



Does the Governed Corporation Perform Better? Governance Structures and Corporate Performance in Germany

ERIK LEHMANN¹ and JÜRGEN WEIGAND²

¹University of Konstanz, Department of Economics and Statistics, P.O. box D-144, D-78457 Konstanz, Germany, E-mail: erik.lehmann@uni-konstanz.de; ²Otto Beisheim Graduate School of Management WHU Koblenz, Burgplatz 2, D-56179 Vallendar, Germany, and CPB Netherlands Bureau for Economic Policy Analysis, 2508 GM Den Haag, Postbus 80510, The Netherlands, E-mail: jweigand@whu.edu, weigand@cpb.nl

Abstract. Although there has been an intensive debate on the relative merits of different systems of corporate governance, empirical evidence on the link between corporate governance and firm performance almost exclusively refers to the market-oriented Anglo-Saxon system. This paper therefore investigates the more network- or bank-oriented German system. In panel regressions for 361 German corporations over the time period 1991 to 1996, we find ownership concentration to affect profitability significantly negatively. However, this effect depends intricately on stock market exposure, the location of control rights, and the time horizon (short-run vs. long-run). We conclude from our results that (1) the presence of large shareholders does not necessarily enhance profitability, (2) ownership concentration seems to be sub-optimal for many German corporations, and, finally, (3) having financial institutions as largest shareholders of traded corporations improves corporate performance.

Key words: firm performance, ownership concentration, governance structures, managerial discretion

JEL classification: G3, L1

Shareholders are stupid and impertinent – stupid, because they give their funds to somebody else without adequate control, and impertinent, because they clamor for a dividend as a reward for their stupidity.

Carl Fürstenberg (1850–1933), German financier

1. Introduction

Ever since Berle and Means (1932) stated that in the modern corporation hired managers have enough discretion for corporate plundering, the issue of separating ownership from control and its resulting impact on corporate performance has

been placed high on the agenda of economists. Globalizing product and financial markets have recently triggered renewed interest in the link between corporate governance and performance among academics and business press. As firms face new challenges from increased cross-border competition, pressures to adapt to an internationally integrated environment mount. The question arises naturally whether established systems of corporate finance and corporate governance are still appropriate to cope with the challenges ahead.¹

Ownership structures are a central distinguishing feature of financial systems (Mayer, 1992; Moerland, 1995). Particular attention has been paid in the corporate governance literature to ownership concentration as a key to more effective corporate governance and shareholder value maximization. The presence of large shareholders may curb managerial discretion, reduce agency costs and enhance performance (Stiglitz, 1985; Shleifer and Vishny, 1986). The existing empirical evidence on the impact of ownership structures on corporate performance refers almost exclusively to Anglo-Saxon firms and is rather mixed.² This paper therefore focuses on German corporations. We investigate empirically how ownership concentration, the location of control rights, board representation of owners, and stock market exposure affect firm profitability (return on total assets).

Ownership concentration is low in the Anglo-Saxon countries which rely heavily on stock markets to channel the flow of capital, control its efficient use, and assure outside investors of maximizing the return on their investments.³ The Anglo-Saxon financial system has been criticized for short-termism, neglect of interests other than shareholders', and inefficiency in delivering effective corporate governance.⁴

By contrast, concentrated ownership is a salient feature of the German system. Non-incorporated small and medium-sized firms tightly held by individuals or families dominate the firm population. German corporations are typically in the hands of large blockholders who often command a super-majority interest. Widely dispersed outside shareholdings as in the USA or UK are rare. Ownership structures hardly change over time, implying that large shareholders stick to their blockhold-

¹ See for a discussion and references, e.g., Porter (1992), Jensen (1993), Blair (1995), Berglöf (1997), Shleifer and Vishny (1997), Mayer (1998), Hopt et al. (1998), Barca and Becht (1999), OECD (1999), Allen and Gale (2000), and Vives (2000).

² See Short (1994) and Shleifer and Vishny (1997) for surveys of the field.

³ Allen and Gale (2000, ch. 2 and 3) provide an excellent overview of the financial systems in the USA, UK, Germany, Japan, and France.

⁴ See, e.g., Porter (1992), Jensen (1993), Roe (1994), Bhidé (1994), Pound (1995). As Bhidé (1994, p. 129, p. 131) argues, "Unwittingly, the system [of U.S. securities regulations and disclosure rules] nurtures market liquidity at the expense of good governance. . . . U.S. rules that protect investors don't just sustain market liquidity, they also drive a wedge between shareholders and managers. Instead of yielding long-term shareholders who concentrate their holdings in a few companies, where they provide informed oversight and counsel, the laws promote diffused, arm's length stockholding". The benefits typically attributed to this so-called market-based system are seen in a better provision of finance to innovative start-up firms and higher returns to investors.

ings even in bad times. An active market for corporate control does not exist yet despite the recent takeover-battle between Mannesmann and Vodafone. Although improving lately, the German stock market is still relatively small regarding listings and market capitalization.⁵ Close ties between industrial firms and financial institutions (banks) (e.g., via cross-holdings, long-term lender-borrower relations) apparently foster access to debt capital, thus reducing the need to attract equity capital on the stock market. This network-like structure has effectively thwarted any serious attempts of hostile takeovers in Germany.⁶ In view of high unemployment and sluggish growth, critics have pointed to the German network-orientation as a root cause for entrepreneurial inertia, risk aversion, and low investment in emerging new technologies and infant industries.⁷

In the remainder of the paper we discuss in Section 2 the link between corporate governance and firm performance in more detail. Section 3 presents our empirical analysis that employs a panel data set of 361 German corporations over the time period 1991 to 1996. Our main finding is a significantly negative effect of ownership concentration on profitability. However, this effect depends intricately on stock market exposure, the location of control rights, and the time horizon chosen (short-run vs. long-run). Section 4 summarizes and concludes.

2. Corporate Governance and Firm Performance

2.1. THE GOVERNED VERSUS THE MANAGED CORPORATION

The Separation of Ownership and Control

A prime element of corporate governance is the alignment of shareholders' interests with the interests of managers hired to run the firm. The major concern is whether managers pursue their own interests (pet projects, empire building, perks etc.) rather than maximize shareholder value. Public corporations with widely dis-

⁵ In December 1998, 323 domestic corporations with an aggregate market capitalization of 1,822,103 million DM (equivalent to 48% of the 1998 German GDP) were quoted and officially traded on the Frankfurt stock exchange. At the same time, 2,399 domestic corporations (3,829,375 million DM, 182% of GDP) were listed on the London stock exchange and 2,722 (17,373,835 million DM, 105% of GDP) on the New York stock exchange. (Source: Deutsche Börse, Factbook, Frankfurt, <http://www.exchange.de>; own calculations). Boehmer (1999) provides a thorough analysis of ownership structures and location of control rights for the 430 stock corporations which were officially traded on the Frankfurt stock exchange in 1996. According to this study, banks, industrial firms, holdings, and insurance companies controlled as large blockholders almost 80% of the median firm's voting rights, or roughly 50% of the overall market value of firms officially listed.

⁶ The high tax on the sale of company cross-holdings (to be abolished soon) and the rigid German takeover code (under revision) which requires shareholders to be bought out with cash have contributed to making takeovers unattractive.

⁷ See, e.g., Edwards and Fischer (1994), Perlitiz and Seeger (1994), Audretsch and Elston (1997), or Wenger and Kaserer (1998). The implementation of the Neuer Markt (new market) on which shares in innovative young firms are traded can be seen as a step in the direction of a more market-based system of corporate finance.

persed outside shareholdings may be particularly prone to managerial discretion. Such corporations have a clear separation of control and ownership. Shareholders delegate decision-making to managers and control to a supervisory board. Managers are put in place because it is expected that their superior entrepreneurial skills allow them to better achieve success for the firm than the owners. The supervisory board is responsible for selecting, monitoring, and replacing senior managers.

An extensive literature has discussed the pros and cons of separating ownership from control and whether governance of such a "managed" (manager-controlled) corporation is inherently ineffective.⁸ Corporate supervisory boards are suspected of being inefficient or 'entrenched' monitors who only take action when true performance disasters have already happened (Warner et al., 1988).⁹ In principle, if the corporation does not perform as expected, shareholders can oust the supervisory board in a joint voting effort. However, coordinating a large number of shareholders for joint voting is difficult. The incentive to monitor and take action against the board will be low for shareholders who command only a negligible share in a firm. The costs of such efforts usually outweigh the individual benefits. Moreover, a shareholder gains from any other shareholder's control effort without having to contribute to the incurred costs. This free-rider problem makes it unattractive for a small shareholder to exercise and enforce voting rights. Thus, managerial mistakes can "go uncorrected" in the managed corporation "until they become catastrophes" (Pound, 1995, p. 92). When markets for equity capital are highly liquid, dissatisfied shareholders can easily sell off their holdings. Therefore, shareholders of the managed corporation rather favor a "cheap 'exit'" over an "expensive 'voice'" (Bhide, 1994, p. 132) in times of crisis.

In active markets for corporate control, hostile takeovers may provide an effective mechanism to reign in free-wheeling managers and sanction underperforming firms (Manne, 1965; Jensen and Ruback, 1983). However, as shown by Grossman and Hart (1980), the free-rider problem also besets the takeover mechanism. The threat of shareholders' cheap exit by selling off to a raider may thus be insufficient to discipline management. In addition, incumbent managers can apply anti-takeover strategies to entrench their positions (Stulz, 1988; Shleifer and Vishny, 1988; Jensen, 1988; Fluck, 1999).

The Governed Corporation

In view of these problems, Pound (1995) has suggested replacing the managed corporation with what he terms the governed corporation. For a corporation to

⁸ See, e.g., Fama and Jensen (1983), Short (1994) and Shleifer and Vishney (1997) for discussion and references to seminal contributions.

⁹ In Germany, the case of Metallgesellschaft may serve as an example of supervisory board failure. Deutsche Bank, as a major debtholder represented on the supervisory board, was regarded responsible for the disaster and scolded in the business press for insufficient and bad monitoring. See Frankel and Palmer (1996) for further discussion. See also Franks and Mayer (1998) on the dubious role of banks in the few German corporate takeovers.

be governed, investors must be different from the investors of the managed corporation. The model of the governed corporation rests on *committed* owners who *actively* participate in governing the firm. Commitment means that investors do not sell out quickly in times of trouble. To guarantee that the company is soundly managed, they participate in selecting the top management and initiate replacements in case of inferior performance.

For having one's interests and concerns respected, the "active" (Jensen 1993, p. 866) or "relationship" (Thompson, 1998, p. 27) investor needs to be a large shareholder, that is, he must have sufficient control over the firm's assets.¹⁰ Only investors who control a substantial part of the voting capital will be able to keep managers from diverting free cash flow into pet projects and force them to distribute profits to shareholders. The incentive to take action should increase with the investor's wealth commitment (Shleifer and Vishny, 1986; Huddart, 1993; Admati et al., 1994). The model of the governed corporation thus suggests concentrating the stakes in a firm in the hands of only a few shareholders. The underlying hypothesis is that by re-integrating ownership and control corporate performance (profitability, productivity, innovative thrust etc.) is going to be enhanced.

Demsetz (1983) has argued that concentrated ownership is no safeguard against corporate plundering: "Where is it written that the owner-manager of a closely held firm prefers to consume only at home?" (ibid., p. 381). Contesting the model of the firm on which both the managerial discretion hypothesis and the agency approach rest, Demsetz states, "It is clearly an error to suppose that a firm managed by its only owner comes closest to the profit-maximizing firm postulated in the model firm of economic theory" (ibid., p. 383).

Theoretically, the impact of ownership concentration on firm value is indeed not definite. Shleifer and Vishny (1986) show that concentrated shareholdings raise firm value. In Huddart (1993) and Admati et al. (1994) this outcome is reversed because of risk-averse large shareholders. Recent contributions by Pagano and Röell (1998) and Bolton and von Thadden (1998a,b) stress the existence of a trade-off between control and liquidity. As the incentive and the ability to monitor increase with share concentration, control will be more stringent and effective but this comes at the cost of liquidity. Constraining liquidity could affect profitability negatively if the firm cannot fully exploit its investment opportunities. This reasoning may only apply to smaller firms with the intention to go public. In general, mature large corporations hardly face financing constraints and finance investment overwhelmingly from retained earnings.¹¹ Cash-flush corporations may thus rather

¹⁰ What insufficient control over a firm's assets means, is nicely depicted by the General Motors example cited in Roe (1994, XII). In 1990, two 'large' (relative to all other shareholders) institutional investors, being dissatisfied with the company's bad performance, wanted to negotiate the implementation of a new CEO with GM's leaders. The management could calmly decline the request, since each 'large' shareholder only accounted for less than one per cent of the voting capital. In 1992 GM's top management had to take action after all. As losses piled up to over \$6 billion, CEO Robert Stempel was eventually fired.

