587.10</td>
<td>55.51</td>
</tr>
<tr>
<td>Attendance at shareholder meeting, per cent</td>
<td>78.1</td>
<td>81.8</td>
<td>19.0</td>
<td>100</td>
<td>26.7</td>
</tr>
<tr>
<td>Effective proportion of voting equity controlled by largest shareholder (CR1), per cent</td>
<td>56.15</td>
<td>57.11</td>
<td>29.06</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Cash flow rights of largest shareholder (CF1), per cent</td>
<td>40.93</td>
<td>37.53</td>
<td>25.88</td>
<td>99.8</td>
<td>0</td>
</tr>
<tr>
<td>Effective proportion of voting equity controlled by second-largest shareholder (CR2), per cent</td>
<td>9.76</td>
<td>3.00</td>
<td>12.01</td>
<td>49</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 1 gives information about various aspects of the sample. A largest shareholder was identified for 93 of the 97 corporations: the smallest proportion of the voting equity owned by the largest shareholder, which could be identified, was 3.09%. Thus there were only four corporations in which ownership was so dispersed that a largest shareholder could not be identified. In these four cases the holding of the largest shareholder was assumed to be zero. Any errors introduced by this assumption are small. A second-largest shareholder was identified for 49 of the corporations, and the smallest proportion of the voting equity owned by the second-largest shareholder which could be identified was 2.23%. Of the 48 cases in which the holding of the second-largest shareholder was zero, 7 corresponded to corporations in which the largest shareholder owned 100% of the voting equity, and 41 to cases in which a second-largest shareholder could not be identified, and so the holding was assumed to be zero. Again, any errors introduced by this assumption are small.

The data in our sample are consistent with other studies, which have shown that ownership in large German listed corporations is much more concentrated than in equivalent US or UK firms. The mean (median) proportion of the voting equity owned by the largest shareholder in the corporations in our sample is 47.3% (49.9%). When account is taken of the fact that, on average, the attendance at the shareholders’ general meeting was such that only 78.1% of the voting equity was represented, the control rights of the largest shareholder become even stronger than is implied by this figure. Grossing up the proportion of the voting equity owned by the largest shareholder by the fraction of the voting equity actually represented at the meeting gives a figure of 56.2% (57.1%) for the mean (median) proportion of votes cast at the shareholders' meeting by the largest shareholder. The mean (median) proportion of the largest shareholder's cash-flow rights is 40.9% (37.5%). It should be noted that the maximum value of the largest shareholder's cash-flow rights in the sample is 99.8%: all corporations in the sample therefore have some minority shareholders.
As has been noted, a largest shareholder could not be identified for four of the corporations in our sample. For the other 93 corporations, the largest shareholder was an individual or family in 37 cases; a German non-bank enterprise in 25 cases; a foreign firm in 12 cases; a German bank in 11 cases; and a German public sector body in 8 cases. We will return to the empirical implications of these different types of largest shareholder in the next section.

5. Empirical implementation

The specification of the regression model which we estimate is based on the theoretical analysis of Section 3 and Appendix A.1. Given our assumption that the market value of a firm is determined by small shareholders on the basis of the dividends they expect to receive, different market values reflect different discounted expected dividends. Therefore, using MTB as the dependent variable is an appropriate way of empirically implementing our theoretical model. Our main interest centres on the effects of the control and cash-flow rights of the largest shareholder, and the holding of the second-largest shareholder, on MTB. As the discussion in Section 3 showed, the effect of increases in the largest shareholder’s cash-flow rights is expected to be non-negative, but the expected sign of increases in the largest shareholder’s control rights is ambiguous, as is the expected sign of increases in the second-largest shareholder’s control rights.

When large shareholders in a corporation are individuals or families, there is a clear relationship between the wealth of the shareholder and the market value of the corporation’s equity. This is not obviously the case when the large shareholder is an organisation controlled by agents. There may be no direct link between the interests of the agents who run the organisation and the value of the corporation's equity. If the incentives of the agents who control large shareholders of this type are not linked to the value of the corporation's equity,
then there may be little incentive for such shareholders to devote effort to monitoring management, and hence the effects on MTB of increases in large shareholders’ control and cash-flow rights which operate via increased monitoring may be much weaker. The effect of greater control rights may also differ between different types of large shareholder for other reasons. To the extent that our measure of the largest shareholder’s control rights is inaccurate because it takes no account of the effect of pyramiding on control rights, the estimated effects of the largest shareholder’s control rights may differ between large shareholders which may be part of a pyramid (i.e., other firms) and those which are not (families). Furthermore, if the largest shareholder in a firm is another enterprise, then it is possible that business relationships between the firm and its largest shareholder provide a particularly advantageous way for this shareholder to divert profits from minority shareholders. The special legal provisions applying to shareholders owning more than 50% of the voting equity which are themselves corporations may, however, limit such possibilities. To test whether there were differences in the effects of increased control and cash-flow rights associated with ownership by different types of large shareholder, we use interactive variables to identify whether the largest and the second-largest shareholder is an individual or family, a non-bank enterprise, a bank, a public-sector body, or a foreign firm.

