

New Evidence on Ownership Structures in Germany

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I. Introduction

Corporate ownership structures around the world are very diverse but there seem to be two distinct groups (*La Porta et al. (1999)*). In the Anglo-Saxon countries the majority of shares is widely held, whereas in continental Europe shares tend to be concentrated in the hands of a few large shareholders.¹ For Germany, empirical studies report large share blocks and cross-ownership of firms (*Adams (1994)*, *Wenger and Kaserer (1997)*, *Becht and Böhmer (1999)*).

The ownership structure of firms is an important element of corporate governance – the complex system of legal, institutional and market forces by which firms are governed (*Berle and Means (1932)*).² Economic theory suggests that large shareholders have the power and the incentives to monitor management and to press for value maximization (*Shleifer and Vishny (1986)*). On the other hand, when protection of minority shareholders is weak they might be exploited by large shareholders. The classical problem of corporate governance – the minimization of agency costs resulting from a separation of ownership and control (*Jensen and Meckling (1976: 328)*) – also depends on the type of the shareholders. Corporate shareholders have internal agency conflicts and might therefore be weak monitors (*von Thadden (1990)*). Likewise, pyra-

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¹ See *Prowse (1994)* and *Franks and Mayer ((1995))* for international comparisons.

² See *Short ((1994))* for a survey of empirical studies examining the effect of ownership structure on performance.

mid structures and cross-shareholdings might limit efficient monitoring of managers (*Bebchuk et al. (1998)*).

The empirical evidence for Germany on the relationship of ownership structure and shareholder value is limited and often contradicting.³ Descriptive evidence, however, on the German ownership structure is accumulating. *Böhmer (1998)* and *Becht and Böhmer (1999)* analyze the ownership structure of the listed *Aktiengesellschaft (AG)*,⁴ one form of a *Kapitalgesellschaft*,⁵ in detail but neglect non-listed firms. *Kammerath (1999)* provides valuable information on a much wider sample of all large German firms. *Beyer (1998)* focuses on pyramids and cross-shareholdings of German firms. But both studies neglect changes in the ownership structure over time.

New Questions

Ownership structures are not necessarily constant over time. If they change, this might have an effect on corporate governance which should be considered in any empirical study. When ownership structures change over time but are treated as being constant this will bias estimates.⁶ *Denis and Sarin (1999)* find for the US that changes in the ownership structure are closely linked to prior stock price performance and consecutive board changes.

Currently, we can identify several forces of change. *Institutional investors* have been increasing their participation in equity markets for two decades (*Blommestein (1998)*). *Deregulation* within the EU will free those investors from portfolio restrictions which could lead to a further increase in their investment activity. *Founder succession* – which is of particular importance in Germany (*Gerke et al. (1995)*) – could change the composition of shareholders significantly. Finally, *international competition* and current concentration on so-called ‘*core competencies*’ could cause firms to divest peripheral activities which in turn would result in ownership changes. Here causality is not totally clear. But the study of the time changes in the ownership structure may provide additional insights into causality.

³ See *Cable (1985)*, *Nibler (1995)*, *Seger (1997)* and *Gorton and Schmid (2000)*.

⁴ Public company with limited liability.

⁵ Company with limited liability which is generally run by managers who are not the single owners.

⁶ See *Himmelberg et al. (1999)* for formal evidence and an empirical example on this.

Purpose of the Study

The purpose of this study is to document the ownership structures of large German manufacturing firms. It tries to address several shortcomings of the previous German empirical literature: First, we include all types of firms in the legal form of a *Kapitalgesellschaft* in the analysis.⁷ We therefore have data on a large number of firms which are not listed on the stock exchange but are also likely to have agency conflicts. This increases sample size considerably. Second, we document the development of the ownership structures over the years 1993–1997 showing that they are not constant as often assumed. Third, we try to find the ultimate owners in complex ownership structures like pyramids. This is an essential approach when firms are governed through pyramids. Finally, we quantify cross-ownership and find that – contrary to the general perception – this issue is of minor relevance in the German manufacturing sector. However, our measure of cross-ownership represents only a lower bound.

The paper is organized as follows: Section II. discusses why the ownership structure of firms theoretically affects corporate governance and what measures of ownership structure are suitable in this context. Section III. describes the data source. Section IV. presents the results and discusses implications for the size of agency costs. Section V. concludes with some implications for future research in the field of corporate governance, in particular in Germany.

II. Measurement Concepts

Economic theory suggests that the ownership structure of enterprises affects their performance. In this chapter we discuss the role of different dimensions of ownership structure: size of share blocks, types of shareholders, pyramids and cross-ownership and suggest empirical measures of ownership structure which are based on economic theory. We begin with a short discussion of the type of the firm which is relevant for corporate governance analysis.

⁷ These are: the listed/non-listed public company with limited liability (AG), the limited partnership on shares (KGaA) and the private company with limited liability (GmbH).

1. Agency Conflicts and Ownership Structure

From the theoretical perspective, any firm with a separation of ownership and control should be included in a study on corporate governance (Jensen and Meckling (1976)). For Germany this means to focus on *Kapitalgesellschaften*⁸ because these firms, in contrast to partnerships and single proprietorships, generally are run by managers who only own small ownership stakes – if at all.⁹ There are two legal forms for a *Kapitalgesellschaft*: the GmbH¹⁰ (private company with limited liability) and the AG¹¹ (public company with limited liability).¹² Both will be considered in this study.

Various differences between both forms of a *Kapitalgesellschaft* might affect agency costs.¹³ In the GmbH owners can monitor their managers much more closely than in the AG.¹⁴ Hence agency costs might be lower in the GmbH. But shares of an AG are easier to trade than shares of a GmbH, especially when the AG is listed on the stock exchange. This makes monitoring by “exit” more attractive compared to monitoring by “voice” as in the GmbH. The threat of exit also can put management under pressure (Steiger (2000)). But new capital is easier to raise by a listed AG in the stock market. Wealth of shareholders puts a constraint on this in the GmbH.¹⁵ In this case, higher agency costs resulting from a dispersed shareholder base might be incurred by a listed AG for the benefit of better risk diversification of shareholders.

Of course, ownership structure is only one element in the corporate governance system.¹⁶ And the choice of the legal form might be determined by other factors besides agency costs.¹⁷ Even causality between ownership structure and firm performance is not clear (Börsch-Supan and Köke

⁸ Firm in a corporate form with limited liability of the owners.

⁹ There is no agency problem only when a firm is 100 percent owned by a single shareholder who is at the same time the only manager. He also must be an individual. This issue will be discussed in detail below.

¹⁰ Gesellschaft mit beschränkter Haftung (GmbH).

¹¹ Aktiengesellschaft (AG).

¹² Two other legal forms are of minor importance: the GmbH & Co. KG (a mixture of a partnership and a Kapitalgesellschaft) and the KGaA (a partnership that emitted tradable shares).

¹³ See Steiner (1998) on the benefits and costs of different legal forms.

¹⁴ The general meeting of shareholders can give directions to the management in the GmbH.

¹⁵ See Bolton and von Thadden (1996) on the decision to go public and its implications for control.

¹⁶ See Shleifer and Vishny (1997) for an excellent survey on this system.

(2000)). But for Germany little is known in particular on ownership structures of GmbHs and non-listed AGs although these firms, if they are large, are also likely to have a separation of ownership and control.

2. Size of Share Blocks

Shleifer and Vishny (1986) use the size of the largest share block as a measure of ownership. They argue that only in the presence of a large minority shareholder can takeovers be an effective disciplining device.¹⁸ When all shares are dispersed initially, free-riding of small shareholders will make any takeover attempt unattractive (*Grossman and Hart* (1980)). But concentration of shares also has costs. *Demsetz and Lehn* argue (1985) that large shareholders are typically not diversified and hence bear excessive risk. A growing literature discusses expropriation of small minority shareholders by a large shareholder. Large owners who are also the managers can have full control over the firm's assets but do not share in all the costs they generate. If they are wealthy enough they might prefer private benefits to the maximization of firm value.¹⁹ Our preferred measure of the voting power of the largest shareholder is the size of the largest share block (C_1).²⁰ However, we calculate some additional measures: the combined stake of the two and three largest shareholders (C_2 and C_3 respectively) to get an idea of the upper distribution of the ownership structure. Second, we use an approximation of the Herfindahl index to measure absolute concentration of shares and to allow for comparison with other studies.²¹ Third, we calculate a measure of the voting power of the largest shareholder as suggested by *Cubbin and Leech* (1983).²² It approximates the probability that the largest share-

¹⁷ For example, worker participation in the supervisory board (*Aufsichtsrat*) probably influences the choice between the two legal forms but also agency costs because the supervisory board is an important internal monitoring institution in German companies (*Hopt* (1998)). Taxes and liability play no role in this decision because they are identical for all forms of the *Kapitalgesellschaft*. Disclosure requirements depend on firm size. But most firms covered in this analysis are large.