¹¹ See Hubbard (1998) for a recent survey on investment and capital market imperfections.

overinvest to keep funds in the firm instead of "wasting" them on the shareholders (Jensen, 1986; Hellwig, 2000). Strong owners could prevent managers from stashing money away and thus reduce both free cash flow and inefficient investments. Profitability should then be enhanced, but this is not for sure, since large shareholders may overdo monitoring. As shown by Burkart, Gromb, and Panunzi (1997), too much monitoring can stifle managerial initiative. The governed corporation may then miss out on profitable investment opportunities.

Large shareholders can inflict substantial costs on other shareholders as well as stakeholders (managers, employees, creditors) in the form of an expropriation-like redistribution of wealth if their interests diverge from those of other investors or stakeholders (Shleifer and Vishny, 1997). Further, large share- or stakeholders and managers may collude to keep minority shareholders at bay (Hellwig, 2000). Finally, large shareholders closely associated with the management may refrain from attempts to dismiss underperforming managers if such an intervention puts their own reputation at risk (Mayer, 1996).

The Identity of Owners

The commitment of owners and their willingness to intervene may crucially depend on who they are. In other words, the location of control rights can be a more important determinant of the degree of control exerted by owners than ownership concentration. Insider (internal) control may represent a higher degree of control at any given level of blockholdings than outsider (external) control (Cubbin and Leech, 1983; Mayer, 1992). Family interests, allied industrial firms, banks, and holdings companies are frequently identified as insiders, while the shareholders of diffusely held firms (e.g., institutional investors such as pensions funds) are viewed as outsiders.

It is not obvious though that insider control enhances performance. For instance, individuals or families are often large blockholders because they are the founders of the company or the heirs. Given an emotional involvement, these owners may be more strongly interested in the success of the firm than investors for which the firm is just one piece in their portfolios. A large shareholder "personally" attached to the firm possibly motivates managers and employees to more commitment and determination so that firm performance improves. The opposite may hold if running the firm is impeded because the owners engage in infighting or take on a know-all attitude and try to "mastermind" decision-making. In this respect, investors without a personal interest may be better for corporate performance. Banks can be such neutral investors. If they are more efficient monitors (Diamond, 1984, 1991) and reduce agency costs, performance should be enhanced. Their actual governance role, either as owners, board representatives or proxy voters, and the impact on corporate performance has been disputed.¹² Not much is known about industrial firms and holdings as blockholders of other industrial firms. Empirical evidence

¹² See, e.g., Edwards and Fischer (1994) or Hellwig (2000) for discussion and references.

on large diversified US corporations (Lang and Stulz, 1994; Shin and Stulz, 1998) suggests that members of business groups may underperform because internal capital markets do not work efficiently. In short, it is open to empirical testing whether the identity of owners really matters.

Product Market Competition and Endogenous Ownership Structures

The mode of corporate governance may be less important if there is intensive competition in product markets (e.g., Demsetz, 1983; Hart, 1983; Schmidt, 1997; Allen and Gale, 1998). Competition forces firms to adopt not only cost minimizing methods of production but also efficient governance and organization structures. More efficient firms will steal business from slack firms and drive the least efficient firms out of the market. At least in the longer run when entry is facilitated, this selection effect of competition eliminates inefficient structures and generates effective governance. In the longer run, the mode of corporate governance may be simultaneously determined with firm performance by the forces of competitive markets (Demsetz, 1983; Demsetz and Lehn, 1985).

Conclusion

The debate on the managed versus the governed corporation, or the insider versus the outsider model of the corporate governance, has generated conflicting hypotheses concerning the link between ownership, control, and firm performance. The model of the governed corporation suggests that the tightly-held, insider-controlled firm outperforms the managed, diffusely-held firm. As there are costs of having large shareholders, ownership concentration or increased monitoring through the owners may be beneficial only up to a certain extent. At a given level of wealth commitment, the willingness of owners to control may also be dependent on who they are. It is thus an empirical question which of the advanced hypotheses are valid.

2.2. EMPIRICAL EVIDENCE

The existing empirical evidence does not allow for clear-cut answers. Short's survey (1994, p. 227) finds no "conclusive evidence either in support of, or in opposition to, the hypothesis that the ownership and control structures of firms materially affect their performance". Mayer (1996, p. 17) interprets the empirical evidence as implying "benefits in the exercise of corporate governance from modest levels of concentrations of ownership", but "exploitation of private benefits" at high levels of ownership concentration.

Considering the high ownership concentration and the presence of presumably strong insiders such as allied industrial firms, banks and families, many German corporations seem to come close to the model of the governed corporation. Only a few empirical studies have focused on German corporations so far to investig-

ate the impact of governance structures on firm performance. The evidence from regression analyses is similarly ambiguous as for Anglo-Saxon firms.¹³

In a pioneering study, Thonet and Poensgen (1979) found significantly lower returns on equity for owner-controlled than for manager-controlled German public companies.¹⁴ Other studies focused on banks as blockholders of industrial firms. Cable (1985), Weigand (1999) and Gorton and Schmid (2000) report a significantly positive impact of bank involvement on firm profitability, whereas profitability differences between bank- and non-bank firms are not significant in Chirinko and Elston (1996).¹⁵ The positive influence of banks is in line with the standard reasoning that banks are better monitors and thus firm performance is enhanced. However, it may very well be that banks were not better in governing but in "picking winners".

Franks and Mayer (1997), analyzing quoted corporations only, and Goergen (1999), focusing on IPOs, could not find a significant impact of ownership indicators on firm performance. Franks and Mayer interpret their results as inconsistent with the view that the German market of corporate control performs a disciplining function. Rather concentration of ownership seems to further rent extraction. Goergen views his results as support for the Demsetz (1983) hypothesis that ownership structures are chosen as to maximize firm value.¹⁶ Gedajlovic and Shapiro (1998) find a significantly negative and non-linear impact of ownership concentration on the return on total assets for a sample of large quoted corporations. Thus profitability first decreases in ownership concentration and then, at higher

¹³ Boehmer (1999, 2000) provides in-depth descriptive analyses of governance structures and stock market performance of traded German corporations. As his approach is different from the regression studies surveyed here, we will refer to some of his results below.

¹⁴ A firm was defined as owner-controlled if individuals or families held at least the blocking minority (25% of voting capital plus one vote). A drawback of the study is that ownership structures were identifiable only for about 90 out of 300 sample firms. Thus in the regression analysis owner-controlled firms had to be compared to a mixture of presumably manager-controlled firms and firms with unknown governance structures, rendering the results questionable.

¹⁵ Cable (1985), Chirinko and Elston (1996) and Gorton and Schmid (2000) apply a cross-section regression approach. Cable's analysis for the time period 1968 to 1972 is based on 48 out of Germany's 100 largest corporations in 1970. The Gorton and Schmid study is also based on a very small sample and only two years (82 firms in 1975) and (56 firms in 1986). Chirinko and Elston investigate 300 stock corporations over the observation period 1965 to 1990 but due to incomplete ownership information cannot take advantage of the panel data properties. Weigand uses a panel data set which includes detailed ownership data (identity of owners, outstanding shares) for 240 stock corporations during 1965 to 1986.

¹⁶ Franks and Mayer (1997) apply a panel data set of 171 quoted corporations over the period 1989 to 1994 and use a fixed effects panel regression approach. There is only weak evidence of a relationship between either management or supervisory board turnover and performance in firms with concentrated ownership. This result is consistent with Kaplan's (1994) findings. Goergen's (1999) sample consists of 86 IPOs during the period 1981 to 1988. In both static and dynamic panel data regressions, ownership concentration did not have an impact on profitability (measured by cash flow over total assets).

levels of concentration, rises again.¹⁷ Becht (1999) reports a negative effect of ownership concentration on liquidity (measured by the ratio of turnover to market capitalization) which supports the hypothesis of a control-liquidity trade-off.¹⁸

In sum, "governed" (more concentrated or owner-controlled) German firms seem to have enjoyed higher returns during the 1970s and early 1980s (Cable, Gorton and Schmid, Weigand). The positive impact vanishes or turns even negative when data from the late 1980s and the 1990s are included (Becht, Chirinko and Elston, Franks and Mayer, Goergen, Gedajlovic and Shapiro). The opening of markets and increased international competition may have altered the profitability-ownership concentration relation since the late 1980s. In the subsequent section we explore this conjecture using a large panel data set of both quoted and non-quoted German corporations for the 1990s.

3. Ownership Concentration, Insider Control, and Performance of German Firms

3.1. DATA, VARIABLES, AND SAMPLE CHARACTERISTICS

The data set contains 361 firms from the German mining and manufacturing industries. Although 300 of these firms have the legal form of stock corporations (Aktiengesellschaften), only 183 were officially listed and traded on German stock exchanges during the observation period. As we are interested in the importance of stock market exposure, our sample also includes non-traded stock corporations as well as some limited liability corporations (GmbH, 54 firms) and limited commercial partnerships (GmbH & Co. KG, KGaA, 7 firms). The time period covered is 1991 to 1996, which yielded the largest number of reporting firms with complete and consistent data. According to their main field of economic activity, the sample firms were assigned to 30 different two-digit industries, among them machinery (76 firms), chemicals and pharmaceuticals (60 firms), the electronic products industry (56 firms), and iron and steel (37 firms).

Our preferred measure of corporate performance is the return on total assets (ROA). We also report summary statistics for the return on equity (ROE) but ROE comparisons across firms may be distorted by the leverage effect and differences in the user cost of capital. For both ROA and ROE the numerator is gross profits,

¹⁷ Gedajlovic and Shapiro (1998) studied the blockholdings-performance link for the largest firms from five major industrialized countries. Their sample includes 99 publicly traded German stock corporations over the period 1986 to 1991. The U-formed relationship between ownership concentration and ROA was also found for the US firms.

¹⁸ Becht (1999) uses the corporations represented in the DAX100 stock market index during 1996 to 1998.

calculated as turnover minus expenses for personnel and materials.¹⁹ Equity capital is defined as shareholders' equity plus reserves and pension liabilities.²⁰

The firm-specific variables are constructed from balance sheet and profit-and-loss account data as collected from either the Hoppenstedt Bilanzdatenbank (a commercially sold data source), the Bundesanzeiger (a federal gazette, in which corporations are obliged by law to publish their annual financial statements), or annual reports directly obtained from the corporations.²¹ We used unconsolidated company data whenever available and excluded pure holding companies.²²

Secondary sources were consulted for identifying owners, share distributions, and the composition of managing and supervisory boards. The sources are Commerzbank's *Wer gehört zu wem?* (Who owns whom?, 16th–18th edition), Bayerische Hypotheken- und Wechselbank's *Wegweiser durch deutsche Aktiengesellschaften* (Guide of German Stock Corporations, "Hypo-Guide", annual issues 1988–1996), and Hoppenstedt's *Börsenführer* (Stock Market Guide, annual issues, 1988–1998). In combining these data sources it was possible to obtain a fairly precise picture of voting stock ownership.²³ For the purpose of this study, we have defined a 'large' shareholder as one who controls at least 5 per cent of a firm's voting capital. This cut-off point of when a shareholder is large rather than small is less important than in Anglo-Saxon studies, since almost all sample firms have large shareholders who control at least 25% of the voting capital. As Table I shows, 65% of the companies in the sample have one large shareholder who, on average, controls 89% of the voting stocks and faces a group of small shareholders with an aggregate share in the voting capital of about 11%.

In the empirical literature ownership concentration is the standard indicator for the extent of "governance" exercised by firm owners. In this study as in previous ones, we measure ownership concentration by the Herfindahl index of outstanding voting stock and, alternatively, by the percentage stake of the largest shareholder. The share of the largest shareholder indicates her fundamental voting power, that is,

¹⁹ This definition is equivalent to earnings before interest, taxes, and depreciation (EBITDA).

²⁰ Pension liabilities have been added for two reasons. First, it is peculiar to the German system of accounting that pension assets and pension liabilities are not netted out in companies' balance sheets. Further, pension liabilities are not paid into a trust (pension fund) but remain within the firm. They are available to the firm as a source of internal long-term finance. Pension liabilities thus can be seen as 'quasi' equity. Second, the shareholders' equity of limited liability companies (GmbH) is, by legal construction, extremely low. Adding reserves and pension liabilities to shareholders' equity helps avoid generating unrealistically high returns on equity for these firms compared to stock corporations.

²¹ We referred to the Bundesanzeiger or requested annual reports from firms to double-check and correct some entries in the Hoppenstedt Bilanzdatenbank (inconsistencies in reporting, missing values, obviously wrong entries etc.).

²² This exclusion refers to the subsequent empirical analysis of profitability only. Of course, a holding company can be the owner of a sample firm.

²³ In many cases the Hypo-Guide also lists blocks smaller than 25% and indicates indirect ownership (voting rights granted to a large shareholder from other shareholders). Sometimes even very small blockholdings (5% and less) are reported.