We include a number of other independent variables in the regression equation to allow for other possible effects on the relationship between the market and book values of equity. The liabilities of German corporations comprise debt (short- and long-term as well as trade credits), pension provisions, and other provisions. These three variables, each expressed as a proportion of total balance-sheet financing, are included in the regression equation. There are two possible reasons why the debt ratio (DEBT) may affect MTB. One is that debt is favourably treated by the tax system. The other is that a high proportion of debt finance has

12 The relative tax advantage of debt over retained profits as a source of finance is greater the lower the personal tax rate of the investor. Since personal investors with a small investment in a firm may face lower personal tax
been argued to exert favourable effects on managerial effort and the consumption of private benefits of control (Jensen and Meckling 1976, Jensen 1986). The reason for including the pension provision ratio (PEN) and the other provision ratio (OTH) is related to the possible problems that arise from the use of the book value of equity in the denominator of our measure of the returns to minority shareholders. In Germany, both sets of liabilities may potentially benefit the shareholders in a company. Pension provisions are a cheap source of investment finance for the owners of a corporation, while other provisions are regarded as being a valuable vehicle for creative accounting and income smoothing.\textsuperscript{13} German corporations have greater opportunities to manipulate their provisions than do firms in many other countries. An important reason for this is the fact that in Germany provisions are allowed even if there is no liability to outsiders. For example, provisions may be built up for deferred maintenance (\textit{Aufwandsrückstellung}). This ability of German firms to make extensive use of provisions is likely to result in a downward bias in the book value of equity capital, and a corresponding upward bias in our measure of returns to minority shareholders.\textsuperscript{14} To allow for differential use of provisions by different corporations, and hence differences in the bias in MTB, we included the other provision ratio as a regressor.

Firm-specific risk is an obvious possible factor affecting MTB. We therefore include a measure of beta calculated from 1990 data on weekly price returns and the FAZ index (BETA) to measure the idiosyncratic risk of each company.\textsuperscript{15} The growth of sales in the previous year (SALESGR) was included to control for the influence of growth prospects on firm valuation. A possible spurious relationship between ownership and the market to book ratio may arise because it is easier to own a large fraction of a small firm, while size and

\textsuperscript{13} See Fischer and Haller (1993).

\textsuperscript{14} A striking illustration of the extent of the downward bias in the book value of equity was provided by Daimler-Benz in the mid-1990s when for the first time it produced its annual report according to both US general agreed accounting practice (GAAP) and German rules (HGB). The reduction of provisions and similar items required by GAAP increased total equity by 23.6\% of HGB equity (Pilhofer 1997, pp. 168-9).

\textsuperscript{15} The FAZ index is a price index of major German shares provided by the Frankfurter Allgemeine Zeitung.
market to book ratio may be negatively correlated. Total assets (ASSETS) were therefore included as a regressor to measure firm size.

Each corporation was categorised as primarily operating in one of thirteen different industries, and industry dummy variables were included to allow for possible systematic industry effects on MTB. A possible way in which there may be systematic industry effects that deserves special mention is the argument that ownership structure may depend on the firm’s industry (Demsetz and Lehn 1985): if MTBs within an industry are highly correlated, failure to include industry dummy variables in the regression might lead to a spurious relationship between MTB and ownership. The inclusion of industry dummies also corrects for cyclical variations in share prices which have an industry-specific component.

As was noted in Section 4, all firms in the sample had no significant changes in ownership during a four year period preceding our observation of MTB. We therefore treat the ownership variables as exogenous with respect to MTB in most of our analysis, and use OLS to estimate regression equations. We discuss whether our results are sensitive to the assumption that ownership is exogenous in the next section.

6. Results

We began our empirical analysis by estimating a very general model in which MTB was regressed on all the non-ownership variables discussed in section 5 and a large number of ownership variables. The effects of the largest and second-largest shareholder’s control rights, and the largest shareholder’s cash-flow rights, were allowed to differ by shareholder type, and the marginal effects of the largest shareholder’s control rights were allowed to differ above and below the value of 50 per cent to allow for the possibility that the largest shareholder had complete control of the company once her control rights were greater than 50%, so that subsequent increases had no further harmful effect on minority shareholders. The model was estimated using OLS and the White heteroscedasticity-consistent estimator of the covariance
matrix. We then imposed a number of restrictions on the coefficients of this general model. These were, first, that the effects of the second-largest shareholder’s control rights were the same for all shareholder types except public-sector bodies, and second, that for each shareholder type the marginal effects of the largest shareholder’s control rights were the same above and below the value of 50 per cent. These restrictions were all acceptable at the 0.01 level. The results obtained when a regression model incorporating these restrictions was estimated are shown as equation (2.1) in Table 2.16

Apart from the ownership variables, and the unreported industry dummies, the only variables in equation (2.1) for which there is evidence of a significant effect on MTB are OTH and PEN, which measure respectively the fraction of other provisions and pension provisions in a firm’s total balance sheet financing. The estimated coefficients of these variables are positive and significant, which is consistent with our expectation that firms making relatively large use of these provisions will have relatively large downward biases in their book value of equity capital, and hence a relatively high ratio of market to book value of equity, since these provisions are unlikely to result in lower share values.