¹⁸ See *Franks and Mayer* (1994) who find that large shareholders are associated with higher turnover of directors in Germany.

¹⁹ See *Morck et al.* (1988) for empirical evidence for the US.

²⁰ This is a valid proxy when the largest shareholder holds more than 50 percent of the shares in most firms.

²¹ This is a lower bound of concentration because we do not have data on all shareholders (e.g. dispersed shares).

²² When the largest share block C_1 is over 50 percent (as is the case here), the difference between absolute and relative measures of concentration is negligible (*Feuerstack* (1999)).

holder can win a vote given that small shareholders might oppose.²³ Definitions of all measures are summarized in the appendix.

3. Type of Shareholders

A second dimension of ownership structure is the type of shareholders. In the center of corporate governance analysis stands the distinction between dispersed and concentrated shareholdings. Although dispersion of shares is a matter of size of share blocks as discussed above, we treat *dispersed shares* as one type of shareholder. It is calculated as the residual from the other five shareholder categories.²⁴

Individuals can be good monitors in comparison to corporate shareholders because they do not have any internal agency conflicts. Corporate shareholders substitute one agency conflict for another (*von Thadden* (1990)). On the other hand, if individuals own a large block of shares in one firm their wealth portfolio will generally be badly diversified. If this is the case they will be too risk-averse and favor too conservative investment decisions which are inefficient from the perspective of well-diversified shareholders.

The group of corporate shareholders is diverse. So is their monitoring behavior. For example, creditors as shareholders might force a company to forego good investment opportunities because they focus on the downside of the earnings distribution (*Myers* (1977)). Insurance companies or universal banks which have regular business relationships besides their investment are unlikely to oppose management (*Pound* (1988)). This also applies to non-financial firms as shareholders. Pension funds, on the contrary, with no business relationships in addition to their investment might be good monitors. But the merits of institutional investors are highly debated.²⁵ In the following we differentiate only between *financial* and *non-financial enterprises* because we have no consistent information on different types of financial enterprises.

²³ See *Leech and Leahy* (1991) for an application of this measure on British firms.

²⁴ Mostly, KSD explicitly states the fraction of dispersed shares. In a few cases ownership of shares does not add up to 100 percent. In these cases the rest was also treated as dispersed shares.

²⁵ See *Black* (1997), *Karpoff* (1998) and *del Guercio and Hawkins* (1999) for recent surveys on institutional investor activism. See *Black* (1992) and *Blair* (1995) on the theoretical merits of this class of investors. See *Porter* (1992) for critical arguments.

Another type of shareholder is the *state*. *Shapiro* and *Willig* (1990) show that firms governed by bureaucrats should perform better under private management because bureaucrats lack the incentives to maximize shareholder value.

Finally, *foreigners* might exhibit a different control behavior from domestic investors. For example, institutional investors especially from the United States and Great Britain are very active shareholders (*Smith* 1996, *Carleton et al.* (1998)). Combined with their growing importance as a shareholder group (*Blommestein* (1998)) this makes a separate category for those shareholders desirable.²⁶

In sum, we look at six different types of shareholders: dispersed shares, individuals, non-financial enterprises, financial enterprises, the state and foreigners.

4. Pyramids and Cross-Ownership

Third, we look at the vertical dimension of the shareholder structure. We consider several levels of ownership. In Germany, pyramids and cross-ownership are the most important ownership characteristics.²⁷

a) Pyramids

In this pyramid firm A is controlled by firm B whereas firm B is controlled by firm C, the ultimate owner. We define the *ultimate owner* as the shareholder who has full control over a firm (either direct through a share of over 50 percent or indirect through a control chain as depicted in Figure 1) and is himself not controlled by another majority shareholder.²⁸ We define a *pyramid* as a control structure by which an ulti-

²⁶ The term “foreigners” here and in the following refers to corporate foreigners only, both financial and non-financial. Data do not allow to consistently distinguish between these two foreign types of corporates.

²⁷ *La Porta et al.* (1999) document that pyramids are a worldwide phenomenon. On cross-shareholdings in Germany see *Adams* (1994), *Beyer* (1998) and *Kammerath* (1999).

²⁸ A majority of 50 percent does not guarantee ongoing control. A majority of 75 percent is required to exchange management during its period of office (§ 103 (1) AktG) or to incorporate a firm into the own firm (§§ 2 ff. UmwG). But a 50 percent majority is sufficient to dismiss management after their regular period of office. A share much lower than 50 percent can be sufficient when the rest of the shares is dispersed or when the corporate charter limits the voting rights of minority shareholders. Without more detailed information 50 percent is the best proxy available.

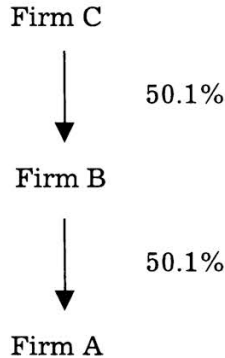


Figure 1: Pyramid of Owners

mate owner controls another firm through a control chain of over 50 percent at each level with at least one intermediate firm.²⁹

This kind of ownership structure can generate agency costs. First, control might be diluted within high pyramids when transaction costs affect the flow of information. Second, pyramids can serve large shareholders as a control device to expropriate minority shareholders. *Grossman and Hart* (1988) and *Harris and Raviv* (1988) argue that pyramids generate a departure from the one-share-one-vote scheme. Large shareholders can divert cash flow to themselves rather than pay it out to all shareholders. On the other hand, if we assume that cash flow is paid out to investors according to their voting rights, the ultimate shareholder in a pyramid might receive less cash flow than would be expected according to his actual voting power. To give an example, firm C in Figure 1 controls firm A but receives only a minority share of cash flow ($50.1\% \times 50.1\% = 25.1\%$). This could weaken its incentive to control firm A efficiently (*Bebchuk et al.* (1998)).³⁰ In sum, we use three measures to characterize pyramids: first, the level of ultimate control. Second, the measure proposed by *Bebchuk et al.* (1998):

$$\alpha = \prod_{i=1}^N P_i^2$$

²⁹ *La Porta et al.* (1999) use a share size of 10 percent and 20 percent at each level for 27 countries, *Renneboog* (1996) share sizes of 25 percent, 50 percent and 75 percent for Belgium.

³⁰ Full control over cash flow requires a majority of 75 percent (§§ 2 ff. UmwG). But when dividends are paid out relative to share size, share size can be used as a proxy for cash flow rights.

whereby P_i is the controlling share on level i , the share $P_i > 50\%$ and N is the ultimate level of control. Third, in order to see if there is a separation of cash flow and control as argued above we calculate the ratio of cash flow rights of the ultimate owner (the measure α) to the size of the largest share block (C_1) on the first level of the pyramid.³¹

b) Cross-Ownership

Cross-ownership which is regularly discussed as a typical feature of the German ownership structure (e.g. *Wenger and Kaserer (1997)*, *Beyer (1998)*) can generate so-called “insider-systems” (*Franks and Mayer (1995)*). These systems are characterized by a lack of control by outside investors. Insiders such as managers might not be held accountable because the firm is either widely-held or has large owners which are themselves partially owned by the firm in consideration. These two-way share linkages could hinder efficient monitoring.