Table I. Ownership structures: sample of 361 German manufacturing firms, 1991–1996

Number of large shareholders	Group of firms		Largest shareholder's stake	Block of widely dispersed shares
	Full sample	Percentage relative to the group of firms	Mean (std. dev.) in per cent	Mean (std. dev.) in per cent
	Quoted firms			
	Non-quoted firms			
0	2	0.55	0.00 (0.00)	100.00 (0.00)
	2	1.09	0.00 (0.00)	100.00 (0.00)
	—	—	—	—
1	235	65.10	89.07 (21.54)	10.93 (21.54)
	100	54.64	76.55 (27.14)	16.50 (27.14)
	135	75.84	98.35 (7.88)	1.65 (7.88)
2	77	21.33	56.55 (18.75)	18.62 (19.45)
	50	27.32	55.08 (20.87)	26.80 (18.53)
	27	15.17	59.26 (13.96)	3.48 (9.60)
3	28	7.76	44.07 (18.41)	24.43 (23.47)
	19	10.38	40.26 (20.01)	36.00 (19.65)
	9	5.06	52.11 (11.65)	0.00 (0.00)
4	15	4.16	52.87 (29.71)	25.67 (25.74)
	11	6.01	43.82 (19.30)	35.00 (23.84)
	4	2.25	77.75 (41.82)	0.00 (0.00)
5	1	0.28	52.00 (NA)	15.00 (NA)
	—	—	—	—
6	1	0.28	55.00 (NA)	0.00 (NA)
	—	—	—	—
	1	0.56	55.00 (NA)	0.00 (NA)
7	2	0.55	53.00 (4.24)	0.00 (0.00)
	—	—	—	—
	2	1.12	53.00 (4.24)	0.00 (0.00)
Total	361	100.00	75.27 (28.72)	14.53 (22.73)
	183	100.00	63.98 (28.56)	27.67 (25.53)
	178	100.00	86.49 (24.39)	1.54 (7.61)

The sample consists of 361 German firms which operated in 30 industries of the mining and manufacturing sector during the period 1991 to 1996. Of the sample firms 300 have the legal form of stock corporations (Aktiengesellschaften) with 183 listed and traded on German stock exchanges. The data set further includes 54 limited liability corporations (GmbH) and 7 limited commercial partnerships (GmbH & Co. KG, KGaA). For identification of owners and share distributions we used Commerzbank, Wer gehört zu wem? (Who owns whom?, editions 16th to 18th, publication years 1988, 1992, 1994), Bayerische Hypotheken- und Wechselbank, Wegweiser durch deutsche Aktiengesellschaften ("Hypo-Guide", Guide of German Stock Corporations, annual issues 1988–1996), and Hoppenstedt's Börsenführer (annual issues, 1988–1998). We define a large shareholder as controlling at least 5 per cent of a corporation's voting capital.

the ability to outvote other shareholders or initiate major changes by herself (e.g., ousting the supervisors, introduce a new corporate charter). The Herfindahl index, defined as the sum of squared individual stakes, has the advantage of accounting for an asymmetric dispersion of shares among different shareholders.²⁴

Ownership concentration may not suffice as an indicator of the degree of "governance". The identity of owners may play a more crucial role. Officially reported shareholdings often do not reflect the true extent of voting control exercised by owners of German corporations (Becht and Boehmer, 1997; Boehmer, 1999). Complex cross-holding arrangements and unreported fiduciary and dormant voting rights complicate the identification of actual controllers. Nevertheless, given the information available, we attempt to assess the relevance of the owner's identity for the link between profitability and ownership concentration.

For the purpose of grouping firms by the location of control rights five broad categories of direct owners can be identified: another industrial firm or holding company (INDFIRM), families or (voting pools of) individuals (FAMILY), financial institutions (banks or bank-owned investment companies, insurance companies, FININST), different large shareholders (MIX, e.g., industrial firms and investment companies), and foreign owners (FOREIGN). A sixth group, CHANGE, is defined to account for 26 firms for which a turnover of blockholdings from one of these owner categories to another was observed during the observation period.

The groups are mutually exclusive. A firm that, for instance, had another industrial firm as largest shareholder in some years and a bank in other years only appears in the CHANGE group but not in the groups INDFIRM or FININST. Due to the lack of detailed ownership information, the foreign-owned firms were also treated as a separate group. A few firms are owned by foundations which have no owner in a strict sense. It is thus unclear who really controls these firms. As the foundations are often close to the founding families of the firms, as in the case of Bosch GmbH (a leading electronic products firm), it seems tenable to assign them to the group of firms controlled by families or (voting pools of) individuals.

For some firms such as Bayer, Mannesmann, Schering, Siemens, or VEBA more than 90% of the voting capital is generally reported as "widely dispersed". The study of Baums and Fraune (1995) shows that in the 1992 annual shareholders' meetings banks controlled an aggregate of more than 90% of those firms' voting capital via associated investment companies and proxy votes. These sample firms

²⁴ As disclosure of smaller blockholdings was not mandatory during the observation period, the calculated Herfindahl index can only be an approximation to the true degree of ownership concentration. Two alternative Herfindahl indices were constructed for corporations with missing information on this "dispersed" portion of shareholdings. One measure treats the "dispersed" portion as one block. Using the means in Table I for corporations with only one large shareholder as an example, the Herfindahl index is $(89.07)^2 + (10.93)^2 = 8,053$. The other measure assumes that the dispersed portion is uniformly distributed among an unknown number of shareholders, each holding at most 1% of the shares outstanding, which yields a Herfindahl index of $(89.07)^2 + 10 \times (1.00)^2 + (0.93)^2 = 7,944$. The results to be presented below are not affected by the choice of the calculation method.

were therefore added to the group of firms with financial institutions as largest shareholders.

To relate back to the discussion on the managed vs. the governed firm, or the insider vs. outsider model, corporations having individuals or families (FAMILY), banks (FININST), or different independent large shareholders (MIX) may be interpreted as potentially governed by committed insiders. By contrast, for firms owned by another industrial firm (INDFIRM) it might be managers rather than the ultimate owners who control the managers of the owned company. Firms of this group, mostly subsidiaries of large quoted stock corporations (e.g., BASF, Thyssen), may then be considered as managed. However, we make no attempt here to argue that a certain location of control rights indeed implies "more" or "less" governance. Although we took great efforts to trace ownership back to the ultimate owners for all firms, it is not entirely clear whether these ultimate owners really "govern", or whether hired managers nonetheless exercise control even if ownership concentration is high and firms are owned by families for example.

To investigate whether stock market exposure makes a difference for the potential link between governance indicators and corporate performance we distinguish between corporations traded on the stock exchange (QUOTED) and non-traded or non-stock corporations (NON-QUOTED).

Table IIA presents the mean and median values of selected variables for the full sample and the groups of quoted and non-quoted firms. The last column reports statistics for testing the hypotheses of equal group means (t-statistic) and medians (Mann-Whitney statistic). The table shows that quoted firms have significantly higher average returns on total assets and also higher median returns on equity. The quoted firms are less levered. Further, as measured by turnover, employment, and the natural log of total assets, the quoted firms are substantially larger on average but the median firms do not differ significantly in turnover or total assets. Finally, quoted firms had significantly higher growth of turnover than non-quoted firms.

Table IIB contains summary statistics of selected variables for the groups of firms as classified by the identity of the largest owner. For any pair of owner categories we conducted pairwise t- and median tests for the variables listed in Table IIB but do not report these results separately.²⁵ The tests reveal that the INDFIRM firms have significantly lower rates of return than any other owner group except for the equity return of firms controlled by financial institutions. Ownership concentration is the highest for the managed firms. Family-controlled firms have the highest ROE and the second highest ROA but their share of equity capital is the lowest of all groups. Bank-controlled firms have the highest share of equity capital and thus the lowest degree of leverage. Foreign-owned firms have the highest ROA and the second highest ROE.

²⁵ The results are available from the authors on request.

Table IIA. Summary statistics: sample of 361 German manufacturing firms, 1991–1996. Sample split by stock market exposure

Variable	Group of firms			Test statistics t/Mann-Whitney
	All firms (361)	Quoted (183)	Non-quoted (178)	
Return on total assets (ROA)				
Mean/median	0.2958/0.2875	0.3159/0.3028	0.2755/0.2705	5.39***/5.75***
Return on equity				
Mean/median	0.5515/0.4993	0.5593/0.5475	0.5436/0.5116	0.90/3.09***
Ownership concentration (OC)				
Herfindahl index (bounded)				
Mean/median	7.465/10.000	5.130/4.543	8.628/10.000	27.48***/482.2***
Largest shareholder's stake				
Mean/median	0.8584/1.0000	0.7340/0.7800	0.9787/1.0000	28.91***/29.60***
Board representation (B)				
Mean/median	0.2802/0.0000	0.2811/0.0000	0.2793/0.0000	0.09/0.07
Turnover				
Mean/median	3.283/552	4.327/477	2.221/631	4.95***/0.89
Employment				
Mean/median	11,063/2,094	14,805/2,291	7,259/1,843	5.16***/3.29***
Firm size (S)				
Mean/median	19.897/19.779	19.982/19.621	19.810/19.887	2.25**/0.88
Firm growth (G)				
Mean/median	0.0219/0.0220	0.0359/0.0296	0.0078/0.0159	2.64***/3.06***
Capital intensity (K)				
Mean/median	12.177/12.085	12.088/12.036	12.267/12.144	6.46***/4.82***
Capital structure (C)				
Mean/median	0.5841/0.5974	0.5979/0.6112	0.5699/0.5753	3.49***/2.99***
Market concentration (H)				
Mean/median	579.52/327.70	610.19/316.70	548.33/350.60	1.95*/0.27

Calculations are based on data from annual reports of 361 German corporations (see Table I). The sample split is based on stock market quotation for at least three out of the six sample years. Return on total assets (ROA) is gross profits (calculated from the firms' profit-and-loss statement as turnover minus expenses for personnel and materials) divided by the book value of total assets (as reported in the firms' balance sheet). Return on equity is gross profits divided by equity (calculated as shareholders' equity plus reserves and pension liabilities). Ownership concentration is measured as the sum of squared individual percentage stakes, thus bounded to lie in the interval [0; 10,000], and alternatively, as the percentage stake of the largest shareholder. Board representation is an indicator variable taking on unit value if an identified owner served on the board of executive directors in a certain year, otherwise it has zero value. Turnover is in millions DM. Employment is the reporting year average number of full-time employees as provided in the firms' annual report or in secondary sources. In some cases end-of-the-year figures had to be used because information on average employment was not available. We measure absolute firm size as the natural logarithm (log) of total assets to reduce the skewness of the firm size distribution. Firm growth is the annual logarithmic change in real turnover (turnover deflated by the 1995 GDP deflator, source: German Statistical Office). Capital intensity is defined as log (total assets/employees). Capital structure is equity (as defined above) over total capital (book values). Market concentration is measured by a standard Herfindahl index at the two-digit industry level of the German industry classification for the manufacturing sector ("SYPRO", source: German Statistical Office).

Means and medians of all variables are calculated for the period 1991 to 1996 with the exception of firm growth which, due to its definition, is available for the period 1992 to 1996. We compare the variables' means and medians between the two groups of firms, quoted versus non-quoted firms. The last column of the table provides the t-statistic for the test of equal group means and the Mann-Whitney statistic for the test of equal group medians.

***/**/* Significant at the 0.01/0.05/0.10 error level respectively.

Table IIB. Summary statistics: sample of 361 German manufacturing firms, 1991–1996. Sample split by the location of control rights

Number of firms	Location of control rights					
	INDFIRM 81	FAMILY 122	FININST 20	MIX 54	FOREIGN 58	CHANGE 26
Return on total assets						
Mean	0.2408	0.3162	0.2725	0.2918	0.3439	0.2913
Median	0.2253	0.3120	0.2536	0.2999	0.3129	0.2844
Return on equity						
Mean	0.4288	0.6359	0.4386	0.5173	0.6084	0.5690
Median	0.3500	0.5626	0.4091	0.5106	0.5487	0.4982
Ownership concentration (bounded Herfindahl index)						
Mean	8,818	7,485	1,897	3,318	9,045	4,078
Median	10,000	9,900	342	3,322	10,000	3,563
Turnover						
Mean	2,880	1,918	16,241	3,427	2,065	3,389
Median	853	333	3,378	889	613	503
Firm growth						
Mean	0.0016	0.0428	0.0363	0.0221	0.0018	0.0204
Median	0.0074	0.0378	0.0256	0.0191	0.0076	0.0082
Capital structure						
Mean	0.5930	0.5541	0.6367	0.5999	0.6115	0.5626
Median	0.6019	0.5666	0.6673	0.6068	0.6264	0.5464

Calculations are based on data from annual reports and secondary sources of 361 German manufacturing firms (see Table I). The sample split is based on the location of control rights (voting stock). We define a large shareholder as controlling at least 5 per cent of a corporation's voting capital and distinguish six identities of large shareholders: 1. INDFIRM is defined as firms having another independent industrial firm or a holding company as largest shareholder (e.g., THYSSEN GUSS AG, subsidiary of THYSSEN concern). 2. FAMILY is defined as firms having (pools of) individuals or families as largest shareholders (e.g., BAUSCH AG, BOSCH GmbH). 3. FININST is defined as firms having banks, insurance companies, or associated investment companies as largest shareholders (e.g., LINDE, larger stakes owned by Deutsche Bank and Commerzbank), or, having widely dispersed shareholdings, but banks control at least 75 per cent of the voting capital through proxy voting rights (e.g., BAYER). 4. MIX is defined as firms having different independent large shareholders (e.g., BOSCH-SIEMENS Hausgeräte GmbH, owned equally by BOSCH GmbH and SIEMENS AG). 5. FOREIGN is defined as firms having foreign companies as largest shareholders (e.g., OPEL AG, owned by GM). 6. CHANGE is defined as firms which experienced a change in the identity of blockholders through turnovers of blocks from one of the owner categories 1–5 to another (e.g., AQUA SIGNAL AG). See Table IIA for definitions of the other variables.