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16 We also estimated a version of equation (2.1) which explicitly allowed the marginal effects of the largest shareholder’s cash-flow as well as control rights to differ according to whether the values of these variables were less than 25%, between 25 and 50%, or more than 50%. Our results suggest that for each type of shareholder the marginal effects of such increases are constant over the entire range of values between 0 and 100%.
Table 2: Effects of ownership structure on share valuation

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Equation Number</th>
<th>2.1</th>
<th>2.2</th>
<th>2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR1(Family)</td>
<td>-2.83****</td>
<td>-2.64***</td>
<td>-2.02***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.97)</td>
<td>(0.81)</td>
<td>(0.74)</td>
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</tr>
<tr>
<td>CR1(Bank)</td>
<td>-5.72*</td>
<td>-4.31***</td>
<td>-2.72**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.19)</td>
<td>(1.13)</td>
<td>(1.04)</td>
<td></td>
</tr>
<tr>
<td>CR1(Nonbank)</td>
<td>-3.89****</td>
<td>-4.63***</td>
<td>-3.50***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.54)</td>
<td>(1.02)</td>
<td>(0.92)</td>
<td></td>
</tr>
<tr>
<td>CR1(Public)</td>
<td>-0.95</td>
<td>-1.04</td>
<td>-0.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.43)</td>
<td>(1.38)</td>
<td>(1.88)</td>
<td></td>
</tr>
<tr>
<td>CR1(Foreign)</td>
<td>-2.37</td>
<td>-3.24***</td>
<td>-3.32***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.54)</td>
<td>(1.13)</td>
<td>(1.01)</td>
<td></td>
</tr>
<tr>
<td>CF1(Family)</td>
<td>4.88***</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.44)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF1(Bank)</td>
<td>6.41</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.32)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF1(Nonbank)</td>
<td>3.59**</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.67)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF1(Public)</td>
<td>-0.39</td>
<td>-0.31</td>
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</tr>
<tr>
<td></td>
<td>(1.98)</td>
<td>(1.91)</td>
<td>(2.56)</td>
<td></td>
</tr>
<tr>
<td>CF1(Foreign)</td>
<td>3.64*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.87)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF1(All except Public)</td>
<td>-</td>
<td>4.54***</td>
<td>3.66***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.08)</td>
<td></td>
<td>(0.96)</td>
<td></td>
</tr>
<tr>
<td>CR2 (All except Public)</td>
<td>2.43**</td>
<td>2.11**</td>
<td>1.88**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.04)</td>
<td>(0.96)</td>
<td>(0.80)</td>
<td></td>
</tr>
<tr>
<td>CR2 (Public)</td>
<td>0.96</td>
<td>0.91</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.52)</td>
<td>(1.45)</td>
<td>(1.86)</td>
<td></td>
</tr>
<tr>
<td>OTH</td>
<td>4.89****</td>
<td>4.84***</td>
<td>3.79***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.66)</td>
<td>(1.58)</td>
<td>(1.38)</td>
<td></td>
</tr>
<tr>
<td>PEN</td>
<td>5.29***</td>
<td>5.11**</td>
<td>3.28**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.14)</td>
<td>(1.96)</td>
<td>(1.55)</td>
<td></td>
</tr>
<tr>
<td>DEBT</td>
<td>1.57</td>
<td>1.50</td>
<td>1.42*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td>(1.06)</td>
<td>(0.79)</td>
<td></td>
</tr>
<tr>
<td>SALESGR</td>
<td>0.94</td>
<td>0.84</td>
<td>-0.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.71)</td>
<td>(0.54)</td>
<td></td>
</tr>
<tr>
<td>ASSETS</td>
<td>-0.0010</td>
<td>-0.0010</td>
<td>-0.0001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0007)</td>
<td>(0.0007)</td>
<td>(0.0007)</td>
<td></td>
</tr>
<tr>
<td>BETA</td>
<td>0.24</td>
<td>0.24</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.45)</td>
<td>(0.43)</td>
<td>(0.36)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.6238</td>
<td>0.6216</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.4528</td>
<td>0.4736</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Notes.
1. Equations (2.1) and (2.2) were estimated by OLS, and equation (2.3) was estimated by a robust regression method (see text for details).
2. Figures in parentheses in equations (2.1) and (2.2) are White heteroscedasticity-consistent standard errors, while figures in parentheses in equation (2.3) are standard errors calculated according to the Street, Carroll and Ruppert approach for robust regression.
3. * indicates significance at the 0.10 level, ** indicates significance at the 0.05 level, and *** indicates significance at the 0.01 level.
4. All equations also included an intercept and 12 industry dummy variables, the estimated coefficients of which are not reported.
The estimated coefficients of the control rights of all types of largest shareholders in equation (2.1) are negative, although the coefficient is small for public sector body largest shareholders, and not significantly different from zero even at the 0.10 level for foreign largest shareholders. The estimated coefficients of the cash-flow rights of all types of largest shareholders except public sector bodies are positive, although the coefficient for banks, though large, is not significantly different from zero at the 0.10 level. The estimated coefficients of the control rights of all types of second-largest shareholders are positive, although the coefficient for public sector bodies is not significantly different from zero.

