Changes in Block Ownership in the London Stock Exchange

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ABSTRACT

We analyze the time-series distribution of large blockholders and managerial ownership in the UK over the last decade. We find a significant decrease in the size of block ownership of a large number of companies. We show that the increase in firm's size and risk and the decrease in performance explain a large proportion of this change. We also find that the dilution of ownership through new issues rather than sales of stakes are the main reasons for the decrease in management ownership and the holdings of pressure-resistant investors, such as fund managers and pension funds. Overall, our results are consistent with the contractual hypothesis as companies appear to consider ownership by different categories as substitute means of resolving agency conflicts.

JEL Classification: G30, G32, G34

Keywords: Corporate governance; Ownership structure; Managerial ownership

I.   INTRODUCTION

Share ownership by institutional investors has been in the centre of much debate, criticism and reviews. In theory, block ownership by institutional investors should prevent managers from pursuing their own interest at the expense of those of shareholders. This divergence of interest between managers and shareholders, referred to in the literature as the agency conflict, cannot be totally resolved by the market for corporate control (Jensen 1993), legal rules (e.g., Shleifer and Vishny, 1997) or by managerial holding (e.g., McConnell and Servaes, 1990, 1995).[1] Instead, some other additional mechanisms, such as block ownership by institutional investors, are likely to solve these agency problems (e.g., Agrawal and Knoeber, 1996) when their monitoring benefits outweigh the costs.

The empirical evidence provided to date on the effectiveness and efficiency of the monitoring role of blockholders is mixed. In an extensive survey on the monitoring role of blockholders, Holderness (2003) shows that, on average, blockholders own about 20% of US equities, and enjoy both the shared and the private benefits of control. In the UK, Faccio and Lasfer (2000) report that companies in which pension funds, the largest shareholder category, do not over-perform. However, most studies in the area are based on only one year data while the link between ownership and control is likely to be time-dependant. The purpose of this paper is to overcome this limitation and contribute to the previous literature by documenting the reasons for changes in the firms' ownership structure, assessing whether these changes are driven by changes in the firms' fundamental factors and whether companies have moved into a more appropriate optimal level of ownership structure in the late 1990s.

The answers to these questions are especially relevant for individual investors and policy-makers who rely on large blockholders to monitor companies. For example, in the UK, large investors, which are mainly institutional investors, are perceived as carrying a social responsibility of promoting good corporate governance in companies in which they hold shares (Cadbury, 1992). By virtue of their size, they are thought of as equipped with the power to govern by exercising their voting rights.

We identify separately the categories of blockholders reported in the financial statements of each company in the sample. These include insiders, fund managers, pension funds, banks, insurance companies, overseas investors, public companies, individuals and nominees. We classify these into four main categories: (i) Insiders, (ii) minority shareholders which include overseas investors, public companies, individuals and nominees, and we follow Brickley, Lease and Smith (1988, 1994) in classifying the remaining shareholders into (iii) pressure-resistant investors (fund managers and pension funds), and, (iv) pressure-sensitive shareholders (banks and insurance companies, because of potential commercial link with the company). We then analyse the determinants of the changes in ownership structure over the last decade and test the contractual hypothesis under which companies adopt an optimal ownership structure to minimize their potential agency costs.

We find a significant drop in block ownership over the 1993 and 1998 period. In particular, we show that the median ownership has decreased from 6.7 per cent to 3.6 per cent for managers, from 9.2 per cent to 7.8 per cent for pressure-resistant investors, from 7.3 per cent to 6.2 per cent for pressure-sensitive investors, and from 5.1 per cent

to 4.2 per cent for the remaining shareholders. We then attempt to explain the rationale behind this change. We find that the fundamental determinants of ownership structure have not changed. In both 1993 and 1998 periods, ownership structure can be explained by proxy variables that measure size, scope for discretionary spending and risk aversion. We also find a negative relationship between the ownership variables themselves, implying that in companies where, for example, pressure-resistant investors hold large stakes, managerial holding is low. These results suggest that companies adopt an optimal ownership structure that minimises agency conflict. The actual changes in holdings are negatively related to change in firm's size, risk and ownership of other categories of investors but positively related to firm performance. We also report that, consistent with Faccio and Lasfer (2000), large investors in the UK in the late 1990s are less likely to monitor despite the policy-makers' recommendations.