3.2. REGRESSION MODEL AND HYPOTHESES

Regression Model

To investigate the impact of the mode of corporate governance on corporate performance we use the following panel regression

$$ROA_{it} = b_1 OC_{it} + b_2 B_{it} + b_3 S_{it} + b_4 G_{it} + b_5 K_{it} + b_6 C_{i,t-1} + b_7 H_{it}^j + u_{it}, \quad (1)$$

in which the subscript $i = 1, \dots, 361$ identifies individual firms, $j = 1, \dots, 30$ indicates the respective two-digit industry a firm operates in, and $t = 1992, \dots, 1996$ denotes time periods.

In model (1) we regress the return on total assets ROA on ownership concentration OC and a set of other variables. For lucidity and space restrictions, we will only present regression results using for OC the unbounded Herfindahl index as in Demsetz and Lehn (1985).²⁶ B indicates the presence of the largest shareholder on the executive board. The following variables which have frequently been employed in the Industrial Organization (IO) literature to explain profitability differences across firms or industries, serve as right-hand side control variables: absolute firm size S (natural logarithm of total assets), firm growth G (logarithmic annual change in turnover), capital intensity K (log of total assets divided by the number of employees), capital structure C (shareholders' equity plus reserves divided by total capital), and the Herfindahl index of supplier concentration at the two-digit industry level (source: German Statistical Office). These variables will be discussed in more detail below.²⁷

Due to the combination of time series and cross-section data we can decompose the regression disturbance u_{it} into a classical white noise error ϵ_{it} and effects specific to individual firms, a_i , time, λ_t , and industries, a_j . We use standard panel regression techniques (see Hsiao, 1986; Baltagi, 1995) to estimate (1). As ownership concentration and profitability could be determined simultaneously in competitive and well-functioning markets, we test for simultaneity bias in (1) by applying instrumental variable estimation techniques as well. Details on estimation techniques and specification tests will be provided in the tables.

Hypotheses

1. Ownership concentration, board representation, and stock market exposure

Our main interest lies in estimating the coefficients b_1 and b_2 . If ownership concentration indicates tighter and performance-enhancing governance exerted by owners, $b_1 > 0$ is to be expected. If managerial discretion is facilitated in traded corporations because ownership concentration tends to be lower for traded than for non-traded firms, we expect to observe a stronger positive impact of ownership concentration on ROA for the traded firms. However, if there is less asymmetric information in traded corporations because they are more transparent to outside investors than non-traded firms, the differential impact of ownership concentration on ROA between traded and non-traded corporations may go the other way. In the

²⁶ The Herfindahl-Index in its standard definition is restricted to take on values between 0 and 10,000. The logit transformation $\log [H/(10,000 - H)]$ yields an "unbounded" variable. In the case of Mannesmann, for which ownership of voting shares is reported to be "100% dispersed", H was set at 1 in the transformation. For firms with only one owner holding 100% of voting stock, H was set at 9,999. In alternative regression runs we used the bounded Herfindahl-Index as well as the share of the largest shareholder plus its squared value as in Gedajlovic and Shapiro (1998). Further, we replaced ROA by ROE. As the estimates with respect to governance indicators do not differ significantly, we do not report the results from these alternative specifications here. They are available from the authors on request.

²⁷ See for a recent discussion, e.g., Church and Ware (2000, ch. 12).

extreme, if the market mechanism indeed provides effective corporate control, as suggested, e.g., by Demsetz and Lehn (1985), $b_1 = 0$ should hold for the traded firms. By contrast, $b_1 < 0$ may indicate inefficiency or rent extraction due to the presence of large shareholders. The same reasoning as for ownership concentration can be applied to the representation of the largest shareholder on the board of executive directors.

2. Firm size and firm growth

Economic theory offers no clear-cut predictions for the impact of firm size and firm growth on profitability. A positive influence of absolute firm size is implied by the economies of scale and scope argument (e.g., Baumol, 1959), while a negative effect may result from organizational inefficiency (X-inefficiency, Leibenstein, 1966). As larger firms tend to be more diversified, lower risk premiums could render b_3 negative. Firm growth may, on the one hand, reflect better investment opportunities and thus higher profitability, $b_4 > 0$. On the other hand, if managers have sufficient discretion to divert free cash flow and overinvest, profitability should be lower for growing firms, $b_4 < 0$.

3. Capital intensity

The coefficient on capital intensity may help to identify overinvestment. If decreasing scale economies prevail, profitability should decrease in capital intensity, $b_5 < 0$. The opposite may hold if high capital intensity is a barrier to entry and exit, which allows incumbents to earn rents, as frequently argued in the IO literature.

4. Capital structure

With imperfect capital markets capital structure matters for investment decisions and firm profitability. Capital structure choices vary across firms and industries depending on informational asymmetries, transaction costs, and growth prospects. If a higher equity share implies lower risk of bankruptcy, an inverse relation between profitability and the share of equity capital, C , can be expected, $b_6 < 0$, since the return on investment required to compensate for risk-taking decreases in risk.²⁸ To reduce potential simultaneity bias between ROA and capital structure, we use beginning-of-the-period values for C .

5. Market concentration

Supplier concentration is implied by oligopoly theory to be positively correlated with profitability. This prediction is supported by a vast empirical literature. We therefore expect $b_7 > 0$. As it is not the concern of this paper to discuss the appropriate interpretation of the relationship, we take market concentration as a summary measure of industry characteristics, reflecting current production technologies (potential scale economies), demand (price elasticity) as well as the intensity of competition.

²⁸ See the discussion in Hall and Weiss (1967).

6. Industry characteristics

Industry characteristics such as knowledge conditions and technological opportunities may simultaneously determine governance structures, investment, and profitability (Audretsch and Weigand, 1999). In industries such as optical instruments or machinery, production technology or the knowledge on which firm know-how is based does not require large firm size per se. Cost advantages (scale economies) from large-scale operations (production, R&D) are not ubiquitous. Therefore, these industries offer a favorable environment for smaller firms, and indeed that is where we find small family-owned firms to be very common. By contrast, in the chemical and pharmaceutical industry large stock corporations dominate. Clearly, production technologies require larger firm sizes. Different ownership structures are also necessary to satisfy the increased capital needs and to better spread the higher risk involved in large-scale operations. Based on this reasoning we expect industry characteristics, if not fully reflected by market concentration, to affect profitability and ownership structures.

7. Firm-specific effects

The firm-specific effects control for systematic variation in profitability not captured by the explanatory variables (e.g., differences in risk-taking, user cost of capital). If our explanatory variables do miss systematic ROA variation, the firm-specific effects should turn out to be statistically significant.

8. Time-specific effects

The time-specific effects subsume the macroeconomic shocks common to all firms. Their inclusion is suggested by the fact that during the sample period the German economy first experienced the reunification boom of 1990/91 and then slid into the recession of 1992/93, the worst downturn in Germany's post-war history.

3.3. RESULTS

Specifying the Relationship between Profitability and Corporate Governance Indicators

Table IIIA summarizes the panel regression estimates for Equation (1), the extended model, which includes the set of variables highlighted in the IO literature, and also for the *parsimonious* variant which excludes the IO variables. Table IIIB takes ownership concentration as the dependent variable. For now, we selectively focus on the impact of the governance indicators OC and *B*, the importance of individual firm and industry effects as well as the possible simultaneity of OC and ROA.²⁹

All regressions in Tables IIIA and IIIB imply a negative relation between the return on total assets and ownership concentration. The estimated coefficients on OC in the extended and parsimonious ROA regressions (Table IIIA) are statistically

²⁹ We discuss the impact of the IO variables below.

Table IIIA. Panel regression estimates of the return on total assets equation, 1992–1996. Full sample

Dependent variable: ROA	Regression coefficient (absolute t-statistic)			Regression diagnostics	
	of selected explanatory variables			Adj. R sq.	DW
	Regression model	Ownership concentration Extended model Parsimonious model	Board representation Extended model Parsimonious model		
A. Between (cross-section)		–0.0007 (0.87) –0.0009 (1.04) –0.0007 (0.93) –0.0009 (1.11) –0.0008 (2.14)** –0.0009 (2.27)** –0.0010 (2.91)** –0.0009 (2.41)** –0.0029 (2.28)** –0.0030 (1.98)** –0.0013 (1.95)* –0.0014 (2.03)** –0.0014 (2.24)** –0.0013 (2.05)** –0.0079 (0.79) –0.0078 (0.71)	0.0309 (1.68)* 0.0375 (2.04)** 0.0142 (0.40) 0.0254 (1.49) 0.0313 (3.59)*** 0.0365 (4.19)*** 0.0187 (2.20)** 0.0247 (2.83)*** 0.0098 (0.51) –0.0009 (0.05) 0.0137 (0.91) 0.0272 (1.76)* 0.0073 (0.52) 0.0198 (1.38) 0.0018 (0.06) –0.0091 (0.33)	0.1016 0.0096 0.2939 0.2058 0.1017 0.0117 0.2829 0.2021 0.7763 0.7302 0.0351 0.5005 0.0330 0.0071 – –	– – – – 0.3636*** 0.3646*** 0.4509*** 0.4589*** 1.5598*** 1.6699*** 0.2203*** 0.2480*** 0.2777*** 0.3022*** – –
B. Between (cross-section) with fixed industry effects					
C. Total (common intercept and slopes)					
D. Total with fixed industry effects					
E. Within (fixed firm effects)					
F. RE (random firm effects)					
G. RE with fixed industry effects					
H. Within-2SLS					

Table IIIA. Continued

Specification test	Null hypothesis	Test statistic	Accept/Reject null
		Extended model	
		Parsimonious model	
Model A vs. Model B	No fixed industry effects	F(29, 325) = 56.24***	Reject
Model C vs. Model D	No fixed industry effects	F(29, 330) = 58.79***	Reject
Model C vs. Model E	No fixed firm effects	F(29, 1762) = 240.79***	Reject
Model C vs. Model F	No random firm effects	F(29, 1767) = 228.71***	Reject
Model D vs. Model G	No random firm effects	F(360, 1431) = 16.01***	Reject
Model E vs. Model H	No simultaneity bias	F(360, 1436) = 14.29***	Reject
Model F vs. Model G	No fixed industry effects	Chisq(1) = 66.07***	Reject
Model D	No time effects	Chisq(1) = 49.81***	Reject
Model E	No time effects	Chisq(1) = 68.91***	Reject
		Chisq(1) = 60.58***	Reject
		Chisq(7) = 50.28***	Reject
		Chisq(3) = 2.24	Accept
		Chisq(6) = 0.4728	Accept
		Chisq(4) = 0.8216	Accept
		F(29, 1762) = 232.48***	Reject
		F(29, 1767) = 193.31***	Reject
		F(4, 1762) = 3.23**	Reject
		F(4, 1767) = 4.72***	Reject
		F(4, 1762) = 1.69	Accept
		F(4, 1792) = 14.66***	Reject

Table IIIA. Continued

Specification test	Null hypothesis	Test statistic	Accept/Reject null
		Extended model	
		Parsimonious model	
Model G	No time effects	$F(4, 1762) = 7.13^{***}$ $F(4, 1767) = 5.98^{***}$	Reject Reject

The estimating sample contains 361 German firms as described in Table I. The extended model is given by

$$ROA_{it} = b_1 OC_{it} + b_2 B_{it} + b_3 S_{it} + b_4 G_{it} + b_5 K_{it} + b_6 C_{it-1} + b_7 H_{it}^j + u_{it} \quad (1)$$

$$u_{it} = a_i + \lambda_t + \epsilon_{it},$$

in which ROA, OC, B, S, G, K, and H are the return on total assets, ownership concentration (unbounded Herfindahl index), board representation, firm size, firm growth, capital intensity, capital structure, and market concentration of firm i operating in industry j at time t . See Table IIA for definitions of variables. In the parsimonious model we only include ownership concentration and board representation as right-hand side variables and ignore all variables implied by the industrial organization literature. The regression disturbance u_{it} can be decomposed into firm-, industry- and time-specific effects, a_i , λ_t , respectively, and a classical white noise regression disturbance ϵ_{it} .