The restriction that the estimated effects of the largest shareholder’s cash-flow rights in equation (2.1) are the same for all shareholder types except public sector bodies was acceptable at the 0.01 level, and equation (2.2) in Table 2 shows the results obtained when this restriction was imposed. The precision of the estimates of the effects of largest shareholder control rights is greatly improved in equation (2.2): for all shareholder types except public sector bodies, the point estimates of this effect is negative and significantly different from zero at the 0.01 level. The point estimates of the effects of the control rights of all types of largest shareholder except public sector bodies are fairly similar in size in equation (2.2). However, the null hypothesis that they are equal was rejected at the 0.01 level. Thus there is evidence that, although increases in the control rights of these types of largest shareholder all have a negative effect on share valuation, the size of this effect differs between them.

Equation (2.3) in Table 2 shows the results of estimating the same specification as that of equation (2.2) using a robust regression method instead of OLS, in order to check whether the estimates in equation (2.2) are sensitive to outliers. The particular robust regression method used to estimate equation (2.3) was one in which, after an initial screening to eliminate gross outliers, Huber iterations followed by biweight iterations are performed (see Li, 1985). The estimated coefficients of the ownership variables in equation (2.3) are similar
to those in (2.2), and provide no reason to think that the conclusions drawn from equation (2.2) about the effects of the ownership variables are sensitive to outliers.

Equation (2.2) is thus our preferred regression model. Its simple linear form may seem surprising, given that the largest shareholder may have complete control of a company with control rights well below 100 per cent, so that increases in the largest shareholder’s control rights beyond this value do not result in further reductions in share valuation. As already noted, our general model allowed the marginal effects of the control rights of each type of largest shareholder to differ above and below 50 per cent, but there was no evidence of such differences. We performed a number of other tests of the linear specification of (2.2). We tested for the significance of quadratic terms in each largest shareholder type’s control rights, and we allowed the marginal effects of each largest shareholder type’s control rights to differ in the ranges 0-25 per cent, 25-50 per cent, and 50-100 per cent. These tests provided no evidence of non-linearity in the effects of the control rights of largest shareholders on share valuation. We also subjected equation (2.2) to a test of model stability based on recursive residuals obtained by estimating it successively on observations arranged in ascending order of the largest shareholder’s control rights. A test based on recursive residuals, rather than a Chow test, is appropriate because the situation is one in which there is uncertainty about the point at which a possible structural change in the regression equation may occur. Neither the CUSUM nor the CUSUMSQ tests of the stability of (2.2) over all observations reject the null hypothesis that the regression coefficients are the same for all firms. Hence there is no evidence that the simple linear form of equation (2.2) is inappropriate.

Our theoretical model predicts that increases in the largest shareholder’s cash-flow rights should result in higher values of MTB, since a greater holding of the corporation’s total equity by the largest shareholder leads to increased monitoring, and also aligns her interests more closely with those of the minority shareholders, thus reducing profit diversion. The estimated coefficients of the cash-flow right variables in both equations (2.1) and (2.2) are
consistent with this prediction, with the exception of those largest shareholders which are public-sector bodies, for which the point estimate is negative although not significantly different from zero. A possible explanation for the different effect of increased cash-flow rights for public-sector body largest shareholders is that the agents running such shareholders have weaker incentives to act in a value-maximising way because their wealth is less closely tied to the equity value of the company.

According to our theoretical analysis, a negative effect of increased control rights for the largest shareholder implies that the harmful effect on minority shareholders through greater profit diversion by this shareholder outweighs any favourable effect of increased monitoring or reduced costs of profit diversion. Hence equation (2.2) provides clear evidence that, for all shareholder types except public-sector bodies, increases in the largest shareholder's control rights are associated with greater consumption of private benefits of control, and have a harmful net effect on minority shareholders. The effect of largest shareholder control rights is more negative if this shareholder is a bank or a non-bank enterprise than if it is a family or a foreign firm.\footnote{This conclusion follows from tests of the significance of the difference between the relevant estimated coefficients in equation (2.2).} This suggests that such largest shareholders are in a particularly good position to divert profits from minority shareholders, perhaps by exploiting business relationships between themselves and the firm in which they hold the largest stake.