The rest of the paper is structured as follows. Section II provides a review of relevant literature on block ownership and UK institutional framework. Section III presents the data and methodology while Section IV presents the results and Section V concludes.

II.   BACKGROUND AND HYPOTHESES TESTED

Diamond (1984), Admati, Pfleiderer and Zechner (1994), Maug (1998) and Kahn and Winton (1998) provide the theoretical models to explain the context in which blockholders would be motivated to monitor managers. Shleifer and Vishny (1997) and Agrawal and Knoeber (1996) suggest that large investors, because of the relevance of the resources invested, have all the interest and the power to monitor companies. These theories assume that blockholders are one large, homogenous and rational group, while in fact, they are likely to face different monitoring costs and benefits and could themselves suffer from agency conflicts (e.g., Del Guercio and Hawkins, 1999). Previous studies also show that institutional blockholders vary greatly in size and in purpose, with different sets of obligations and pressures in place for each type (Charkham, 1995). Brickley, Lease and Smith (1988) note that institutional behaviour is not homogeneous as it depends on the sensitivity to managerial pressure. They classify institutions into two groups as "pressure-resistant" and "pressure-sensitive" institutions. Pressure-resistant institutions, which include mutual funds, foundations and public employer pension funds, are less subject to management influence and more likely to oppose managers. On the other hand, pressure-sensitive institutions, such as banks, insurance companies and trusts, have a current or potential business with the firm and are sensitive to pressures from the management to vote in their favour.

In the UK, although, financial institutions hold about 60 per cent of the London Stock Exchange, there is a debate as to whether they monitor (e.g., Mallin, 1997, Faccio and Lasfer, 2000, National Association of Pension Funds, 1996). Their monitoring role may be hindered by the lack of resources and time required to interfere with management decision-making; they become active only in the event of a real disaster (Financial Times, 22 June 2000). As in Brickley, Lease and Smith (1988) and Jarrell and Poulsen (1987), we test the hypothesis that firms with high institutional ownership are more likely to adopt value-increasing policies. As in Demsetz and Lehn

(1985) and Himmelberg *et al* (1999), we test for the optimal ownership structure under a contracting environment faced by the firm. Following Brickley *et al* (1988, 1994), we split shareholders, excluding managerial ownership which we identify separately, into pressure-resistant, pressure-sensitive and other investors. The former category includes fund managers, investment trusts, unit trusts and pension funds (excluding pension funds investing in their own company), i.e., investors who are expected to monitor actively companies in which they hold large stakes because of their size, objectives and investment styles and lack of commercial link with the firm. Failure to monitor will indicate that these investors are passive or are subject to agency costs themselves (e.g., Del Guercio and Hawkins, 1999). On the other hand, pressure-sensitive investors, i.e., investors with current or potential business relationship with the firm, are not likely to monitor because of the potential loss of commercial links with the firms. The remaining investors (overseas investors, nominees, individuals and public sector), are not expected to monitor because they are likely to be small and any monitoring activity will be costly and ineffective. We, thus, expect these different investors to be heterogeneous in their monitoring activities.

From a firm's perspective, we expect ownership structure to be optimal and to be determined in such a way as to minimise monitoring costs. Thus, for example, we expect managerial holding to be negatively related to the holdings of pressure-resistant investors, bondholder monitoring and scope for managerial discretionary spending. We account for liquidity that could also result in a negative relationship between managerial holding and blockholding.

III.   DATA AND METHODOLOGY

The sample consists of all non-financial companies listed in the London Stock Exchange in 1993 and in 1998. We started with 1360 UK non-financial companies. We exclude all companies with missing ownership and other data in 1993 and 1998. Our final sample includes 764 non-financial companies. We collect for each individual company manually ownership data from the London Stock Exchange Official Yearbook (the Yearbook),[2] and financial data from *Extel Financial* a database that reports all accounting and stock market data. The Yearbook provides the name of the shareholder and the shares held as a percentage of the ordinary capital of the company.[3] From June 1990, companies are legally required to disclose external interests equal to or greater than 3 per cent of their issued share capital. These relatively large holdings allow us to test directly the arguments of Admati *et al* (1994) and Diamond (1984) that the benefits of monitoring outweigh the costs.