Model A is a standard cross-section regression with the regression variables averaged over the observation period (361 observations). Model B adds 29 industry dummies to Model A. Models C to H use the pooled cross-section time-series data (1805 pooled observations). Model C restricts the firm-specific effects to be constant and identical for all firms. Model D adds 29 industry dummies to Model C. Model E assumes fixed (constant) firm-specific effects (361 firm-specific intercepts). Other time-constant effects (e.g., industries dummies) cannot be included. Model F assumes random firm-specific effects (i.e., a common intercept from which individual firms may deviate randomly). Model G adds 29 industry dummies to Model F. Model H includes fixed firm-specific effects as Model E but treats OC as an endogenous right-hand side variable (i.e., being correlated with ϵ_{it}). Models A, B, C and D are estimated by OLS. Model E is Within-OLS (LSDV, Least Squares Dummy Variables estimator). Models F and G use GLS. Model H is Within-2SLS using the fitted values of OC from the reduced-form (first-stage) regression of OC on all exogenous right-hand side variables in (1), B, S, G, K, C, H plus the number of large shareholders as an additional instrument included to identify the regression equation. The number of large shareholders has been excluded from the second-stage OC regression (to be presented in Table IIIB). We tested alternative exclusions of variables, since picking a specific variable is – admittedly – arbitrary. The results were not significantly different when any other pair of the 10 variables was excluded.

We present specification test statistics for these models. A standard F-test is employed to test a restricted model (e.g., no industry or no time effects) against an unrestricted model (allowing for such effects). To test for random firm-specific effects versus no such effects we use the Lagrange multiplier test suggested by Breusch and Pagan (1980). Hausman's (1978) specification test is used to decide on fixed versus random firm-specific effects. The same test, known in this case under the name "Wu-Hausman" (Wu, 1972) is also applied to compare the Within-OLS estimates (which are inefficient if OC in Equation (1) is endogenous) with the Within-2SLS estimates (which are efficient if OC is indeed endogenous). "Durbin-Watson" tests for first-order serial correlation (AR1) of panel regression residuals (Bhargava et al., 1982). See Hsiao (1986) or Baltagi (1995) for a detailed discussion of panel regression models and specification tests. The estimates' absolute t-statistics as provided in parentheses are based on White's (1980) heteroskedasticity-robust variance-covariance estimator.

***/**/* Significant at the 0.01/0.05/0.10 error level respectively.

Table III.B. Panel regression estimates of the ownership concentration equation, 1992–1996. Full sample

Dependent variable: OC	Regression coefficient (absolute t-statistic)			Regression diagnostics	
	of selected explanatory variables			Adj. R sq.	DW
	Return on total assets	Board representation			
Regression model	Extended model	Extended model	Parsimonious model		
A. Between (cross-section)	–1.8990 (0.58)	–1.8985 (1.63)		0.1489	–
	–3.5145 (1.05)	–0.5887 (0.51)		–0.0014	–
B. Between (cross-section)	–3.2924 (0.86)	2.0470 (1.69)*		0.1364	–
with fixed industry effects	–4.3864 (1.12)	–0.0471 (0.04)		–0.0088	–
C. Total	–1.9620 (1.55)	–1.4862 (3.18)***		0.1441	0.0398***
(common intercept and slopes)	–2.9901 (2.19)**	–0.6368 (1.28)		–0.0003	0.0263***
D. Total with fixed industry effects	–2.8930 (2.14)**	1.6834 (3.43)***		0.2082	0.0414***
	–3.4874 (2.32)**	–0.1163 (0.22)		0.2021	0.4589***
E. Within (fixed firm effects)	–1.4324 (2.32)**	–1.4332 (1.08)		0.9680	0.9930***
	–1.1429 (1.90)*	–1.6843 (1.19)		0.9674	0.9793***
F. RE (random firm effects)	–1.3055 (2.41)**	–1.2139 (2.40)**		0.323	0.0229***
	–1.1929 (2.33)**	–1.4840 (2.89)**		0.4645	0.0219***
G. RE with fixed industry effects	–1.3877 (2.52)**	–1.1100 (2.17)**		0.0146	0.0247***
	–1.1986 (2.31)**	–1.3782 (2.65)***		–0.0209	0.0234***
H. Within-2SLS	–6.9690 (1.58)	–1.3606 (0.97)		–	–
	–0.3924 (0.23)	–0.0091 (0.33)		–	–

Table III.B. Continued

Specification test	Null hypothesis	Test statistic		Accept/Reject null
		Extended model	Parsimonious model	
Model A vs. Model B	No fixed industry effects	$F(29, 325) = 11.94^{***}$		Reject
Model C vs. Model D	No fixed industry effects	$F(29, 330) = 13.19^{***}$		Reject
Model C vs. Model E	No fixed firm effects	$F(29, 1762) = 64.49^{***}$		Reject
Model C vs. Model F	No random firm effects	$F(29, 1767) = 68.51^{***}$		Reject
Model D vs. Model G	No random firm effects	$F(360, 1431) = 128.97^{***}$		Reject
Model E vs. Model F	Random firm effects	$F(360, 1436) = 149.05^{***}$		Reject
Model E vs. Model H	No simultaneity bias	$\text{Chisq}(1) = 19.99^{***}$		Reject
Model F vs. Model G	No fixed industry effects	$\text{Chisq}(1) = 7.14^{***}$		Reject
Model D	No time effects	$\text{Chisq}(1) = 20.27^{***}$		Reject
Model E	No time effects	$\text{Chisq}(1) = 6.41^{**}$		Reject
		$\text{Chisq}(4) = 3.51$		Accept
		$\text{Chisq}(3) = 0.86$		Accept
		$\text{Chisq}(2) = 19.97^{***}$		Reject
		$\text{Chisq}(2) = 0.63$		Accept
		$F(29, 1762) = 66.03^{***}$		Reject
		$F(29, 1767) = 61.01^{***}$		Reject
		$F(4, 1762) = 0.13$		Reject
		$F(4, 1767) = 0.25$		Reject
		$F(4, 1762) = 2.04^*$		Reject
		$F(4, 1792) = 5.63^{***}$		Reject

Table IIIB. Continued

Specification test	Null hypothesis	Test statistic	Accept/Reject null
		Extended model	
		Parsimonious model	
Model G	No time effects	F(4, 1762) = 0.73 F(4, 1767) = 0.51	Accept Accept

The estimating sample contains 361 German firms as described in Table 1. The extended regression model is given by

$$OC_{it} = e_1 ROA_{it} + e_2 B_{it} + e_3 S_{it} + e_4 G_{it} + e_5 NLS_{it} + e_6 C_{it-1} + e_7 H_{it}^2 + u_{it}, \quad (2)$$

$$u_{it} = a_i + \lambda_t + \epsilon_{it}$$

in which OC , ROA , B , S , G , NLS , C , and H , are ownership concentration (unbounded Herfindahl index), the return on total assets, board representation, firm size, firm growth, the number of large shareholders, capital structure, and market concentration of firm i operating in industry j at time t . As theory is rather silent on potential determinants of ownership concentration, regression (2) is an ad-hoc specification. See Tables I and IIA for definitions of variables. In the *parsimonious* model we only include the return on total assets and board representation as right-hand side variables and ignore all other ad-hoc variables. The regression disturbance u_{it} can be decomposed into firm-, industry- and time-specific effects, a_i , λ_t , respectively, and a classical white noise regression disturbance ϵ_{it} .

Model A is a standard cross-section regression with the regression variables averaged over the observation period (361 observations). Model B adds 29 industry dummies to Model A. Models C to H use the pooled cross-section time-series data (1805 pooled observations). Model C restricts the firm-specific effects to be constant and identical for all firms. Model D adds 29 industry dummies to Model C. Model E assumes fixed (constant) firm-specific effects (361 firm-specific intercepts). Other time-constant effects (e.g., industries dummies) cannot be included. Model F assumes random firm-specific effects (i.e., a common intercept from which individual firms may deviate randomly). Model G adds 29 industry dummies to Model F. Model H includes fixed firm-specific effects as Model E but treats OC as an endogenous right-hand side variable (i.e., being correlated with ϵ_{it}). Models A, B, C and D are estimated by OLS. Model E is Within-OLS (LSDV, Least Squares Dummy Variables estimator). Models F and G use GLS. Model H is Within-2SLS using the fitted values of ROA from the reduced-form (first-stage) regression of ROA on all exogenous right-hand side variables in (2), B , S , G , NLS , C , H plus capital intensity as an additional instrument (included to identify the regression equation). Capital intensity has been excluded from the second-stage ROA regression (Table IIIA). We tested alternative exclusions of variables. The results were not significantly different when any other pair of variables was excluded.

We present specification test statistics for these models. A standard F-test is employed to test a restricted model (e.g., no industry or no time effects) against an unrestricted model (allowing for such effects). To test for random firm-specific effects versus no such effects we use the Lagrange multiplier test suggested by Breusch and Pagan (1980). Hausman's (1978) specification test is used to decide on fixed versus random firm-specific effects. The same test, known in this case under the name "Wu-Hausman" (Wu, 1972) is also applied to compare the Within-OLS estimates (which are inefficient if OC in Equation (1) is endogenous) with the Within-2SLS estimates (which are efficient if OC is indeed endogenous). "Durbin-Watson" tests for first-order serial correlation (AR1) of panel regression residuals (Bhargava et al., 1982). See Hsiao (1986) or Baltagi (1995) for a detailed discussion of panel regression models and specification tests. The estimates' absolute t-statistics as provided in parentheses are based on White's (1980) heteroskedasticity-robust variance-covariance estimator.

***/**/° Significant at the 0.01/0.05/0.10 error level respectively.

significant at the 0.05 level in Models C to G which take advantage of the pooled data. With one exception the same holds for ROA in the OC regression (Table IIIB). Board representation has a positive coefficient in the ROA regression and a negative coefficient in the OC regression in almost all models. However, the statistical significance of the estimated coefficient is clearly affected by the way unobserved systematic influences are modelled. The coefficient of determination (adjusted R squared) reveals how much the respective variables add to the explanatory power of the regression. Beginning with the parsimonious variant in Model C, the governance indicators explain about 1% of the ROA variation, while ROA and board representation are of little help in explaining the variation of ownership concentration across firms and over time. In terms of explanatory power, the combination of random firm-specific and fixed industry-specific effects with other firm variables is not very useful either (Models F and G). By far the highest explanatory power is achieved by including fixed individual firm effects (Model E).

The specification tests show that there is systematic variation in the explained variables picked up by either individual firm or industry effects. Firm-specific effects are fixed rather than random. There is no gain by endogenizing OC. Put differently, OC can be taken as an exogenous variable in the ROA regression. For the OC regression, the specification test indicates simultaneity bias at least in the extended model, that is, ROA should be treated as an endogenous variable.³⁰ In short, model E is supported. As they lack time series variation, the industry indicator variables cannot be included in Model E because they would be perfectly correlated with the fixed firm effects (see Baltagi, 1995, p. 11). We will return to the problem of estimating the impact of time-constant variables in a fixed effects model below. The time-specific effects are highly significant in the parsimonious variant of Model E but insignificant in the extended variant. Further investigation reveals that including capital intensity in the regression renders the time effects insignificant. We will offer an explanation shortly.

Does Stock Market Exposure Affect the Profitability-Corporate Governance Relationship?

The negative impact of ownership concentration on ROA supports the view of inefficient ownership concentration and rent extraction. So far it does not refute the Demsetz-Lehn hypothesis which implicitly assumes firms to be exposed to the market for corporate control. This assumption holds only for about half of our sample firms. Therefore, we consider stock market exposure next.

³⁰ With respect to the IO variables in the extended model we find ownership concentration to be significantly lower for firms which are larger, use more capital per employee, have more equity capital, and, hardly surprising, have more large shareholders. By contrast, growing firms and firms operating under more concentrated market structures have more concentrated ownership. In an alternative try, we endogenized board representation and the number of large shareholders. The results were qualitatively identical. The Wu-Hausman test did not indicate the endogeneity of board representation or the number of large shareholders.

As the Durbin-Watson statistic in Table IIIA indicates problems of first-order serial correlation in our favored Model E, we used an estimation technique which corrects for both heteroskedasticity and first-order serial correlation. Table IVA contains these robust estimates for the extended model. To allow for a comparison with the non-robust coefficient estimates for OC and *B* in Table IIIA, column 1 of Table IVA ignores stock market exposure. Column 2 then presents the robust estimates for the quoted firms, while column 3 gives the coefficient differences with respect to the (not separately reported) regression coefficients of the non-quoted firms. We also report the group means of the firm-specific effects.

The fixed effects measure the average systematic difference in ROA across groups of firms not accounted for by the model's explanatory variables. There is no statistically significant difference in the means of these firm-specific intercepts between the traded and non-traded firms.³¹ Stock market exposure does also not change the profitability-ownership concentration relationship. The negative impact of ownership concentration is a bit weaker for the quoted firms (-0.0027) than for the non-quoted firms (-0.0049) but still significant at the 0.05 error level. The coefficient difference (-0.0022) is not statistically significant. These results contradict both the hypothesis of the beneficial large shareholder as well as the Demsetz-Lehn hypothesis of no ownership effect. However, the estimated coefficient on OC for the full (non-split) sample implies a quantitatively small effect. Evaluated at the sample means, doubling the unbounded Herfindahl index would lower ROA by about 8%.