The estimated coefficients of equation (2.2) imply that the net effect of equal increases in the control and cash-flow rights of different types of largest shareholder on MTB are as follows (with heteroscedasticity-consistent standard errors in brackets): family 1.90 (0.50); bank 0.22 (0.65); nonbank enterprise –0.10 (0.55); public-sector body –1.34 (0.87); and foreign firm 1.30 (0.54). These estimated effects are significantly different from zero for family and foreign largest shareholders. A rise in the ownership stake of the largest shareholder that involves equal increases in both aspects of ownership thus benefits minority
shareholders in the case of two types of largest shareholder, and does not appear to harm them in the case of the other three types, although this latter conclusion is less clear-cut for public sector largest shareholders.

According to our theoretical analysis, a positive effect of the second-largest shareholder’s control rights implies that the beneficial aspects of greater monitoring of management and limitation of profit diversion by the largest shareholder outweigh any harmful effect of increased costs of profit diversion. Equation (2.2) shows that increases in the control rights of all types of second-largest shareholders except public sector bodies have a significant positive effect on share valuation, and thus implies that the net effect of increases in the control rights of most types of second-largest shareholders is beneficial for minority shareholders. According to equation (2.2), neither the control nor the cash-flow rights of largest shareholders that are public sector bodies, nor the control rights of second-largest shareholders that are public sector bodies, have a significant effect on share valuation. The null hypothesis that the coefficients of the three public-sector body ownership variables (CR1(Public), CF1(Public), CR2(Public)) in equation (2.2) are jointly zero was strongly rejected, but the null hypothesis that the coefficients of the two public-sector body control rights variables were both zero was not rejected. When a regression equation incorporating the latter two restrictions was estimated, the coefficient of CF1(Public) was –6.37, with a (heteroscedasticity-consistent) standard error of 1.28. Hence there is evidence that large shareholders that are public sector bodies have very different effects on share valuation from those of other types of large shareholder.

Equations (2.1) and (2.2) were both estimated by OLS, and this raises the question whether it is justifiable to treat the ownership variables as exogenous. Ownership structure may, for example, be chosen to maximise the wealth of the initial owner when the firm goes
Consequently it is possible that the ownership structure variables will be correlated with the error term in a regression of the market-to-book ratio (MTB) on ownership and other variables, because certain unobserved characteristics of the firm influence both firm value and ownership structure. If this is the case, OLS cannot be used to obtain consistent estimates of the effects of ownership structure on share valuation. In the literature on the relationship between managerial ownership and firm performance, Cho (1998) and Himmelberg et al. (1999) have provided evidence that managerial ownership cannot be treated as an exogenous variable, which casts doubt on the finding that managerial ownership affects firm performance, since it results from studies which have taken such ownership to be an exogenous variable in their econometric analysis. It is therefore necessary to consider whether the results in Table 2 are vitiated by the possibility that firm ownership structure cannot be treated as exogenous in the regressions we estimate.

In order to do this, we took two approaches. First, we established that 57 of the firms in our sample had the same largest shareholder in 1979 as in 1991. We then estimated the specification corresponding to equation (2.2) separately on this subsample and that of the other 40 firms, and tested whether the estimated coefficients differed between these two subsamples. The null hypothesis that the regression coefficients are the same for these two subsamples was not rejected, suggesting that the regression model applies both to firms whose largest shareholder changed in the twelve years before 1991 and to those with no change in their largest shareholder during this period.

The second approach we adopted was to use instruments for the ownership variables to estimate a regression model by instrumental variables (IV). We used three variables as instruments. One was turnover, an alternative measure of firm size to that included as an explanatory variable, on the basis of the Demsetz and Lehn argument that there should be an inverse relationship between firm size and ownership concentration. Another was age, on the

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grounds that the older a firm is, the less likely is it to have concentrated ownership because of the holdings of its founders. The third instrumental variable used was beta, the risk measure included as an explanatory variable in the equations reported in Table 2, but which was consistently insignificant. The higher a firm’s specific risk, other things equal, the lower is its ownership concentration likely to be. Multiplying each of these three variables by the dummy variables for type of largest shareholder gave us fifteen instruments for the nine ownership variables in equation (2.2).

Using OLS and IV to estimate a regression model that differs from the specification in (2.2) only by the exclusion of beta as an explanatory variable produces the results shown in Table A.1 of the appendix. The estimated coefficients of the ownership variables in equation (A1.2), which was estimated by IV, are typically larger in absolute value and much less well-determined than those in (A1.1), which was estimated by OLS. A Hausman test of the significance of the differences between the OLS and IV coefficient estimates can be used to test whether the ownership variables are correlated with the error term in the regression. Under the null hypothesis of no correlation, both OLS and IV are consistent but IV is inefficient, whereas under the alternative IV is consistent but OLS is not. Hence, under the null hypothesis, the two sets of coefficient estimates should not differ significantly. The appropriate statistic for a test of the null hypothesis that there is no difference between the coefficient estimates in equations (3.1) and (3.2) is distributed as chi-squared with 25 degrees of freedom. The value of this statistic is 5.93, so that the null hypothesis is not rejected, and thus there is no evidence that the ownership variables are correlated with the error term in the regression. Given the instruments we have, there is no evidence that the results obtained are dependent on the inappropriate use of OLS as an estimation method.