We define a firm as part of an *insider-system* if it directly or indirectly owns some fraction of its own shares. We further define a firm as *controlled by an insider-system* if its ultimate shareholder is part of an insider-system. Our measure of an insider-system is the degree of *cross-ownership*: the cumulated fraction of shares a particular firm owns in itself. If cross-ownership is greater than zero we say that the particular firm is part of an insider-system. Figure 2 graphically illustrates an insider-system:

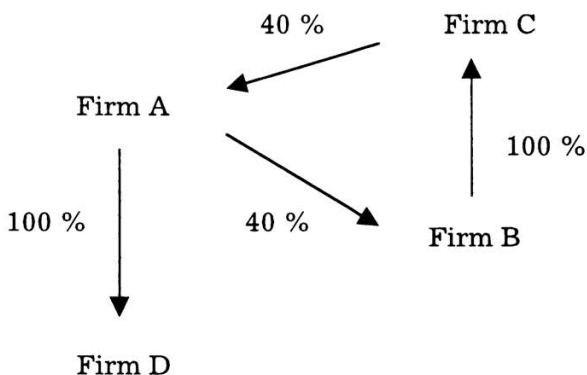


Figure 2: Cross-Ownership

³¹ The share size on the first level is used as a proxy for the extent of control as desired by the ultimate owner.

In Figure 2 firm A holds 40 percent of the shares in firm B which in turn holds 100 percent of the shares in firm C, and firm C holds 40 percent of the shares in firm A. Therefore firm A (as well as firms B and C) is part of an insider-system because it owns 16 percent of its own shares, the degree of cross-ownership. Furthermore, firm D which is fully controlled by firm A is controlled by an insider-system because its ultimate shareholder, firm A, is part of an insider-system. Note that – in contrast to *Franks and Mayer* (1995) – we do not require that all firms in an insider-system hold shares of at least 50 percent in each other. Thus our definition of an insider-system is broader. The reason is that firms can use many other instruments to immunize themselves from the control of outsiders, e.g. by multiple voting rights or caps on voting rights which are not reflected in the ownership structure of shares.

All definitions and measurement concepts of ownership structure discussed so far are summarized in the appendix.

III. Data

Firm-level data on ownership structures are obtained from the *Konzernstrukturdatenbank* (KSD), a commercially available database.³² KSD has been available since 1994. Each year four updates are released on CD-ROM. The data are typically reported with a time lag of one year. The 2/98 update, for example, gives ownership data for the year 1997. It contains 38,788 observations on German banks, insurance companies, non-financial companies, holding companies, investment trusts,³³ foundations, government authorities and individuals. Further details can be found in *Köke* (1999).

As can be seen from Table 1, more than 23,200 firms in KSD are run in the legal form of a *Kapitalgesellschaft*.³⁴ About 15,600 observations relate to partnerships, households, municipalities etc. which are not the subject of this study. Compared with the number of all total German firms, KSD covers firms in the legal form of the *Aktiengesellschaft* (AG) very well (almost 97 percent). But only a small part of all GmbHs (about 5 percent) is contained in KSD. However, as firm size increases (measured by sales) coverage of KSD improves also for GmbHs. For example,

³² *Company Structure Database* from Verlag Hoppenstedt GmbH in Darmstadt/Germany; see <http://www.hoppenstedt.de>.

³³ I.e. the German *Kapitalanlagegesellschaften*.

³⁴ These are: AG, GmbH, GmbH&Co.KG, KGaA.

Table 1
Descriptive Statistics on KSD (Update 2-1998)¹

	AG	GmbH ²	KGaA	other	total	Percent of all German firms ³
Number of firms in KSD	2,340	20,835	29	15,584	38,788	1.40
Percent of all German firms ³	96.89	5.04	n. a.	n. a.	1.40	–
Sales ≥ 1 million DM	1,380	7,363	15	1,201	9,959	1.91
Sales ≥ 10 million DM	1,246	6,680	15	1,018	8,959	13.90
Sales ≥ 100 million DM	893	2,695	13	456	4,057	64.60

Notes: ¹ Number of firms in KSD (update 2-1998) with ownership structures from the year 1997 relative to the number of all German firms.

² Including GmbH&Co.KG.

³ Number of firms in KSD relative to number of all German firms (by legal form and by sales class). Data on all German firms refer to the year 1996 and are taken from *Statistisches Bundesamt* (1999). KGaA is included in AG, no aggregate data are available for GmbH&Co.KG separately; therefore coverage ratios represent only a rough estimate.

Source: KSD update 2-1998; *Statistisches Bundesamt* (1999), VAT Statistic, Table VIIb; own calculations.

KSD contains about 64.4 percent of firms with sales higher than 100 million DM for the year 1997.³⁵

Coverage of listed firms is much better in KSD because information on publicly listed firms has been easier accessible by Hoppenstedt. Likewise, according to Hoppenstedt mostly large non-listed firms have recently been added to KSD. Smaller firms are only covered when they appear in the ownership chains of these large firms. But since this study aims to document ownership structures of large listed and non-listed firms, weaker coverage of small firms is not a problem here.

We collect data on five consecutive years (1993–1997) to get a better picture of the development of ownership structure over time. This is a new approach because most previous studies on Germany only analyze cross-sections of ownership data. We exclude all firms which are not a *Kapitalgesellschaft*. In addition, we focus on the manufacturing sector to allow comparisons with previous studies. After this selection procedure we obtain a sample of 5,788 observations for the years 1993–1997. About 95 percent of these firms are large in terms of German Trade Law

³⁵ This is only a lower bound estimate because many firms in KSD do not have sales data.

Table 2
Number of Firms by Year and Legal Form

Year	GmbH	AG		KGaA		All	
		total	thereof listed	total	thereof listed	total	thereof listed
1993	528	341	167	2	1	871	168
1994	576	361	175	2	1	939	176
1995	613	398	196	3	2	1014	198
1996	797	638	321	10	7	1445	328
1997	843	666	348	10	7	1519	355
Total	3357	2404	1207	27	18	5788	1225
Percent of all observations	58.00	41.53	20.85	0.47	0.31	100.00	21.16

Note: The following editions of KSD were used: 3-1994, 2-1995, 2-1996, 1-1997, 2-1998.

(HGB), i.e. have sales over 32 million DM and balance sheet total over 15.5 million DM.

The majority of firms has the legal form of GmbH (58 percent) and about half of the AGs are listed on a stock exchange. Overall, only 21 percent of all observations are listed firms. Thus – in contrast to previous German studies – we have data on a large amount of firms which are also likely to have principal-agent conflicts but are not run as an AG or are not listed.

IV. Results

Making use of the measurement concepts developed in section II. we now describe the ownership structure of large German manufacturing firms run as a *Kapitalgesellschaft*.

1. Size of Share Blocks

German shareholdings are highly concentrated in the hands of only very few shareholders. Table 3 shows the largest share block (C_1), the sum of the two largest share blocks (C_2), and the sum of the three largest share blocks (C_3) in the aggregate and by legal form.

Table 3
Size of Largest Share Blocks by Legal Form and Firm Size (1993-1997)¹

in percent	Largest block (C ₁)	Sum of two largest blocks (C ₂)	Sum of three largest blocks (C ₃)	Number of Observations ²
GmbH	88.39	94.66	95.64	3351
Non-Listed AG	82.79	89.89	91.09	1188
Listed AG	55.91	63.68	65.94	1151
Weighted Average ³	80.57	87.35	88.63	5712
Sales ≥ 1 million DM	79.27	86.02	87.30	4357
Sales ≥ 1 billion DM	68.86	78.54	80.56	1148
Sales ≥ 10 billion DM	53.86	63.21	66.33	171

Note: ¹ The measures by legal form could not be calculated for 76 observations because only dispersed shares were recorded for these. In addition, the measures by firm size could not be calculated for another 1320 observations because no sales data were available.