There is a notable difference between the two groups with respect to board representation. The coefficient on *B* is insignificantly positive (and remains so when ownership concentration is excluded from the regressions) for the non-split sample and for the quoted firms but significantly positive for the non-traded firms. For the non-traded firms the presence of the largest owner on the board of executive directors thus improves profitability. Assuming that informational problems are more pronounced for non-traded firms this result implies that tighter control through the owner reduces agency costs and improves firm performance. The estimated coefficient on *B* for the non-quoted firms suggests an increase of average ROA by about 3% if average board representation raises by 1%.

For the IO variables we find that all coefficients except for the one on market concentration are highly significant. Larger firms and firms with a higher share of equity capital (lower leverage) have significantly lower returns, which is consistent with diversification and risk-return considerations. Firm growth affects ROA positively which supports the argument that growing firms have better investment opportunities. The negative coefficient on capital intensity seems to imply decreasing returns to scale. Given the above-mentioned fact that the time effects become insignificant when capital intensity enters the regression, this variable is apparently

³¹ As some of the variables in the regression are expressed in the natural logarithm, the means of the firm-specific intercepts are of different magnitude than mean ROA in the summary statistics tables.

Table IVA. Robust estimates of the return on total assets equation, 1992–1996. Full sample and sample split by stock market exposure

Dependent variable: ROA Explanatory variable	Regression coefficients (absolute t-statistic)		
	All firms (1)	Quoted firms (2)	Difference to non-quoted firms (3)
Ownership concentration	−0.0031 (2.54)**	−0.0027 (2.00)**	−0.0022 (0.69)
Board representation	0.0113 (0.43)	0.0157 (0.59)	3.0411 (7.35)***
Firm size	−0.0954 (7.69)***	−0.0975 (6.14)***	0.0069 (0.26)
Firm growth	0.1232 (12.49)***	0.1226 (8.33)***	0.0014 (0.07)
Capital intensity	−0.0695 (5.66)***	−0.0793 (4.79)***	0.0196 (0.76)
Capital structure ($t - 1$)	−0.0938 (3.23)***	−0.1375 (3.08)***	0.0830 (1.40)
Market concentration	0.2361 (1.31)	0.3484 (1.45)	−0.2468 (0.68)
Mean firm intercept	3.0996 (183.42)***	3.1038 (188.26)***	−0.0082 (0.36)
Adj. R squared	0.78 (0.78)		
Durbin–Watson	1.56**, 1.86		

The estimating sample contains 361 German firms as described in Table I. The split criterion is stock market quotation which divides the full sample into 183 traded and 178 non-traded firms. The estimating regression is

$$\begin{aligned}
 ROA_{it} = & b_1 OC_{it} + b_2 B_{it} + b_3 S_{it} + b_4 G_{it} + b_5 K_{it} + b_6 C_{i,t-1} + b_7 H_{it}^j \\
 & + d_1 D_{it} \times OC_{it} + d_2 D_{it} \times B_{it} + d_3 D_{it} \times S_{it} + d_4 D_{it} \times G_{it} \\
 & + d_5 D_{it} \times K_{it} + d_6 D_{it} \times C_{i,t-1} + d_7 D_{it} \times H_{it}^j + a_i + \lambda_t + \epsilon_{it}
 \end{aligned}$$

in which ROA, OC, B , S , G , K , C , and H are the return on total assets, ownership concentration (unbounded Herfindahl index), board representation, firm size, firm growth, capital intensity, capital structure, and market concentration of firm i operating in industry j at time t . See Table 2A for definitions of variables. a_i is a firm-specific effect, λ_t a time dummy, and ϵ_{it} the stochastic disturbance.

The split sample estimates are based on the full sample regression with the set of explanatory variables (except for the fixed firm-specific effects) interacted with a dummy variable D which takes on unit value for non-quoted firms and zero value for quoted firms. The regression coefficients b estimate the impact of the respective explanatory variables on ROA for the quoted firms, while the coefficients d yield the difference between the coefficients b and the respective coefficients for the non-quoted firms, to be obtained by adding d 's to matching b 's, or directly, by estimating the regression a second time but with D defined the other way around. The "All firms" estimates (column 1) come from the regression excluding the set of interacted variables. For the governance variables, these latter estimates can be compared to the Within-OLS estimates presented in Table IIIA (Model E) which are not robust to first-order serial correlation.

The estimates shown above are robust to heteroskedasticity (White, 1980) and first-order serial correlation (AR1) (see Hsiao, 1986, pp. 55). The Within-OLS estimator was employed to generate consistent first-step estimates. We used the Within residuals to estimate a firm-specific serial correlation coefficient ρ . Alternatively, we restricted the model to have a serial correlation coefficient common to all firms. The ρ s were used to transform the original data. Regressions based on the transformed data were then estimated by OLS (firm-specific ρ) or Maximum Likelihood (common ρ). The drawback of the "firm-specific ρ " approach is that due to the larger number of firm-specific coefficients to be estimated the coefficient on board representation was not estimable for the group of non-quoted firms. Therefore, we only report the estimates based on the "common ρ " approach. However, the coefficients on all other explanatory variables can be estimated in the "firm-specific ρ " approach. As these latter coefficient estimates are qualitatively identical and quantitatively only marginally different from those shown below, we do not report them separately. The estimates are available from the authors on request. The first Durbin–Watson statistic refers to the first-step Within-OLS residuals, the second statistic is based on the residuals from the AR1 regression. The adjusted R squared is given for both the original and, in parentheses, the transformed data.

***/**/* Significant at the 0.01/0.05/0.10 error level respectively.

Table IVB. Robust estimates of the return on total assets equation, 1992–1996. Sample split by location of control rights

Dependent variable: ROA	Regression coefficients (abs. T-statistic)	Coefficient difference (absolute t-statistic)				
Explanatory variable	INDFIRM	FAMILY	FININST	MIX	FOREIGN	CHANGE
Ownership concentration	0.0028 (1.00)	-0.0060 (1.72)*	0.0129 (2.09)**	-0.0146 (2.56)**	-0.0061 (1.14)	-0.0098 (2.73)***
Board representation	0.0852 (1.63)	-0.1024 (1.57)	-0.1242 (1.30)	-0.1176 (1.23)	—	—
Firm size	-0.0529 (1.74)*	-0.0633 (1.74)*	-0.0442 (0.43)	-0.0498 (0.96)	-0.0360 (0.78)	-0.0464 (0.84)
Firm growth	0.1104 (6.50)***	0.0131 (0.48)	0.0822 (1.19)	0.0726 (1.67)*	0.0176 (0.69)	0.0256 (0.68)
Capital intensity	-0.0520 (1.74)*	-0.0023 (0.70)	-0.0634 (1.55)	0.0014 (0.03)	-0.0021 (0.54)	-0.1104 (1.69)*
Capital structure ($t-1$)	0.0180 (0.35)	-0.2539 (3.55)***	-0.1021 (1.15)	-0.0208 (0.16)	-0.0091 (0.75)	0.0655 (0.56)
Market concentration	0.3048 (1.05)	0.2177 (0.39)	-1.3709 (0.78)	-0.7218 (0.77)	-0.2214 (0.54)	0.0010 (0.00)
Mean intercept	3.1126 (136.7)***	-0.0590 (1.94)*	0.1174 (1.97)**	-0.0080 (0.23)	0.0455 (1.15)	-0.0782 (1.64)*
Number of firms (obs.)	81 (405)	122 (610)	20 (100)	54 (270)	58 (290)	26 (130)
adj. R squared	0.78 (0.78)					
Durbin-Watson	1.56**	1.86				

The estimating sample contains 361 German firms as described in Table I. The split criterion is the location of control rights (identity of voting block owners). The estimating regression is

$$ROA_{it} = b_1 OC_{it} + b_2 B_{it} + b_3 S_{it} + b_4 G_{it} + b_5 K_{it} + b_6 C_{i,t-1} + b_7 H_{it}^j + \sum_{z=1}^5 \sum_{k=1}^7 d_{kz} D_{zi} \times x_{kzi} + a_i + \lambda_t + \epsilon_{it}$$

in which ROA, OC, B, S, G, K, C, and H are the return on total assets, ownership concentration (unbounded Herfindahl index), board representation, firm size, firm growth, capital intensity, capital structure, and market concentration of firm i operating in industry j at time t . a_i is a firm-specific effect, λ_t a time dummy, and ϵ_{it} the stochastic disturbance.

The split sample estimates are based on the full sample regression with the set of explanatory variables $x = \{OC, B, S, G, K, C, H\}$ interacted with a set of dummy variables D_z which take on unit value for firms from $z = \{FAMILY, FININST, MIX, FOREIGN, CHANGE\}$ respectively and zero value for other firms. See Tables IIA and IIB for definitions of variables. The regression coefficients b estimate the impact of the respective explanatory variables on ROA for firms from the INDFIRM group, arbitrarily chosen as the base group, while the coefficients d yield the difference between the coefficients b and the coefficients for other groups of firms as represented by z . Adding the respective “coefficient difference” to the base group’s “regression coefficient”, yields the regression coefficients for the other groups of firms.

The estimates shown above are robust to heteroskedasticity (White, 1980) and first-order serial correlation (AR1) (see Hsiao, 1986, pp. 55). The Within-OLS estimator was employed to generate consistent first-step estimates. We used the Within residuals to estimate a firm-specific serial correlation coefficient ρ . Alternatively, we restricted the model to have a serial correlation coefficient common to all firms. The ρ s were used to transform the original data. Regressions based on the transformed data were then estimated by OLS (firm-specific ρ) or Maximum Likelihood (common ρ). The coefficient on board representation was not estimable for the firms in MIX and CHANGE due to an insufficient number of observations. In line with Table IVA, we report the estimates based on the “common ρ ” approach. Again, the coefficients of all other explanatory variables can be estimated in the “firm-specific ρ ” approach. These latter coefficient estimates are qualitatively identical and quantitatively only marginally different from those shown below so we do not report them separately. The estimates are available from the authors on request. The first Durbin-Watson statistic refers to the first-step Within-OLS residuals, the second statistic is based on the residuals from the AR1 regression. The adjusted R squared is given for both the original and, in parentheses, the transformed data.

— Not estimable due to an insufficient number of observations in the respective group.

***/**/* Significant at the 0.01/0.05/0.10 error level respectively.

a proxy for capital utilization and thus picks up business cycle effects. Market concentration has a positive but statistically insignificant effect. Stock market exposure does not change the impact of the IO variables on ROA in any significant way.

Does the identity of owners matter?

As in the case of the industry indicators, we cannot consider the identity of owners in a fixed-effects regression directly, since the indicators for the location of control rights lack time series variation and thus will be perfectly correlated with the firm-specific effects. We therefore follow two approaches. In the first approach, we investigate the indirect impact of the location of control rights on ROA by interacting the identity indicators with all time-varying right-hand side variables of (1).³² The second approach homes in on the estimated fixed firm effects. The fixed effects can be interpreted as the autonomous component of ROA neither explained by the explanatory variables nor by purely stochastic disturbances. By regressing the fixed effects on the identity indicators we obtain a direct multivariate test on how the location of control rights affects ROA, after having controlled for the time-varying explanatory variables' influence.

The regression results from the indirect approach are contained in Table IVB. The group of firms with another firm as largest shareholder, INDFIRM, serves as the base group. Column 1 presents the coefficient estimates for this base group, while the following columns contain the estimates of coefficient differences with respect to the other owner categories. The coefficient on ownership concentration is positive but insignificant for this base group of presumably managed rather than governed firms. The negative impact of ownership concentration as reported for the non-split sample (Table IVA, column 1) can be traced back to the firms owned, and perhaps governed by FAMILY, MIX, FOREIGN, and CHANGE. The coefficient difference is statistically significant for the FAMILY and MIX firms. Taking the number of shareholders as given, the Herfindahl index is lower when the variance of stakes is lower.³³ Therefore, the higher the stake of the largest shareholder, and the smaller the individual stakes of other shareholders, the larger will be the variance of stakes *cet. par.* (i.e., the more asymmetric is the stake distribution). In other words, the presence of another large shareholder improves profitability. This result is in line with Boehmer (2000) who finds the presence of a second or third large shareholder to raise firm value.

Interestingly, ownership concentration is beneficial to firms potentially under the control of financial institutions. The coefficient difference is significantly positive. This group of firms has by far the lowest degree of ownership concentration (cf. Table IIB) and can, by German standards, be viewed as dispersedly held. The group

³² This model specification gives estimates identical to those from separate regressions for each group of owners but considers the across-groups variation of the regression residuals in the variance-covariance matrix.

³³ Recall that the Herfindahl index can be decomposed into $n^{-1} + nV$ where, in our case, n and V denote the number of (large) shareholders and the variance of individual stakes respectively.

also includes firms in which banks accumulated proxy votes. The positive impact of ownership concentration suggests that firm performance is enhanced when banks increase their cash flow stakes.

With respect to the IO variables, larger firm size and a higher equity share are significantly more important for FAMILY firms, which are the smallest on average and at the median, than for any other group of firms. The choice of absolute firm size and capital structure can be interpreted as reflecting the risk-return trade-off. As the risk of bankruptcy is lower for larger firms with more equity, the rate of return required to compensate for risk-taking can be lower as well.