As was noted in Section 3, any marginal effects of increases in the largest shareholder’s control and cash-flow rights which operate via greater monitoring of management cannot be identified from the estimated effects of increases in these rights on the MTB. However, an
estimate of the total effect of increased ownership by the largest shareholder which operates through greater monitoring of management can be obtained on the basis of the argument discussed at the end of Section 3. Estimates of both the value of the MTB when the largest shareholder has all the control and cash-flow rights in a firm, and its value when the control and cash-flow rights of the largest shareholder are zero, can be obtained from regression equations relating the MTB to ownership and other variables. If the argument that there is no diversion of profits from minority shareholders in either of these two extreme cases is accepted, any difference in the estimated value of the MTB will reflect the effects of the change from no monitoring of management (under dispersed ownership) to efficient monitoring of management (when the largest shareholder has all the control and cash-flow rights in a company). Note that our estimates of the relationship between the MTB and the ownership of the largest shareholder are made on the basis of a sample of companies all of which have minority shareholders, so the predicted value of the MTB when a largest shareholder has 100 per cent of the control and cash-flow rights in a corporation represents the value that would be placed on such a firm by a hypothetical minority shareholder. The estimated changes in the value of the MTB thus reflect the change in the value to minority shareholders of the firm's equity as a result of efficient monitoring: they do not include any component reflecting the strategic value a shareholder owning all of the equity might place on the firm.

Table 3 shows the estimated proportional changes in the MTB obtained from equation (2.2) when CR1 and CF1 jointly increase from 0 to 100, with CR2 equal to zero, and all other variables at their sample mean values. Since there is evidence in Table 2 that different types of largest shareholder have different effects on share valuation, Table 3 gives corresponding estimates for each shareholder type. For family and foreign largest shareholders, the estimated proportional increase in the market-to-book ratio is large and significantly different from zero, suggesting that a
Table 3: Estimated percentage increase in Q when ownership changes from complete dispersion to full ownership by a single shareholder

<table>
<thead>
<tr>
<th>Type of largest shareholder</th>
<th>102.08***</th>
<th>(34.48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>11.96</td>
<td>(35.65)</td>
</tr>
<tr>
<td>Bank</td>
<td>-5.23</td>
<td>(29.28)</td>
</tr>
<tr>
<td>Non-bank enterprise</td>
<td>-72.26</td>
<td>(44.77)</td>
</tr>
<tr>
<td>Public-sector body</td>
<td>69.80**</td>
<td>(34.39)</td>
</tr>
</tbody>
</table>

Notes.
1. Figures in parentheses are White heteroscedasticity-consistent standard errors.
2. ** indicates significance at the 0.05 level, and *** indicates significance at the 0.01 level.

change from completely dispersed ownership to full ownership by a single shareholder of these types has substantial effects on the extent of monitoring of management. The implied estimate of the value of efficient monitoring of management by these types of shareholder relative to no monitoring of management is very large. However, for bank and non-bank enterprise largest shareholders, the estimated proportional change in the MTB is small and not significantly different from zero, while for public-sector body largest shareholders the estimated change is large and negative, although not significantly different from zero. These results suggest that the extent of monitoring of management varies significantly according to the type of largest shareholder, and raise the possibility that, in terms of managerial monitoring, full ownership by a public sector body is worse than completely dispersed ownership.
7. Conclusion

In this paper we have argued that it is possible to obtain separate measures of the control and cash-flow rights of the largest shareholder in German companies that do not depend on an ad hoc measurement of the effects of pyramids on control rights. Two features of German corporate governance enable us to do this: the fact that German companies issue both voting and non-voting shares, and the fact that shareholders with voting rights have to be present at the annual shareholder meeting either themselves or via a proxy in order to exercise these rights. The evidence presented in this paper confirms that the control and the cash-flow rights of the largest shareholder in German companies do indeed have the very different effects on the market value of equity predicted by theoretical analyses, and this conclusion does not depend on the treatment of pyramid control structures.

Our empirical results show that higher control rights of most types of largest shareholder lower the market value of equity, which is consistent with this shareholder being able to obtain private benefits of control at minority shareholders’ expense. However, our results also show that higher cash-flow rights of most types of largest shareholder raise the market value of equity, which is consistent with greater cash-flow rights increasing this shareholder’s incentives to act in minority shareholders’ interests. Our results also show that minority shareholders benefit from increases in the control rights of most types of second-largest shareholder. The one type of large shareholder to which the above statements do not apply are public-sector body shareholders: our results suggest that large shareholders of this type have very different effects on minority shareholders than do other types of large shareholder.