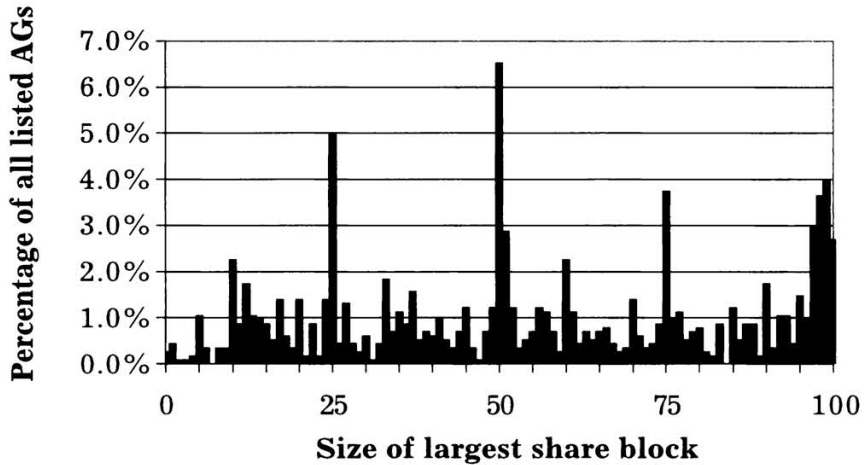
² The KGaA is not reported here as a separate category because the number of observations is only 22.

³ Including KGaA.

The upper part of Table 3 shows that during the years 1993–1997 the largest share was very high at 81 percent on average. Adding the shares of the second and third largest shareholder their combined holdings increases to almost 89 percent. Differentiating according to legal form shows that in the GmbH the average largest share is about 32 percentage points higher than in the listed AG. Comparing the listed with the non-listed AG we see that the average largest share in the listed AG is much lower than in the non-listed AG.

The lower part of Table 3 indicates that the size of the largest blocks is inversely related to firm size. Whereas the size of the largest share block is almost 80 percent in firms with more than 1 million DM of sales, it is still over 53 percent in firms with sales over 10 billion DM. Hence, even in the largest German manufacturing firms concentration of shares is very high. This becomes clear in a comparison with US enterprises but also with firms from other European countries.³⁶ Descriptive evidence

³⁶ The cumulated share of the three largest shareholders is: 42% in the US (*Becht (1997)*), 57.5% in Spain (*Crespi (1997)*), 31.4% in the Netherlands (*de Jong et al. (1997)*) and 89.8% in Italy (*Bianchi et al. (1997)*).



Note: Data for 1993–1997 on the listed AG.

Figure 3: Density Function of Largest Share Block (C_1)

can be found in *Becht* (1997) for the US, *Crespi* (1997) for Spain, *de Jong* et al. (1997) for the Netherlands and *Bianchi* et al. (1997) for Italy.³⁷

Due to the theoretical importance of the largest shareholder we choose the size of the largest block (C_1) for closer scrutiny. Figure 3 shows the density function of C_1 for the listed AG. In Germany specific shareholder rights are connected with specific block sizes. A share of 25 percent implies the right to veto proposed changes of the corporate charter. With a majority of 50 percent the shareholder can appoint and dismiss management³⁸ and with a supermajority of 75 percent this shareholder's decisions are not subject to veto by minority shareholders.³⁹ Figure 3 suggests that the size of the largest share is influenced by these legal rights. In other words, shareholders tend to buy that amount of shares which is necessary for control purposes.

³⁷ Evidence on other European countries see ECGN (1997).

³⁸ For regular elections of the board a 50 percent majority is required in the AG. For elections before the regular end of the period of office a 75 percent majority is required (§103 (1) AktG)

³⁹ Even smaller share sizes can provide a sufficient majority when the corporate charter contains voting right restrictions. However, they are illegal from the year 2000 on (WpHG).

Table 4
Cumulative Distribution of Largest Share Block (C₁)¹

in percent	GmbH	Non-Listed AG	Listed AG	Weighted Average ²
≥ 99% of shares	71.03	56.76	6.69	54.87
≥ 90% of shares	75.74	64.53	20.33	62.04
≥ 75% of shares	79.55	70.19	33.10	68.03
≥ 50% of shares	93.74	88.01	59.77	85.61
≥ 25% of shares	98.00	95.69	82.28	94.28
Number of Observations ³	3355	1151	1184	5712

Note: ¹ The measure could not be calculated for 76 observations because only dispersed shares were recorded for these.

² Including KGaA.

³ The KGaA is not reported here as a separate category because the number of observations is only 22.

Table 4 shows how many of the sample firms have a large shareholder and the size of the largest block. We see that in 55 percent of all firms the largest shareholder holds 99 percent or more of the shares. Thus the majority of firms is controlled by a single owner. From this perspective, agency problems resulting from expropriation of small shareholders through large shareholders are unlikely because most firms do not have any minority shareholders. In over 85 percent of the firms the largest shareholder owns 50 percent or more of the shares. Thus most firms have a large shareholder – which is very large in comparison with UK and US shareholders⁴⁰ – that could govern the firm efficiently. But the quality of monitoring also depends on the type of the largest shareholder.

Table 4 also shows that – on average – the largest shareholder is relatively small in the *listed* AG. In only 6.7 percent of the listed AGs he holds 99 percent of the shares or more, compared to 56.8 percent of the non-listed AGs and 71 percent of the GmbHs. Almost 60 percent of the firms listed on the stock exchange have a shareholder that holds 50 percent and more of the shares. The numbers for the non-listed AG and the GmbH are still higher: 88 percent and 93.7 percent respectively. From this perspective it seems reasonable to analyze primarily the listed AG because agency costs resulting from weak control by the dominant shareholder might be the highest here.

⁴⁰ See *Becht* (1997) for the US and *Franks and Mayer* (1994) for the UK.

Table 5
Ownership Concentration of Shares by Legal Form (1993–1997)

	GmbH	Non-Listed AG	Listed AG	Weighted average ¹
Herfindahl index of share concentration (0 = infinite number of shareholders, 1 = one shareholder)	0.856	0.769	0.403	0.741
Percent of observations with voting power index = 1 indicating high voting power of largest shareholder	85.25	80.79	62.30	79.35
Number of observations ²	3357	1197	1207	5788

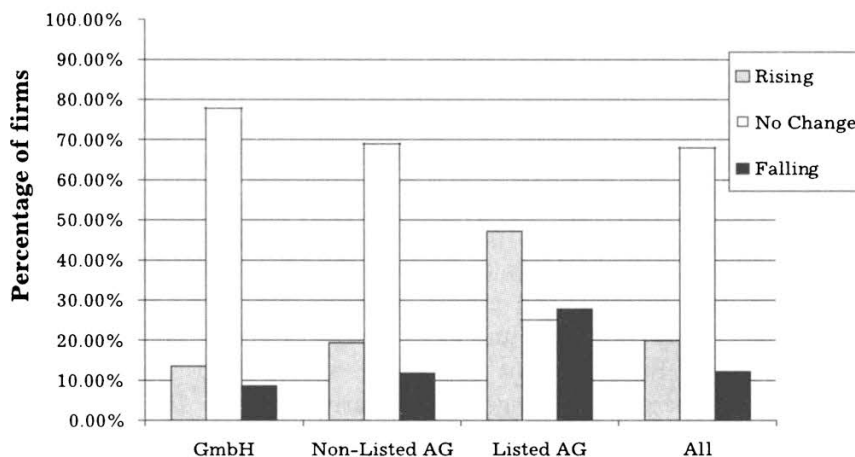
Note: ¹ Including KGaA.

² The KGaA is not reported here as a separate category because the number of observations is only 27.

Table 5 presents further evidence on concentration of shares. The Herfindahl index, theoretically ranging from zero (full dispersion) to one (full concentration in the hands of a single shareholder) indicates that concentration is high in GmbHs ($H = 0.856$) and non-listed AGs ($H = 0.769$). It is much lower in the listed AG ($H = 0.403$). The measure of voting power developed by *Cubbin* and *Leech* (1983) also indicates high concentration of shares: the largest shareholder is likely to decide a vote for himself in 62.3 percent of the listed AGs and over 80 percent in both types of unlisted firms.

Changes in Size of Share Blocks

Previous German studies neglect changes in the ownership structure. Figure 4 addresses this issue. It depicts the percentage of firms for which shareholder concentration increases, decreases or does not change over the years 1993–1997. Concentration is measured by the Herfindahl index; it rises in about 20 percent and falls in about 12 percent of firms, but it is constant in the large majority of firms (68.0 percent). From this perspective, the selection of a single year to describe the ownership structure of a firm – as not only previous German studies do – should



Note: Percentage of firms with increasing, decreasing or stable shareholder concentration over the years 1993–1997. Shareholder concentration is measured by the Herfindahl index. A firm is classified as having rising (falling) shareholder concentration if the geometric mean of the firm-specific growth rate of the Herfindahl index is greater (smaller) than zero. A mean growth rate equal to zero means stable shareholder concentration.