Finally, Table IVB shows differences in the means of the firm-specific intercepts across the groups. The firms controlled by financial institutions have the highest mean intercept, while the FAMILY and CHANGE firms have the lowest. Compared to the INDFIRM group, FAMILY and CHANGE firms have a significantly lower autonomous ROA, while having financial institutions as largest shareholders significantly improves profitability. To investigate these differences further is our second, direct approach to assessing the impact of the identity indicators on ROA.

Ignoring time effects for simplicity, the estimates of the firm-specific fixed effects are given by (see Hsiao, 1986, p. 30)

$$\hat{a}_i = \bar{y}_i - \bar{X}'_i \hat{b}, \quad (2)$$

where $\hat{a}$ indicates an estimated parameter, the bar denotes the firm-specific time mean of a variable, y is the dependent variable, X is the matrix of time-varying right-hand side variables, a and b are the vectors of firm-specific effects and slope coefficients. We interpret (2) as depicting the long-term or autonomous component of the ROA model (1). The fixed effects can be regressed on a set of variables, z , which vary across firms but not over time, such as the identity or industry indicators.

$$\hat{a}_i = \mu + z'_i \gamma + \bar{\epsilon}_i. \quad (3)$$

The coefficient vectors γ and μ in Equation (3) can be consistently estimated by OLS if $\hat{b}$ is a consistent estimate and if the number of cross-section units is large and the time-series component is not tending to infinity (Hsiao 1986, p. 50). The first requirement is satisfied, since we can insert for $\hat{b}$ the estimates described in Table IVA. With 361 firms and variables averaged over five years we feel confident that the second condition is not completely violated. Therefore, we present in Table V the results from estimating regression (3) by OLS.

When we regress the firm-specific effects on the identity indicators only, taking INDFIRM as the base group and the regression constant μ in (3) as its regression coefficient, we obtain the mean firm-specific effects and the corresponding t-statistics on the differences as reported in Table IVB. Column 1 of Table V adds in stock market exposure and industry indicators as further determinants of autonomous ROA. The coefficient on stock market exposure is positive but not

Table V. OLS estimates of the firm-specific fixed effects equation, 1992–1996

Dependent variable: fixed firm-specific effect			
Explanatory variable	Regression coefficient (absolute t-statistic)		
	(1)	(2)	(3)
INDFIRM (base group)	3.1346 (53.87)***		
FAMILY	−0.0541 (1.70)*		
FININST	0.0996 (1.96)**		
MIX	−0.0279 (0.84)		
FOREIGN	0.0290 (0.74)		
CHANGE	−0.0857 (1.85)*		
QUOTED	0.0140 (0.56)		
QUOTED			
INDFIRM (base group)		3.1406 (37.48)***	0.9066 (4.19)***
FAMILY		−0.0233 (0.48)	0.0368 (1.18)
FININST		0.1432 (2.26)**	0.0593 (1.54)
MIX		0.0373 (0.69)	0.0508 (1.48)
FOREIGN		0.0517 (0.73)	0.1156 (2.24)**
CHANGE		−0.0415 (0.70)	0.0509 (1.44)
Ownership concentration			0.0048 (2.62)***
Board representation			0.0131 (0.55)
NON-QUOTED			
INDFIRM		0.0320 (0.62)	0.1112 (2.61)***
FAMILY		−0.0030 (0.07)	0.0805 (2.00)**
FININST		−0.1009 (1.20)	−0.1021 (1.65)*
MIX		0.0938 (1.98)**	−0.0227 (0.63)
FOREIGN		0.0093 (0.13)	0.0377 (0.64)
CHANGE		−0.0748 (0.59)	−0.0312 (0.78)
Ownership concentration			−0.0066 (2.62)***
Board representation			−0.0079 (0.21)
Firm size			0.0872 (15.42)***
Firm growth			0.1404 (2.01)**
Capital intensity			0.0145 (0.92)
Capital structure			0.2529 (5.83)***
Market concentration			−0.1009 (0.52)

Table V. Continued

Dependent variable: fixed firm-specific effect			
Explanatory variable	Regression coefficient (absolute t-statistic)		
	(1)	(2)	(3)
Industry effects		F(29,326) = 42.91***	F(29,312) = 52.49***
Adj. R ²	0.0377	0.1854	0.6804

The estimating sample contains 361 German firms as described in Table I. The estimating regression is

$$\begin{aligned}\hat{a}_i = & \gamma_1 + \gamma_2 \text{FAMILY}_i + \gamma_3 \text{FININST}_i + \gamma_4 \text{MIX}_i + \gamma_5 \text{FOREIGN}_i + \gamma_6 \text{CHANGE}_i \\ & + d_1 D_i \times \text{INDFIRM}_i + d_2 D_i \times \text{FAMILY}_i + d_3 D_i \times \text{FININST}_i + d_4 D_i \times \text{MIX}_i \\ & + d_5 D_i \times \text{FOREIGN}_i + d_6 D_i \times \text{CHANGE}_i + a_j + \epsilon_i\end{aligned}$$

with

$$\hat{a}_i = \overline{\text{ROA}}_i - \hat{b}_1 \overline{\text{OC}}_i - \hat{b}_2 \bar{B}_i - \hat{b}_3 \bar{S}_i - \hat{b}_4 \bar{G}_i - \hat{b}_5 \bar{K}_i - \hat{b}_6 \bar{C}_i - \hat{b}_7 \bar{H}_i^j.$$

The firm-specific effects are denoted by a . $\overline{\text{ROA}}_i$, $\overline{\text{OC}}_i$, $\bar{B}_i$, $\bar{S}_i$, $\bar{G}_i$, $\bar{K}_i$, $\bar{C}_i$, $\bar{H}_i^j$ are the time means (1992–1996) of the return on total assets, ownership concentration (unbounded Herfindahl index), board representation, firm size, firm growth, capital intensity, capital structure, and market concentration of firm i operating in industry j . See Table IIA for variable definitions. INDFIRM, FAMILY, FININST, MIX, FOREIGN, and CHANGE are the mutually excluding groups referring to the location of control rights as defined in Table IIB. a_j is an industry-specific effect and ϵ_i the stochastic disturbance.

The coefficients $\hat{b}_k$ ($k = 1, \dots, 7$) are the robust estimates as shown in Table IV A, column 1. The coefficients γ_2 to γ_6 estimate the difference between the average fixed firm-specific effect γ_1 of the chosen base group INDFIRM and the average fixed firm-specific effect of the other groups. Adding the respective coefficient difference γ_2 to γ_6 to the base group's regression coefficient γ_1 , yields the regression coefficients for the other groups of firms. The dummy variable D takes on unit value for non-quoted firms and zero value for quoted firms. The coefficients d estimate the difference in the coefficients between quoted and non-quoted firms. The OLS cross-section estimates below are robust to heteroskedasticity (White, 1980).

***/**/*Significant at the 0.01/0.05/0.10 error level.

significantly so. This result is consistent with Table IVA where we ignored the location of control rights and industry effects when comparing quoted and non-quoted firms. The included industry effects are highly significant.

In column 2 of Table V, we interact the identity and stock market indicators to explore whether there is a combined impact of the location of control rights and stock market exposure on the fixed firm-specific effects. Significant differences emerge for the MIX firms for which the lack of stock market exposure lowers profitability. Further, as previously found, firms with financial institutions as controlling stakeholders perform better than the “managed” base group. However, the

regressions of columns 1 and 2 ignore that the firm-specific effects may be correlated with the explanatory variables of the original ROA regression.³⁴ Therefore, column 3 adds in the regression the time means of these variables, distinguishing also ownership concentration and board representation by stock market exposure.

Ownership concentration significantly improves the autonomous ROA for the quoted firms but lowers it for the non-quoted firms. As the quoted firms are significantly less concentrated (see Table IIA), this result supports the view that the presence of large shareholders enhances the long-term performance of traded corporations. For the non-quoted firms higher concentration implies weaker performance both in the short (Table IVA) and in the long run (Table V). Board representation, market concentration and capital intensity do not make a difference. Autonomous ROA is significantly larger for larger and growing firms as well as for firms with more equity capital.

Controlling for differences in ownership concentration, firm size and capital structure changes the magnitude, sign and significance of the coefficients on the identity indicators compared with column 2. Our multivariate test now reveals that the non-quoted FININST significantly underperformed with respect to the base group of quoted INDFIRM firms, whereas the quoted FOREIGN firms and the non-quoted INDFIRM and FAMILY firms have significant larger fixed effects than the base group.³⁵ All other differences are statistically insignificant at conventional error levels.

Summing up, the changes in the estimates on the identity indicators underline that, given firm size, investment opportunities (growth) and capital structure, it is the combination of the size of the equity stake held, the identity of owners and stock market exposure that matters for firm performance in the longer run.

4. Summary and Conclusion

Almost a decade ago Michael C. Jensen (1993, p. 873) laid out the research agenda for the new millenium in the field of corporate governance, corporate finance, and corporate performance:

For those with a normative bent, making the internal control systems of corporations work is the major challenge facing economists and management scholars in the 1990s. For those who choose to take a purely positive approach, the major challenge is understanding how these systems work, and how they interact with other control forces (in particular the product and factor markets,

³⁴ This is suggested by the Hausman specification test in Table IIIA (model E vs. model F) from which we concluded that the firm-specific effects are fixed rather than random. The test does indeed check whether these effects are correlated with the right-hand variables or not.

³⁵ There are only two non-quoted firms with bank involvement. These two firms operated with mean ROAs of 0.16 and 0.09 respectively in the notoriously declining and restructuring mining industry. The mean ROA for the quoted firms with bank involvement is 0.28.

legal, political, and regulatory systems, and the capital markets) impinging on the corporation.

This paper contributes to the positive approach. We focused on German firms because ownership concentration is an important feature setting the German system of corporate governance apart from the Anglo-Saxon. In the corporate governance literature ownership concentration is often understood as reflecting a stronger governing effort of owners. By reducing informational asymmetries between owners and managers as well as between the firm and external investors ownership concentration is expected to affect firm profitability positively. Contrary to this argument, we find a significantly negative impact of ownership concentration on profitability as measured by the return on total assets. This result holds for both quoted and non-quoted firms and supports the view that large shareholders inflict costs on the firm (e.g., rent extraction, too much monitoring, or infighting).

Ownership concentration can be an insufficient or misleading indicator of the control owners actually exert. We therefore checked the location of control rights and also the time horizon. When focussing on short-run ROA, the negative effect of ownership concentration originates primarily with the firms owned by families (individuals) or different large shareholders as well as firms which experienced a change in owners during the observation period. A positive impact of ownership concentration on profitability is found for firms with financial institutions as largest shareholders. This latter result is consistent with the view that banks are better (more efficient) monitors so that agency costs are lower.

When we look at the long-term performance we find that ownership concentration significantly improves the ROA of firms exposed to the stock market. This result is consistent with the standard view advanced in the literature that in the bank- or network-oriented system of corporate governance, committed owners take a long-term horizon on their investments at the expense of a higher short-term return. However, and the qualification warrants attention, this conclusion does not hold for the non-quoted firms. For the non-quoted firms ownership concentration influences profitability negatively, not only in the short but particularly so in the long run. An interpretation is that the owners favor control over both higher liquidity (by going public) and higher profitability (by exploiting investment opportunities better). The location of control rights seems to be more important for non-quoted firms. While the representation of the largest shareholder on the board of executive directors does not affect the ROA of quoted firms, it makes a significant positive difference for the non-quoted firms in the short run but not in the long run.

Finally, can we answer the question posed in this paper: Do governed corporations perform better? If one is willing to view firms owned by families, financial institutions, or a mix of large shareholders as governed rather than managed, the answer to the question seems to be yes. These groups have significantly higher mean and median profitabilities than the group of firms owned by another industrial firm. After controlling for other potential ROA determinants such as firm size, stock

market exposure, industry effects, or the time horizon, these differences between owner categories are less pronounced but still present. Most of the variation in ROA across firms is explained by firm- or industry-specific effects. To get a more comprehensive picture of how governance structures affect firm performance, future research faces the challenge to identify what is behind these effects.

In conclusion, our study finds systematic influences of ownership concentration, stock market exposure, and the location of control rights on the profitability of German corporations. Our results imply that (1) the presence of large shareholders does not necessarily improve performance as measured by ROA, (2) concentrated ownership appears to be a sub-optimal choice for many of the tightly held and non-traded German corporations, and, finally, (3), having financial institutions as largest shareholders of traded corporations enhanced profitability.