Germany is typical of the world as a whole in that most large listed German companies have a controlling shareholder. The evidence presented in this paper is therefore relevant to a fundamental issue in corporate governance: does the presence of a controlling shareholder in a company benefit or harm minority shareholders in it? The answer to this
question requires a distinction to be made between the control and cash-flow rights of the largest shareholder, and our results imply that the presence of a controlling shareholder in a German company can be beneficial, or at least not harmful, for minority shareholders provided that such a shareholder has cash-flow rights in line with her control rights. Our results also show that minority shareholders in German companies with controlling shareholders benefit from increases in the second-largest shareholder’s control rights, which is consistent with the view that the presence of a sufficiently large outside shareholder can limit the extent to which the controlling shareholder is able to obtain private benefits at other shareholders’ expense.

An important question is whether similar conclusions to those of this paper hold in other economies where controlling shareholders are widespread. The results for Asian countries found by Claessens et al. (2002), who use pyramiding and the WLP to obtain separate measures of control and cash-flow rights, are consistent with ours. The method used in the present paper to identify the distinct effects of a controlling shareholder’s control and cash-flow rights depends on both the existence of non-voting shares and the ability to measure the fraction of voting rights actually exercised by this shareholder, and data limitations mean that this method cannot always be applied in other countries. Tests of the robustness of conclusions about the effects of ownership concentration on minority shareholders are very important. This is particularly so given that the data we use in this paper consists of a single cross-section of 97 companies. It is a general feature of empirical studies of corporate governance in countries where controlling shareholders are widespread that the data available is very limited: this is certainly true for Germany. Consequently any empirical findings must be regarded as very tentative. Subject to this proviso, however, our findings provide evidence which is consistent with the theoretical analysis set out in Section 3, and give estimates of the magnitude of the different effects of ownership by large shareholders in an important European capital market.
Appendix

A.1 A model of ownership concentration and share valuation

The gross profits $\pi$ of a company are assumed to depend on a vector of firm and industry characteristics, $J$, and on the extent to which its management is subject to monitoring by shareholders. The amount of shareholder monitoring, $M$, is assumed to depend on both the largest shareholder’s control rights, $k$, and her cash-flow rights, $\alpha$, as well as the second-largest shareholder’s cash-flow rights, $z$.

Thus we assume that

$$\pi = \pi[M(k, \alpha, z), J]$$  \hspace{1cm} (A.1)

with partial derivatives $\pi_M > 0, M_k \geq 0, M_\alpha \geq 0, M_z \geq 0$. The partial derivatives of $M$ are assumed to be non-negative rather than strictly positive to allow for the possibility that, at certain values of the arguments of $M$, marginal changes in $k$, $\alpha$, or $z$ do not affect the extent of monitoring.

We assume that the largest shareholder can divert some gross profits, $T$, away from other shareholders, at a cost $C$. $C$ is assumed to be a positive and convex function of $T$, and also to depend on $k$, $z$, and the book value of the firm's equity, $E$. We assume that the diversion cost function is homogeneous of degree one in $T$ and $E$, so that there are constant returns to scale in diversion, given constant ownership structure.

Dividends paid equal profits less the diversions to the largest shareholder and the costs of these diversions:

$$D = \pi[M(k, \alpha, z), J] - T - C(T, k, z, E)$$  \hspace{1cm} (A.2)
To use this model as a basis for empirical testing, it is helpful to divide both sides of (A.2) by the book value of the firm's equity capital to obtain

\[
D/E = \pi[M(k, \alpha, z), J] / E - T/E - C(T, k, z, E) / E
\]

(A.3)

The assumption that \( C \) is homogeneous of degree one in \( T \) and \( E \) means that \( C(T, k, z, E) = C(t, k, z, l) \cdot E \), where \( t \equiv T / E \). Define \( c(t, k, z) \equiv C(t, k, z, l) \). The properties of the function \( c(t, k, z) \), which gives diversion costs as a proportion of equity capital, are central to our model. We assume that \( c(t, k, z) \) has the following properties.

\[
c(0, k, z) = 0, c_k \leq 0, c_z \geq 0
\]

(A.4)

\[
c_i \geq 0, c_u > 0, c_{ik} \leq 0, c_{iz} \geq 0
\]

(A.5)

The assumptions in (A.4) state, respectively, that diversion costs are zero when there is no diversion; the total cost of diverting profits does not rise as the largest shareholder's control rights increase; and the total cost of diversion does not fall as the second-largest shareholder's control rights increase. The latter two assumptions reflect the idea that it is easier for the largest shareholder to divert profits if her control rights increase, but harder to do so as the control rights of the second-largest shareholder increase, since this increases the incentives for the second-largest shareholder to monitor the company's actions. The effects are assumed to be non-positive and non-negative respectively because of the possibilities that at some sufficiently high value of the largest shareholder's control rights further increases have no effect on the total cost of diversion, and that there is no effect on the total cost of diversion if the control rights of the second-largest shareholder are sufficiently low.

The assumptions in (A.5) concern the marginal cost of profit diversion by the largest shareholder. This is assumed to be non-negative, and increasing in diversion. The marginal cost of diversion is also assumed not to rise as the largest shareholder's control rights increase, and not to fall as the second-largest shareholder’s control rights increase. These latter two
assumptions reflect the same considerations as those underlying the corresponding assumptions concerning the total cost of diversion in (A.4), and the effects are assumed to be non-positive and non-negative respectively for the same reasons.