Figure 4: Changes in Shareholder Concentration (1993–1997)

not generate a significant bias because ownership structures seem fairly stable. However, when a distinction is made between GmbH and AG and between listed versus non-listed AGs the assumption of stable ownership structures cannot be maintained, particularly not for listed firms. Almost half of the firms being traded on the stock exchange exhibit increasing shareholder concentration over 1993–1997 (47.2 percent). This is a consequence of smaller shareholders selling out to the largest shareholders. At the same time, more than a quarter of listed firms show a decreasing concentration of shares (27.8 percent). Concentration of shares does not change in the majority of non-listed firms. Firm-specific concentration changes in 20–30 percent of these firms.

To check whether shareholder concentration increased also in the aggregate we compare the median annual growth rate of the Herfindahl index for firms with rising and falling concentration. The results (not tabled here) show that the (positive) median annual growth rate of the Herfindahl index is larger in firms with increasing shareholder concentration than the (negative) median annual growth rate in firms with decreasing shareholder concentration. Hence, more firms increase than decrease shareholder concentration (Figure 4), and the average increase is larger than the average decrease. Taken together this means that

aggregate shareholder concentration increases over the years 1993–1997. When differentiating by legal form we confirm this result for the GmbH and the non-listed AG. In case of the listed AG the result is ambiguous because more firms increase than decrease concentration but the absolute median annual growth rate of the Herfindahl index is larger for firms with decreasing concentration.

In sum, shareholder concentration is high for all types of firms. From this perspective, agency costs could be small due to the absence of a separation of ownership and control or good monitoring by the large shareholder. Ownership structure as measured by share concentration is fairly stable.⁴¹ But in about one third of the firms concentration increases or decreases. Changes particularly occur in the listed AG. Whether the neglect of changes in ownership structures produces a bias in empirical studies must be examined by further research.⁴²

2. Type of Shareholders

We next classify shareholders into the six groups defined in section II.3: dispersed shareholdings, individuals, non-financial firms, the state, financial enterprises and foreigners. During 1993–1997, on average, the largest group of shareholders were non-financial enterprises with a share of 65.1 percent (Table 6). Foreigners hold about 11 percent and individuals about 8 percent of outstanding shares. In contrast to the influential role assigned to banks in various studies on German corporate governance⁴³ stands their – on average – very low share of 1.9 percent. However, banks' voting power is potentially much greater due to the specific system of proxy voting, widespread membership of bankers on boards and their role as creditors.⁴⁴

Table 6 describes the aggregate shareholder structure, i.e. the fraction of shares which is owned by a particular type of shareholder. Most

⁴¹ Changes in the shareholder structure which do not lead to changes in share concentration are neglected here. We therefore estimate only a lower limit of all changes.

⁴² A bias would occur if the changes in the ownership structure were not random but would be caused by an exogenous variable which also influences performance measures.

⁴³ See for example *Nibler* (1995) and *Gorton and Schmid* (2000).

⁴⁴ See *Baums and Fraune* (1995) on banks' voting power through proxy votes and *Pfannschmidt* (1993) on personal interlockings. Taking into account these additional sources of bank influence *Edwards and Fischer* (1994) still reject the hypothesis of strong bank power in corporate governance.

Table 6
Shareholder Structure by Type and Legal Form: All Shares

in percent	GmbH	Non-Listed AG	Listed AG	Weighted Average ¹
1 Dispersed Shares	3.99	9.2	36.1	11.92
2 Individuals	4.00	15.39	10.79	7.85
3 Non-Financial Firms	75.57	62.63	39.55	65.14
4 State	3.04	2.11	1.04	2.41
5 Financial Enterprises	0.40	1.52	6.45	1.93
6 Foreigners	13.00	9.15	6.07	10.75
Total	100.00	100.00	100.00	100.00
Number of Observations ²	3357	1197	1207	5788

Notes: ¹ Including KGaA.

² The KGaA is not reported here as a separate category because the number of observations is only 27.

shares are held by non-financial firms in listed and non-listed firms. A relatively high fraction is dispersed in the listed AG, whereas dispersion is low in firms that did not go public. Dispersion of shares is of course a consequence of the decision to go public. The role of individuals as direct shareholders is small, looking at the fraction of all shares in their hands. They hold about 15.4 percent of the shares in the non-listed AG, 10.8 percent in the listed AG, and only 4 percent in the GmbH.

This aggregate shareholder structure does not necessarily reflect actual voting power of the individual types of shareholders. Therefore we also look at the type of the largest shareholder in each firm-year. Since the largest shareholder is not always large enough to dominate all decisions,⁴⁵ we additionally check whether the largest shareholder fulfills the voting power criterion of *Cubbin and Leech* (1983).⁴⁶ If the largest shareholder does not fulfill this criterion, the respective observation is grouped as dispersed shares.

More than 60 percent of the firms are governed by a large shareholder that is another non-financial firm (Table 7). These shareholders have not

⁴⁵ For example, the largest shareholder holds 51 percent, the second largest shareholder 49 percent. Then the position of the largest shareholder is much weaker compared to a 99 percent stake in his hands.

⁴⁶ See section IV.1.

Table 7
Shareholder Structure by Type¹ and Legal Form: Largest Share Block

in percent	GmbH	Non-Listed AG	Listed AG	Weighted Average ¹
1 Dispersed Shares	14.75	19.21	37.70	20.65
2 Individuals	2.83	11.78	10.60	6.39
3 Non-Financial Firms	67.92	58.81	41.18	60.25
4 State	2.80	1.59	0.83	2.13
5 Financial Enterprises	0.18	0.42	3.81	0.98
6 Foreigners	11.53	8.19	5.88	9.61
Total	100.00	100.00	100.00	100.00
Number of Observations ³	3357	1197	1207	5788

Notes: ¹ Type of largest shareholder that is classified as having voting power using the *Cubbin* and *Leech* (1983) index. All firms with no large shareholder (just dispersed shares) or those having no large shareholder with voting power using the *Cubbin* and *Leech* index are classified as "dispersed".

² Including KGaA.

³ The KGaA is not reported here as a separate category because the number of observations is only 27.

only large stakes. They also have high voting power due to the small size of other shareholders in their firms. About 20 percent of the firms can be classified as widely-held which is much more than indicated in Table 6. Foreigners dominate almost 10 percent of German manufacturing firms by vote, whereas individuals govern only about 6.4 percent of all firms. The state controls about 2 percent of all firms.

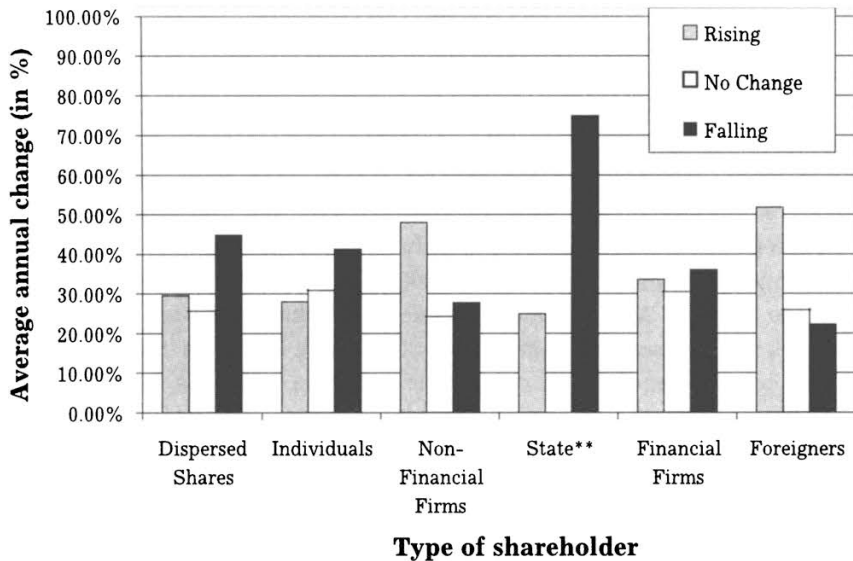
Looking at the three different forms of firms we see differences in the shareholder structure. 38 percent of the firms traded on the stock exchange are widely-held, but only 15 percent of the GmbHs and 19 percent of the non-listed AGs. Non-financial firms control 68 percent of GmbHs, almost 60 percent of non-listed AGs, and more than 41 percent of listed AGs. Surprising is the small role of financial enterprises: they govern only about 4 percent of listed AGs, and their influence is even smaller in non-listed firms. At first sight this contrasts with the belief that German banks or insurance companies are powerful shareholders. But this result is based only on voting power connected to ownership of shares. Since financial firms typically do not own the majority of shares in German manufacturing firms, they do not fulfill the criteria of our concept of control to be counted as controlling shareholders.