The 1993-1998 period allows us to analyse the extent to which institutional monitoring has shifted over the last decade. In particular, the 1993 period marks the beginning of the increased emphasis on corporate governance issues with reports prepared by special task groups such as the Cadbury, Greenbury, Myners and Hampel Committees. Cadbury (1992) has specifically stressed the importance of financial institutions to encourage companies to adopt a more efficient corporate governance system, as contained in the *Code of Best Practice*. The report specifies that institutional investors are expected to make greater use of their voting rights, to seek contacts with companies at a senior executive level, to monitor the board and to bring about changes

in under-performing companies rather than dispose of their shares. In this paper we concentrate on the changes in the relationship between ownership and firm value over these two periods to see whether such recommendations are followed.

We define a number of observable variables that influence the optimal ownership structure. We extend the specifications used in previous studies (e.g., Demsetz and Lehn, 1985, Himmelberg *et al*, 1999) by including various explanatory variables to proxy for the scope of managerial discretion, the monitoring role of each type of blockholders, and to account for the UK institutional framework. Table 1 lists the variables, including those used only for robustness checks.

Ownership Structure: We define management ownership as the proportion of shares held by firm's managers that are members of the board. UK quoted companies are required to disclose in their financial statements the names of all the board members, and the proportion of shares held directly and indirectly (beneficial and non-beneficial) by executive and non-executive directors, even if the ownership stake is zero (Companies Act 1985). The officers who are not members of the board are only subject to the ordinary disclosure rules of 3% or above. This legal disclosure requirement meant that we had to define managerial ownership as ownership by members of the board of directors. Although this definition is consistent with that of Morck *et al* (1988) and Short and Keasey (1999), it differs from that of McConnell and Servaes (1990) and Holderness *et al* (1999) as we do not include shares owned by corporate officers not members of the board. The holdings of executive non-members of the board and employees are included in pressure-sensitive category.

We collect all other holdings above 3 per cent and classify them first into type of investor.[4] Each type of investor is then classified into pressure-resistant, pressure-sensitive and other.

Performance measures: We use four measures of performance, Tobin's Q, market-to-turnover, return on assets and one-year abnormal returns. As in previous studies (e.g., Himmelberg *et al*, 1999), we define Tobin's Q as the sum of the market value of equity and book value of debt over total assets. We test for the robustness of these results by using market value of equity *plus* total liabilities *over* total assets, market-to-book and one-year raw returns. The results are qualitatively similar.

Size: Firm size has also an ambiguous effect on the scope for managerial entrenchment and the monitoring role of investors. Jensen (1986) argues that larger companies are more likely to suffer from agency costs, which, in turn increases the desire for larger managerial ownership. However, because of the wealth constraint problem, managers cannot hold large stakes in large firms. Himmelberg et al (1999) argue that large firms might enjoy economies of scale in monitoring by top management and by rating agencies, leading to a lower managerial ownership. We use the log of firm market value, ln(mv), to measure size. We test for robustness of our results by using total assets and sales revenue.

Shareholders' risk aversion: Himmelberg *et al* (1999) argue that, since higher managerial ownership imply less portfolio diversification for managers, the optimal contract involves a trade off between diversification and incentive performance. They suggest a negative relationship between the firm's idiosyncratic risk and optimal managerial ownership. Other investors, on the other hand, are not likely to face similar wealth-constraint than managers. For example, fund managers allocate their assets in

such a way as their risk is diversified. Thus, for pressure-resistant or pressure-sensitive investors, the negative relationship between their holdings and the firm's risk profile is not likely to prevail. We use the standard deviation of 5-year monthly stock returns (*Sigma*) and the regression coefficient of 5-year stock return on the market index (*beta*) as proxy for volatility. As in Himmelberg *et al* (1999), we set missing value of *Sigma* (4 per cent of observations) equal to zero to maintain our sample size and include in the regressions a dummy variable *DSigma* equal to one when Sigma is not missing and zero otherwise.