Acknowledgments

The authors are indebted to Bob Chirinko for extensive and insightful comments on the very first draft of the paper and, most of all, for his encouragement. We are also grateful to an anonymous referee for substantial advice which greatly improved the paper. Many helpful suggestions on various drafts were received from Rashjree Agarwal, David Audretsch, Matthew Bennett, Hans Degryse, Paul De Grauwe, Julie Ann Elston, Oliver Fabel, Rainer Feuerstack, Günther Franke, Carolin Frohlin, George Gelauff, Sabine Langner, Manfred Neumann, Marco Pagan, Hans-Jürgen Ramser, and seminar participants at the 1999 Meetings of the European Finance Association (EFA, Helsinki), European Economic Association (EEA, Santiago de Compostela), European Association for Research in Industrial Economics (EARIE, Torino), and Western Economic Association (WEA, San Diego) as well as at the University of Central Florida Orlando, Humboldt University Berlin, University of Konstanz, and Katholieke Universiteit Leuven. The second author would like to thank Ulrich Hege, Piet Moerland, and Luc Renneboog for stimulating discussions on corporate governance. As a matter of fact, any remaining errors are the authors' sole responsibility. Generous financial support was provided by the Bundesland Mecklenburg-Vorpommern (first author) and the German Science Foundation (DFG, second author). Main parts of the paper were written while the second author was visiting Georgia State University (School of Policy Studies, Atlanta) and Indiana University (School of Public and Environmental Affairs, Bloomington). The hospitality and support of these institutions is gratefully acknowledged. This research is not related to any CPB Netherlands Bureau for Economic Policy Analysis projects. The opinions expressed here do not necessarily reflect those of the CPB.

References

- Admati, A., Pfleiderer, P., and Zechner, J. (1994), Large shareholder activism, risk sharing, and financial market equilibrium, *Journal of Political Economy* **102**, 1097–1130.
- Allen, F. and Gale, F. (1998), *Corporate Governance and Competition*, Working paper, New York University.
- Allen, F. and Gale, D. (2000), *Comparing Financial Systems*. MIT Press, Cambridge and London.
- Audretsch, D. and Elston, J. (1997), 'Financing the German Mittelstand', *Small Business Economics Journal* **9**, 97–110.
- Audretsch, D. and Weigand, J. (1999), *Does Science Make a Difference? Investment, Finance and Corporate Governance in German Industries*, CEPR working paper No. 2056, London.
- Baltagi, B. H. (1995), *Econometric Analysis of Panel Data*. Wiley, New York.
- Baumol, W. (1959), *Business Behavior, Value, and Growth*. Macmillan, New York.
- Baums, T. and Fraune, C. (1995), 'Institutionelle Anleger und Publikumsgesellschaft: Eine empirische Untersuchung', *Die Aktiengesellschaft* **40**, 97–112.
- Barca, F. and Becht, M. (eds.) (1999), *Ownership and Control in Europe*. Oxford University Press, Oxford.
- Becht, M. (1999), 'European corporate governance: Trading off liquidity against control', *European Economic Review* **43**, 1049–1056.
- Becht, M. and Boehmer, E. (1997), *Transparency of Ownership and Control in Germany*, Working paper, Humboldt University, Berlin.
- Bergloef, E. (1997), 'Reforming corporate governance: Redirecting the European agenda', *Economic Policy*, 93–123.
- Berle, A. and Means, G. (1932), *The Modern Corporation and Private Property*. MacMillan, New York.
- Bhargava, A., Franzini, L., and Narendananathan, W. (1982), 'Serial correlation and the fixed effects model', *Review of Economic Studies* **49**, 533–549.
- Bhide, A. (1994), 'Efficient Markets, Deficient Governance', *Harvard Business Review*, November–December, 129–139.
- Blair, M. (1995), *Ownership and Control: Rethinking Corporate Governance for the Twenty-First Century*, The Brookings Institution, Washington, D.C.
- Boehmer, E. (1999), *Who Controls Germany? An Exploratory Analysis*, Working paper, Humboldt University, Berlin.
- Boehmer, E. (2000), 'Business groups, bank control, and large shareholders: An analysis of German takeovers', *Journal of Financial Intermediation* **9**, 117–148.
- Bolton, P. and von Thadden, E.-L. (1998a), 'Blocks, liquidity, and control', *Journal of Finance* **53**, 1–25.
- Bolton, P. and von Thadden, E.-L. (1998b), 'Liquidity and control', *Journal of Institutional and Theoretical Economics* **154**, 177–215.
- Breusch, T. and Pagan, A. (1980), 'A simple test for heteroscedasticity and random coefficient variation', *Econometrica* **47**, 1287–1294.
- Burkhart, M., Gromb, D., and Panunzi, F. (1997), 'Large shareholders, monitoring, and the value of the firm', *Quarterly Journal of Economics* **112**, 693–728.
- Cable, J. (1985), 'Capital market information and industrial performance: The role of West German banks', *Economic Journal* **95**, 118–132.
- Chirinko, R. and Elston, J. (1996), *Finance, Control, and Profitability: An Evaluation of German Bank Influence*, American Institute for Contemporary German Studies: The Johns Hopkins University, Working Paper No. 28, Washington, D.C.
- Church, J. and Ware, R. (2000), *Industrial Organization: A Strategic Approach*. McGraw-Hill, New York.

- Cubbin, J. and Leech, D. (1983), 'The effect of shareholding dispersion on the degree of control in British companies: Theory and evidence', *Economic Journal* **93**, 351-369.
- Demsetz, H. (1983), 'The structure of ownership and the theory of the firm', *Journal of Law and Economics* **26**, 375-390.
- Demsetz, H. and Lehn, K. (1985), 'The structure of corporate ownership: Causes and consequences', *Journal of Political Economy* **93**, 1155-1177.
- Diamond, D. (1984), 'Financial intermediation and delegated monitoring', *Review of Economic Studies* **51**, 393-414.
- Diamond, D. (1991), 'Monitoring and reputation: The choice between bank loans and directly placed debt', *Journal of Political Economy* **99**, 689-721.
- Edwards, J. and Fischer, K. (1994), *Banks, Finance, and Investment in Germany*. Cambridge University Press, Cambridge.
- Fama, E. and Jensen, M. (1983), 'Separation of ownership and control', *Journal of Law and Economics* **26**, 301-325.
- Fluck, Z. (1999), 'The dynamics of the management-shareholder conflict', *Review of Financial Studies* **12**, 379-404.
- Frankel, A. and Palmer, D. (1998), 'The management of financial risks at German nonfinancial firms: The case of Metallgesellschaft', in S. Black and M. Moersch, eds., *Competition and Convergence in Financial Markets: The German and Anglo-American Models, Advances in Finance, Investment and Banking*, vol. 5, Elsevier Science, North-Holland, Amsterdam, pp. 41-78.
- Franks, J. and Mayer, C. (1997), *Ownership, Control and the Performance of German Corporations, Paper presented at the Center for Financial Studies Conference*, November 19-20, Frankfurt a.M.
- Franks, J. and Mayer, C. (1998), 'Bank control, takeovers, and corporate governance in Germany', *Journal of Banking and Finance* **22**, 1385-1403.
- Gedajlovic, E. and Shapiro, D. (1998), 'Management and ownership effects: Evidence from five countries', *Strategic Management Journal* **19**, 533-553.
- Goergen, M. (1999), *Corporate Governance and Financial Performance*. Edward Elgar, Cheltenham.
- Gorton, G. and Schmid, F. (2000), 'Universal banking and the performance of German firms', *Journal of Financial Economics* **58**, forthcoming.
- Grossman, S. and Hart, O. (1980), 'Takeover bids, the free-rider problem and the theory of the corporation', *Bell Journal of Economics* **11**, 42-64.
- Hausman, J. A. (1978), 'Specification Tests in Econometrics', *Econometrica* **46**, 1251-1272.
- Hall, M. and Weiss, L. (1967), 'Firm size and profitability', *Review of Economics and Statistics* **47**, 319-331.
- Hart, O. (1983), 'The market mechanism as an incentive scheme', *Bell Journal of Economics* **14**, 366-382.
- Hellwig, M. (2000), 'On the economics and politics of corporate finance and corporate control', in Xavier Vives, ed., *Corporate Governance*, Cambridge University Press, Cambridge.
- Hopt, K., Kanda, H., Roe, M. J., Wymersch, E., and Prigge, S. (1998), *Comparative Corporate Governance: The State of the Art and Emerging Research*, Clarendon Press, Oxford.
- Hsiao, C. (1986), *Analysis of Panel Data*, Cambridge University Press, Cambridge.
- Hubbard, R. G. (1998), 'Capital-market imperfections and investment', *Journal of Economic Literature* **36**, 193-225.
- Huddart, S. (1993), 'The effects of a large shareholder on corporate value', *Management Science* **39**, 1407-1421.
- Jensen, M. C. (1986), 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Review* **76**, 323-329.
- Jensen, M. C. (1988), 'Takeovers: Their causes and consequences', *Journal of Economic Perspectives* **2**, 21-48.

- Jensen, M. C. (1993), 'The modern industrial revolution, exit, and the failure of internal control systems', *Journal of Finance* **48**, 831–880.
- Jensen, M. C. and Ruback, R. (1983), 'The market for corporate control: The scientific evidence', *Journal of Financial Economics* **11**, 5–50.
- Kaplan, S. (1994), 'Top executives, turnover, and firm performance in Germany', *Journal of Law, Economics, and Organization* **10**, 142–159.
- Lang, L. and Stulz, R. (1994), 'Tobin's q, corporate diversification, and firm performance', *Journal of Political Economy* **102**, 1248–1280.
- Leibenstein, H. (1966), 'Allocative efficiency vs. "X-Efficiency"', *American Economic Review* **56**, 392–415.
- Manne, H. G. (1965), 'Mergers and the market for corporate control', *Journal of Political Economy* **73**, 110–120.
- Mayer, C. (1992), Corporate finance, in P. Newman, M. Milgate and J. Eatwell, eds., *The New Palgrave Dictionary of Money & Finance*, New York.
- Mayer, C. (1996), 'Corporate governance, competition, and performance', *OECD Economic Studies* **27**, 7–34.
- Mayer, C. (1998), 'Financial systems and corporate governance: A review of the international evidence', *Journal of Institutional and Theoretical Economics* **154**, 144–165.
- Moerland, P. W. (1995), 'Corporate ownership and control structures: An international comparison', *Review of Industrial Organization* **10**, 443–464.
- OECD (1999), *Principles of Corporate Governance*, OECD, Paris.
- Pagano, M. and Röell, A. (1998), 'The choice of stock ownership structure: Agency costs, monitoring, and the decision to go public', *Quarterly Journal of Economics* **113**, 187–225.
- Perlitz, M. and Seger, F. (1994), 'The role of universal banks in German corporate governance', *Business and the Contemporary World* **4**.
- Porter, M. E. (1992), 'Capital disadvantage: America's failing capital investment system', *Harvard Business Review*, September–October, 65–82.
- Pound, J. (1995), 'The promise of the governed corporation', *Harvard Business Review*, March–April, pp. 89–98.
- Roe, M. (1994), *Strong Managers, Weak Owners: The Political Roots of American Corporate Finance*, Princeton: Princeton University Press.
- Schmidt, K. (1997), 'Managerial incentives and product market competition', *Review of Economic Studies* **64**, 191–213.
- Shin, H.-H. and Stulz, R. (1998), 'Are internal capital markets efficient?', *Quarterly Journal of Economics* **113**, 531–552.
- Shleifer, A. and Vishny, R. (1986), 'Large shareholders and corporate control', *Journal of Political Economy* **95**, 461–488.
- Shleifer, A. and Vishny, R. (1988), 'Management entrenchment: The case of manager-specific investment', *Journal of Financial Economics* **25**, 123–139.
- Shleifer, A. and Vishny, R. (1997), 'A survey of corporate governance', *Journal of Finance* **52**, 737–783.
- Short, H. (1994), 'Ownership, control, financial structure, and the performance of firms', *Journal of Economic Surveys* **8**, 203–249.
- Stiglitz, J. (1985), 'Credit markets and the control of capital', *Journal Money, Credit and Banking* **17**, 133–152.
- Stulz, R. (1988), 'Managerial control of voting rights: Financing policies and the market for corporate control', *Journal of Financial Economics* **20**, 25–54.
- Thompson, J. K. (1998), 'Shareholder value and the market for corporate control in OECD countries', *OECD Financial Market Trends* **69**, February, 15–37.
- Thonet, P. J. and Poengsen, O. (1979), 'Managerial control and economic performance in West Germany', *Journal of Industrial Economics* **28**, 23–37.

- Vives, X. (ed.) (2000), *Corporate Governance*, Cambridge University Press, Cambridge.
- Warner, J., Watts, R., and Wruck, K. (1988), 'Stock prices and top management changes', *Journal of Financial Economics* 20, 461–492.
- Weigand, J. (1999): Corporate Governance, Profitability, and Capital Structure, unpublished post-doctoral thesis (Habilitationsschrift), Nuernberg.
- Wenger, E. and Kaserer, C. (1998), 'The German system of corporate governance – A model that should not be imitated', in S. Black and M. Moersch, eds., *Competition and Convergence in Financial Markets: The German and Anglo-American Models*, Advances in Finance, Investment and Banking, vol. 5. Elsevier Science, North-Holland, Amsterdam.
- White, H. (1980), 'A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity', *Econometrica* 48, 817–838.
- Wu, D. (1972), 'Alternative tests of independence between stochastic regressors and disturbances', *Econometrica* 41, 733–750.

Copyright of European Finance Review is the property of Springer Science & Business Media B.V.. The copyright in an individual article may be maintained by the author in certain cases. Content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.