In the aggregate, foreigners play a significant role as shareholders. But foreigners are controlling shareholders more frequently in GmbHs than

in listed AGs. This difference indicates that foreign investors prefer to invest in a GmbH rather than in a listed AG. Indeed, many of the foreign investments in GmbHs are 100 percent subsidiaries. Thus, full control seems to be important for a foreign direct investment in Germany.

Changes in Type of Shareholders

Figure 5 provides additional evidence on changes in the ownership structure. It depicts the changes in each shareholder category for the period 1993–1997. For example, given that non-financial firms own a share block in a firm, they do not change the size of this share block in only 25 percent of the cases. Rather, in 48 percent they increase the size of their block and decrease its size in 27.7 percent of the firms they are invested in. The state, in turn, changes the size of all its share blocks. Only non-financial firms and foreigners increase rather than decrease the size of their blocks.



Note: * Percentage of firms in which shareholder type x holds a share block larger than zero at least in one year during the period 1993–1997 and in which the mean annual change is different from zero. Depicted for the case of the listed AG. Excluded are firms that have over 50% of shares with no clearly identified type of shareholder and firms for which we do not have a continuous history of data without missing values.
 ** 0% have no change.

Figure 5: Change in the Share Held by Each Type of Shareholder (1993–1997)*

Table 8
Median Annual Change in Each Shareholder Category (1993–1997)¹

	Dispersed Shares	Individuals	Non-Financial Enterprises	State	Financial Enterprises	Foreigners
Rising	2.60	11.04	0.88	6.30	5.70	8.00
No Change	0.00	0.00	0.00	0.00	0.00	0.00
Falling	-1.05	-6.00	-8.60	-11.25	-2.50	-8.33
Number of Obs. ²	728	211	577	20	200	139

Note: ¹ Median annual change in firm-specific size of the share block held by shareholder type x. Excluded are firms that have over 50% of shares with no clearly identified type of shareholder and firms for which we do not have a continuous history of data without missing values.

² Data only for the listed AG.

Next we check whether the size of share blocks which change from one shareholder category to another is significant, or whether we just observe highly frequent changes of small blocks. Table 8 shows for the listed AG that the size of share blocks which change ownership category is quite large. For example, individuals that increase their share blocks during 1993–1997 do this by about 11 percent annually. The decrease is smaller in size with -6 percent annually. The median annual increase in the share blocks held by non-financial firms is comparatively low with 0.9 percent, whereas the decrease is rather high with -8.6 percent. Figure 5 and Table 8 also reflect recent privatization: the state decreased 75 percent of its share blocks and reduced their size by about -11.3 percent annually. Overall, we see that not only the frequency of ownership changes is high. Also the average size of blocks traded is large. These changes in the shareholder structure can also be found for the non-listed firms but the frequency of changes is lower. In turn, the magnitude of changes is higher.

What can be learned from this section is that non-financial enterprises are often the largest and the decisive shareholder. And there are differences in the shareholder structure between listed and non-listed firms. Differences can also be found among non-listed firms. Second, there is evidence of significant changes in the shareholder structure in terms of shareholder type even over the short period of five years. Third, these changes are not uniform over the three types of firms. Since ownership structure is not constant over time these changes in the ownership structure must enter empirical studies of corporate governance.

Table 9
Level of Ultimate Control

	1	2	3	4	5	6	Total
Number of Obs.	2527	1478	494	128	8	3	4638
Percent of Total	54.48	31.87	10.65	2.76	0.17	0.06	100.00

Note: Necessary condition for control is a share size of over 50% on each level in the control chain.

3. Pyramids and Cross-Ownership

The third characteristic of ownership structure besides the size and type of individual stakes is the location of control as defined in section II.4. Table 9 shows the level of ultimate control, i. e. the end of a continuous 50 percent-stake control chain.

a) Pyramids

In the majority of firms the ultimate owner is located on the first level of the ownership structure. This suggests that the agency problem resulting from dilution of control in the pyramid might be low. Only 13.6 percent of the firms are governed through a pyramid with at least three levels. Among the three types of firms the GmbH has the longest control chains. Out of the 633 observations with a level of ultimate control above 2 over 82 percent are in the form of the GmbH. This indicates that the GmbH is the preferred legal form to construct pyramids. It must be noted, however, that we probably underestimate the size of the pyramids because control chains are not always complete in KSD.

Table 10 examines who is this ultimately controlling shareholder. It shows the type of the largest shareholder with high voting power – both on the first level and the ultimate level.

As can be seen from Table 10, non-financial enterprises are the most important group of controlling shareholders on the first level and also on the ultimate level. In 60 percent of the firms the dominant shareholder on the first level is a non-financial firm. On the ultimate level, a non-financial firm is the ultimate shareholder in 42 percent of the cases. This means that a large part of German manufacturing firms ultimately is

Table 10

Ultimate Shareholder versus Dominant Shareholder on First Level by Type

in percent	Dispersed	Individuals	Non-Financial Enterprises	State	Financial Enterprises	Foreigners	Total
First level ¹	20.65	6.39	60.25	2.13	0.98	9.61	100.00
Ultimate level ²	27.79	9.95	41.59	3.09	0.74	16.84	100.00

Note: Number of observations is 5788.

¹ Dominant shareholder on first level by type as shown in Table 7.

² Ultimate shareholder classified according to voting power index as done in Table 7.

under full control of other non-financial firms, not under control of individuals as usually assumed in economic theory.⁴⁷

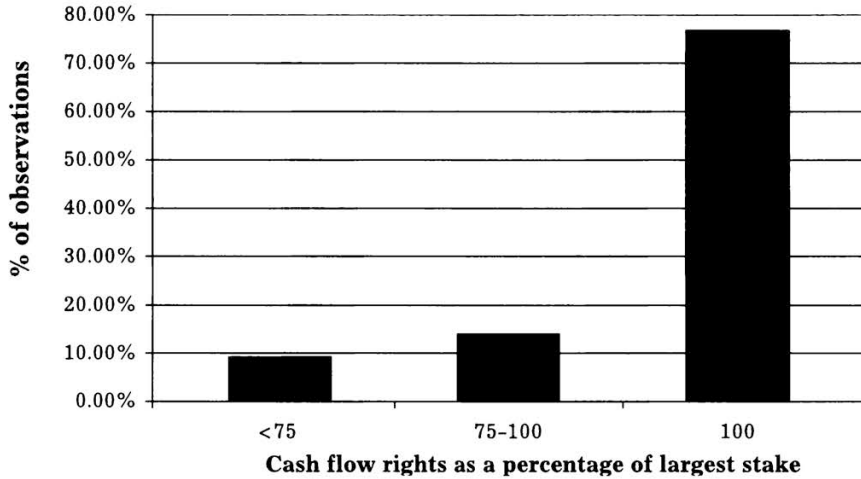
Cash flow rights of the ultimate shareholder can serve as an indicator of the size of another agency problem: the exploitation of minority shareholders by a majority shareholder. Calculation of the measure suggested by *Bebchuk et al. (1998)* shows that in 97.6 percent of the firms the ultimate shareholder receives over 50 percent of the cash flow. Only in 2.4 percent of the firms can he claim a minority fraction of cash flow. From this perspective, there is no problem of minority shareholder exploitation.