Equation (A.3) can now be rewritten as

\[ q = \pi[M(k, \alpha, z), J]/E - t - c(t, k, z) \]  

(A.6)

where \( q \equiv D/E \). If the largest shareholder is entitled to the fraction \( \alpha \) of the firm’s payments to shareholders, then her benefit from owning the firm, expressed as a proportion of \( E \), is equal to

\[ \Omega/E = \alpha q + t \]  

(A.7)

The largest shareholder is assumed to choose \( t \) to maximise \( \Omega/E \) taking \( k, \alpha, z \), and \( E \) as exogenous. Using (A.6) in (A.7), and assuming an interior solution, the first-order condition gives

\[ 1 = \alpha(1 + c, (t^*, k, z)) \]  

(A.8)

Intuitively, an additional unit of diverted profits benefits the largest shareholder by one, but reduces dividends received by \( \alpha \) plus her share of the marginal diversion cost. At the optimal choice of \( t \), \( t^* \), the marginal benefit and cost of diversion must be equal. From (A.5) and (A.8), it is clear that exogenous changes in \( k, \alpha, \) and \( z \) alter \( t^* \) as follows:

\[ t^*_k = -\frac{c_k}{c_{\alpha}} \geq 0, t^*_\alpha = -\frac{1}{\alpha c_{\alpha}} < 0, t^*_z = -\frac{c_z}{c_{\alpha}} \leq 0 \]  

(A.9)

The effect of an exogenous increase in the largest shareholder’s control rights on dividends as a proportion of equity capital is given by differentiating (A.6), using (A.9):

\[ \frac{\partial q}{\partial k} = [\pi_M M_k]/E - (1 + c_i) t^*_k - c_k \]  

(A.10)
The overall effect of increased control rights is thus unclear. The first term on the right-hand side of (A.10) represents the effect of increased control rights on gross profits via increased monitoring, and is non-negative. The second term represents the effect of increased control rights on diverted profits, and this has a non-positive effect on dividends as a proportion of equity capital. The third term represents the effect of increased control rights on the costs of diverting profits, and this has a non-negative effect on dividends as a proportion of equity capital.

The effect of an exogenous increase in the largest shareholder's cash-flow rights on dividends as a proportion of equity capital is

$$\frac{\partial q}{\partial \alpha} = [(\pi M_a) / E] - (1 + c_t) t_a^*$$

(A.11)

Both effects of higher cash-flow rights tend to increase dividends as a proportion of equity capital, by increasing monitoring of management and by raising the cost to the largest shareholder of diverting profits.

Finally, the effect of an exogenous increase in the second-largest shareholder’s control rights is

$$\frac{\partial q}{\partial \tau} = [(\pi M_z) / E] - (1 + c_t) \tau_z^* - c_z$$

(A.12)

Thus the effect of increases in the holding of the second-largest shareholder is also unclear. Such increases may have a non-negative effect on dividends as a proportion of equity capital by increasing monitoring of management (the first term on the right-hand side of (A.12)) and reducing the diversion of profits by the largest shareholder (the second term). But they also increase the cost of profit diversion, and this has a non-positive effect (the third term).
In our model, the optimal choice of diversion by the largest shareholder will be zero for a firm with completely dispersed ownership if the marginal cost of diversion at zero diversion becomes large as $k$ becomes small, while for a firm in which $k = \alpha = 1$, the optimal choice of diversion will be zero if the marginal cost of diversion at zero diversion is zero, but subsequently increases with diversion. If these assumptions about the marginal cost of profit diversion are made, then the equity value of a company when its ownership is completely dispersed reflects the absence of both profit diversion and monitoring of management, while its equity value when the largest shareholder has all the control and cash-flow rights in it reflects the absence of profit diversion and the presence of efficient monitoring of management, and the difference between the value of equity in these two cases provides an estimate of the value of efficient monitoring of management relative to no monitoring of management.

A.2 OLS and IV estimates of the effects of ownership on share valuation

Table A.1 shows the full set of results obtained when a slightly modified version of equation (2.2) was estimated by OLS and IV, as discussed in section 6 of the main text.
Table A.1: Comparison of OLS and instrumental variable estimates of effects of ownership structure on share valuation

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<td>(0.80)</td>
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Notes.
1. Figures in parentheses are White heteroscedasticity-consistent standard errors.
2. * indicates significance at the 0.10 level, ** indicates significance at the 0.05 level, and *** indicates significance at the 0.01 level.
3. GR² and adjusted GR² are the measures of goodness of fit for an IV regression proposed by Pesaran and Smith (1994).
4. All equations also included an intercept and 12 industry dummy variables, the estimated coefficients of which are not reported.
References


Jenkinson, T.J. and A. Ljungqvist (1999), ‘The role of hostile stakes in German corporate governance’, *Journal of Corporate Finance* 7, 397-446.