This result is strongly influenced by the very large size of individual stakes on each level. For example, for over 45 percent of all observations control is exercised by 100 percent stakes on all levels throughout the pyramid. This mirrors a preference for strict hierarchies in large firms. To see if there is a discrepancy between cash flow and control rights we correct for the share size on the first level.⁴⁸ Figure 6 shows the cash flow rights calculated as above as a percentage of the control rights on the first level of the pyramid.

In over 76 percent of all firms cash flow rights are identical with control rights (Figure 6). There is no agency problem in these firms as far as they are caused by a discrepancy of cash flow and control rights. But for about a quarter of all firms Figure 6 indicates a discrepancy of cash flow and control. For 10 percent of all firms there is a clear divergence of

⁴⁷ In pyramids, the importance of non-financial firms as decisive shareholders increases with the height of the pyramid.

⁴⁸ Share size on the first level is used as a proxy for the desired level of control (see section II.4.).



Note: Cash flow rights are calculated as the measure suggested by *Bebchuk et al.* (1998). The largest share block (C_1) is used as a proxy for (desired) control rights.

Figure 6: Cash Flow Rights as a Percentage of Control Rights in Pyramids

cash flow and control rights: cash flow rights (measured by the sum of squared ownership shares over all levels of ownership) are more than 25 percent lower than ownership rights (measured by the size of the largest block).⁴⁹ And almost 60 percent of the pyramids with no discrepancy of cash flow and control rights have non-financial institutions at their top which also could hinder efficient monitoring.

b) Cross-Ownership

To check whether the firms in our sample are part of an insider-system we calculate their degree of cross-ownership as defined in section II.4. For the year 1997 we find that out of 1519 firms only 19 are part of an insider-system as the degree of cross-ownership is larger than zero. This is equal to 1.3 percent of all sample firms. Mostly these firms directly own their shares. This is likely to be a result of share buybacks. The degree of cross-ownership is rather small with on average 10.2 percent.

⁴⁹ It must be kept in mind that only a majority of 75 percent guarantees full control over cash flow. But about 90 percent of the firms fulfill this criterion. For the other 10 percent of firms our measure is a proxy (see section II.4.).

Next we check whether these firms that are part of insider-systems are larger than the firms being not part of an insider-system. We calculate the ratio of output produced by firms controlled by insider-systems to output produced by all sample firms.⁵⁰ This ratio is 6.3 percent. For employment, the analogous ratio is 5.2 percent, for total assets 8.3 percent. Hence, size does make a difference: firms being part of insider-systems are much larger than firms not being part of insider-systems.

The next step is to analyze whether the ultimate shareholders of the 1519 firms under consideration (or the firms themselves if they have no ultimate shareholder) are part of an insider-system. This is a relevant question because firms under the ultimate control of insider-systems are sheltered from the control of outsiders. Only 57 (i.e. 3.8 percent) out of 1519 firms fulfill our criteria for insider-systems.

Again, we might underestimate the relevance of insider-systems by simply counting the number of insider-controlled firms. Therefore we calculate the ratio of output produced by insider-controlled firms to output produced by all sample firms.⁵¹ This ratio is 8.9 percent. For employment, the analogous ratio is 6.2 percent, for total assets 10.4 percent. Again, size does make a difference: firms controlled by insider-systems or firms not having an ultimately controlling shareholder but themselves being part of insider-systems are larger than other firms. The average degree of cross-ownership is only 5 percent. This, however, is a result of long loops of cross-shareholdings as Figure 7 illustrates. In the example of Figure 7 all firms hold a share of 10 percent in each other. But the degree of cross-shareholdings shrinks with the length of the loop. Therefore and because the length of the loop is an interesting characteristic of insider-systems by itself, Table 11 shows the degree of cross-ownership by length of loop.

Table 11 broadly confirms that the degree of cross-ownership as defined in section II.4. shrinks with the length of the loop. We see that six firms hold own shares directly, eight firms do so over one intermediate firm. In some cases the length of the loop is very long. These loops correspond to the well-known figures presented by *Adams* (1994). But in

⁵⁰ Due to missing financial data for 251 firms this measure is based on 1268 firms only. This does not appear to cause a systematic bias: the number of firms controlled by insider-systems to all firms changes only slightly.

⁵¹ Again, due to missing financial data for 251 firms this measure is based on 1268 firms only. And again, this does not appear to cause a systematic bias in the ratio of firms controlled by insider-systems to all sample firms.

Length of Loop = 2
Degree of Cross- Ownership = 1%

Length of Loop = 4
Degree of Cross- Ownership = 0.01%

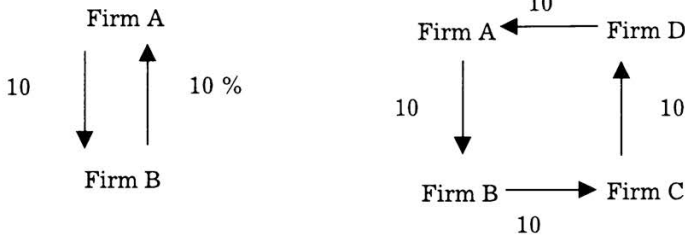


Figure 7: Length of Loop in Cross-Shareholdings

Table 11

Cross-Ownership by Length of Loop¹

Length of Loop	Number of Firms	Degree of Cross-Ownership ²
own shares	6	14.19
2	8	14.98
4	23	0.18
6	1	0.27
9	9	7.69
25	10	1.05
Total	57	Weighted Average: 5.07

Note: ¹ Length of loop is defined as the number of firms over which a firm holds shares in itself.
² Degree of cross-ownership is defined as the size of the share a firm ultimately holds in itself. It is calculated by multiplying the share sizes throughout each loop and then adding the results over all loops of a particular firm.

most cases the web of cross-shareholdings is small in terms of the number of firms involved.

As a surprising result we find that cross-ownership is of minor relevance when we look at the absolute number of firms which are controlled by insider-systems. This strongly contrasts with the popular view that corporate Germany is marked by dense webs of cross-ownership of firms. But once we correct for firms size the relevance of cross-ownership increases significantly: firms controlled by insider-systems are larger in terms of sales, total assets and employment than firms not

being controlled by an insider-system. But even after correction for firm size the phenomenon of cross-ownership seems to be of minor relevance in Germany.

Two factors are likely to influence this result. First, note that this study covers only the manufacturing sector. Other sectors of the German economy, in particular the financial service industry, is known to be more concentrated and characterized by cross-shareholdings (*Monopolkommission* (1998: 193)). Second, our concept of control requires a continuous ownership chain with at least 50 percent share stakes at each level. Assume, for example, shareholder B owns less than 50 percent in company A, but company A has no other large shareholder. Then shareholder B effectively is the owner with ultimate control over A.⁵² In this case our measure underestimates the true relevance of cross-ownership in Germany. Hence, our results represent a lower bound on the relevance of cross-ownership.

Another lesson from this section is that pyramids are a relevant phenomenon in Germany, but only a minority of firms is controlled through pyramids of three and more levels of ownership. A separation of cash flow and control cannot be found for the large majority of firms. As a result, agency costs are not likely to be caused by pyramids. However, if non-financial firms were weak monitors, this would drive agency costs especially in pyramids because non-financial firms usually are located at each level and because over 40 percent of the ultimate shareholders are non-financial firms.

V. Conclusions

This study documents the ownership structure of large German manufacturing firms as an important element of corporate governance. It addresses several shortcomings of the previous German empirical literature.

First, in principle, all types of firms in the legal form of the *Kapitalgesellschaft* have agency conflicts resulting from the separation of ownership and control (*Jensen and Meckling* (1976)). We therefore analyze a large sample of listed and non-listed firms with different legal forms. The results show that German shareholdings are highly concentrated in the hands of a few large shareholders. The average size of the largest share block is 81 percent during 1993–1997. A comparison between

⁵² See section II.4.

listed and non-listed firms shows a lower but still high share concentration for the listed *Aktiengesellschaft* (AG): 60 percent of the AG firms have a shareholder that holds more than 50 percent of all shares. Concentration of share ownership decreases with firm size. But even in the largest firms the biggest shareholder owns, on average, over 53 percent of the shares. From this perspective the potential for agency conflicts is small.

Further analysis shows that in over 60 percent of the cases the largest shareholder is another non-financial enterprise. Therefore agency conflicts might arise because the controllers are plagued by internal agency conflicts (*von Thadden* (1990)). Again, this problem is the least severe for the listed AG.

The second shortcoming of previous analyses we address is the neglect of changes in the ownership structure over time. Ownership concentration is stable for most non-listed firms but only for 25 percent of listed firms. It increases in almost half of the AG firms from 1993–1997. In addition, the ownership structure by type exhibits significant changes. Therefore, ownership structure is not constant as commonly assumed. This is particularly true for the case of the listed AG.

Third, the analysis of higher levels of the ownership structure shows that the largest majority of firms is controlled from the first or second level. Only about 14 percent of the firms are governed through a pyramid with three or more levels. This suggests that agency costs resulting from a separation of cash flow and control (*Bebchuk et al.* (1998)) is probably irrelevant for most German firms. However, over 40 percent of the ultimate controllers are non-financial firms making agency costs in the sense of *von Thadden* (1990) likely.

Finally, cross-ownership does not seem to be wide-spread in the German manufacturing sector. The number of firms controlled by insider-systems is small. Size makes a difference here: firms controlled by insider-systems are much larger in terms of sales, total assets and employment. But even after correction for firm size the phenomenon of cross-ownership seems to be of minor relevance in Germany. In practice the influence of insider-systems might be much greater. Note that the concept of control used in this study is rather cautious. Therefore our results represent only a lower bound for cross-shareholdings in Germany. Keep also in mind that this study exclusively analyzes the German manufacturing sector. The intense discussion of cross-shareholdings in Germany primarily focuses on the financial service sector (*Adams* (1994)).

This study discovered some prospective avenues for future research. First, changes in the ownership structures should be analyzed in more detail. In this study we analyzed changes in the aggregate shareholder concentration and in the aggregate shareholder type. If changes in individual shareholders can be identified this will allow analyzing the market for ownership stakes. *Bethel et al. (1998)* and *Renneboog (2000)* document an active share market of friendly takeovers for the US and Belgium respectively. Especially in light of the lack of hostile takeovers in Germany (*Franks and Mayer (1993)*) this could be an important mechanism for corporate control. Second, the documented differences between listed and non-listed firms and the changes in ownership structures do not necessarily imply a bias in previous studies. For example, only when changes in the ownership structure indeed affect corporate performance after taking into account the endogeneity problem (*Börsch-Supan and Köke (2000)*), can the correctness of previous results be assessed. But this can only be achieved by an econometric analysis including all relevant mechanisms of corporate governance. Third, future research should experiment with other concepts of control, in particular with lower minimum thresholds in the ownership chains. This extension might significantly increase the relevance of cross-ownership.

Appendix: Characteristics of Ownership Structure

Measure	Definition of Measure	Theoretical Foundation
C1 (C2, C3)	Size of largest block (two/three largest blocks)	<i>Shleifer and Vishny (1986)</i>
Herfindahl Index	Herfindahl index $H = \sum_{i=1}^N P_i^2$ with P_i being the individual share	<i>Demsetz and Lehn (1985)</i>
Voting Power	Dummy = 1 if probability exceeds 95 % that largest shareholder will win a vote, 0 otherwise: $\alpha = \Phi \left(\frac{C_1}{\sqrt{(H - C_1^2)}} \right)$ with C_1 the largest share block, H the Herfindahl index, Φ the standard normal distribution function, and the critical value α_c taken from a standard normal distribution (e.g. for $\alpha = 0.05$). If $\alpha \geq \alpha_c$ the dummy will be 1.	<i>Cubbin and Leech (1983)</i>
Type	<ol style="list-style-type: none"> 1 Dispersed Shares 2 Individuals (Families, Partnerships, Managers) 3 Non-financial enterprises 4 State 5 Banks, insurance companies, mutual and investment funds 6 Foreigners (financial and non-financial firms, state) 	<i>Black (1992), Jensen and Meckling (1976), Pound (1988), Shapiro and Willig (1990), Stulz (1988), von Thadden (1990)</i>
Level of Ultimate Control	Level of the end of the control chain with a share of over 50% on each level of the pyramid	author's definition
Ultimate Owner	Shareholder who has full control over a firm (either directly through a share of over 50 % or indirectly through a pyramid with over 50 % majority control at each level) and itself is not controlled by any majority shareholder	author's definition

(Continued on page 288)

(Continued)

Measure	Definition of Measure	Theoretical Foundation
Pyramid: Cash Flow Rights	Cash flow rights of the ultimate shareholder in a pyramid: $\alpha = \prod_{i=1}^N p_i^2$ where $p_i > 50\%$	<i>Bebchuk et al. (1998), Grossman and Hart (1988), Harris and Raviv (1988)</i>
Pyramid: Discrepancy of Cash Flow and Control	Cash flow rights of the ultimate shareholder divided by the largest direct share (C_1) in the firm at the bottom of the pyramid: $\beta = \frac{\alpha}{C_1}$ where α is the cash flow rights of the ultimate owner	author's definition
Insider-system	A firm is part of an insider-system when it directly or indirectly owns some fraction of its own shares. A firm is controlled by an insider-system when its ultimate shareholder is an insider-system	author's definition
Cross-ownership	Size of share stake which a firm owns in itself – either directly or indirectly: $\alpha = \sum_{j=1}^J \prod_{i=1}^N p_i^2$ with $p_i > 1\%$, N the length of each ownership loop, and J the number of these loops.	author's definition

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Summary

New Evidence on Ownership Structures in Germany

This study documents the ownership structures of large listed and non-listed German manufacturing firms as an important element of corporate governance. We find that shares are concentrated in the hands of few large shareholders. This limits agency problems resulting from a separation of ownership and control. Also, pyramid structures and cross-ownership exist but are not as widespread as commonly assumed. However, mostly the largest shareholder is another non-financial enterprise giving rise to a different kind of agency problem. But significant variation in the corporate ownership structures suggest that there is an active market for large share stakes which could act as a control device. (JEL G32)

Zusammenfassung

Neue Erkenntnisse zu Eigentümerstrukturen in Deutschland

Diese Studie beschreibt die Eigentümerstrukturen bei großen deutschen, dem produzierenden Sektor zuzurechnenden Unternehmen mit und ohne Börsennotierung als ein wichtiges Element von Corporate Governance. Es wird gezeigt, daß sich die Unternehmensanteile oft in den Händen weniger Großaktionäre befinden. Dadurch werden die sich aus einer Trennung von Unternehmenseigentum und -führung ergebenden Vertretungsprobleme in Grenzen gehalten. Man trifft auch auf pyramidenförmige Strukturen und geschachtelte Eigentumsrechte, jedoch sind diese nicht so weit verbreitet, wie dies gemeinhin angenommen wird. In den meisten Fällen ist der größte Anteilseigner jedoch selbst ein nicht dem Finanzsektor zuzurechnendes Unternehmen, wodurch eine andere Art von Vertretungsproblemen entsteht. Aber signifikante Änderungen in den Eigentümerstrukturen der Unternehmen deuten auf einen aktiven Markt für große Aktienanteile hin, der als Kontrollmechanismus wirken könnte.

Résumé

Nouvelle évidence sur les structures de participation en Allemagne

Cette étude documente les structures de participation d'un grand nombre d'industries allemandes cotées et non cotées comme un élément important de la politique gouvernementale. Nous constatons que les actions sont aux mains de quelques gros actionnaires. Ceci limite les problèmes d'agence qui résultent de la séparation de participation et du contrôle. Des structures pyramidales et des participations croisées existent aussi, mais elles ne sont pas aussi répandues que ce qui est généralement assumé. Cependant, le plus souvent, le plus gros actionnaire est une autre entreprise non financière, soulevant une autre sorte de problème d'agence. Mais, des variations significatives dans les structures de participation suggèrent qu'il existe un marché actif pour de larges participations qui pourrait agir comme dispositif de contrôle.