Table 1
Description of variables

Variable	Description
Mgt	The total proportion of common equity held by mangers as a fraction of common equity outstanding
Pr	The total proportion of common equity held by pressure resistant investors. These include holdings of fund managers, investment trusts, unit trusts and pension funds
Ps	The total proportion of common equity held by pressure sensitive investors. These include holdings of assurance companies, insurance companies, banks, employees, industrial and commercial companies, parent companies, venture capital companies and charities, trusts and foundations.
Other	The total equity held by other investors such as individuals, nominee, overseas investors, public sector and joint holding by more than one type of institution.
Q	The ratio of the value of the firm (market value of equity *plus* book value of long-term debt *over* total assets.
M/T	The ratio of the market value of equity *over* turnover
ROA	The ratio of profit before interest and tax *over* total assets
AR	The performance of the share over the past year relative to the Financial Times All (FTA) Share index.
Ln(mv)	Log of year-end market value of equity
Sigma	The standard deviation of the returns on the share computed using 5-year monthly returns.
DSigma	A dummy variable equal to unity if the data required to estimate Sigma is available, zero otherwise. We set missing observations of Sigma to zero to maintain sample size and reduce the risk of sample selection bias and include this dummy variable to allow the intercept term to capture the mean of the Sigma for missing values.
Beta	The sensitivity of the share price to general market movement computed by regressing stock returns on market index using 5-year monthly returns.
RD/K	The ratio of R&D expenditure over tangible fixed assets
RDum	A dummy variable equal to unity if R&D data is available, zero otherwise (see definition of Dsigma).
I/K	The ratio of investments in tangible fixed assets (property and plant and machinery) over tangible fixed assets
K/S	The ratio of tangible fixed assets over turnover
Y/S	The ratio of operating income over turnover
Lev %	The ratio of long-term debt *over* the sum of long-term debt and market value of equity
Yield	The ratio of annual dividend over year-end share price

Scope for discretionary spending: Following Himmelberg *et al* (1999), we use the ratio of firm's tangible fixed assets-to-sales to measure the extent to which firms that have more observable fixed investment have lower agency costs because these investments are easy to monitor. We expect the higher the proportion of these investments, the lower the managerial ownership and the lower propensity of other categories of investors to monitor. Himmelberg *et al* (1999) also argue that there is a need to control for other firm's expenditures, which are discretionary, and less easily monitored. As in their study, we define the ratio of R&D over tangible fixed assets, R&D/K, we set missing values into 0 and construct a dummy variable, RDum, equal to one if the firm reports R&D spending, zero otherwise. We account for growth opportunities by using the firm's investment rate, the ratio of investments in tangible fixed assets over tangible fixed assets and we use the ratio of operating income to sales to measure the level of free-cash flow.

In addition to these variables we account for the power of shareholders and bondholders in reducing scope for discretionary spending by including dividend yield and leverage. We expect a negative relationship between yield and managerial ownership if managerial holding reduces the free cash flow problem and the level of monitoring by say, pressure-resistant investors to be reduced if the firm is already paying high dividends. The impact of leverage on the scope for moral hazard is ambiguous. Harris and Raviv (1988) and Stulz (1988) argue that managers may tend to increase leverage in order to inflate the voting power of their shareholdings, and reduce the discipline of the market for corporate control. In contrast, Fama (1980) and Jensen (1986) argue that, since managers may tend to protect their under-diversified wealth, including human capital and reduce the pressures to pay out a large amount of cash, they may limit the use of debt. We lag our control variables to account for endogeneity between firm value and managerial ownership, and to avoid that our results reflect a spurious relationship between ownership and performance, we include industry dummies to control for unobservable firm characteristics.

IV.   EMPIRICAL RESULTS

A.   Changes in Ownership Structure

Table 2 shows the descriptive statistics of the ownership structure variables over the sample periods. Table 2, Panel A, reports the proportion of shares owned by each category of investors. As expected, financial institutions are the largest blockholders. However, the striking results are the changes from 1993 to 1998. The results indicate a significant decrease in share ownership in the late 1990s for all shareholder categories. For example, while managerial holdings amount to 16 per cent in 1993, they decreased to 13 per cent in 1998. To account for non-linearity in the holdings, we report also the median values. The median managerial ownership decreased from 6.7 per cent to 3.6 per cent. The differences in means and in medians are all statistically significant, as reported in the last column of Table 2. The only exception relates to financial companies. Their average holdings decreased from 22.1 per cent to 21.4 per cent but the differences in means and medians are not statistically significant. We find the same results using value of ownership (Panel B).

Table 2
Descriptive statistics of ownership structure in 1993 and 1998

The last column indicates the p-value of the t-statistics of the differences in means between 1993 and 1998 (p-t-stat) and the Mann Whitney p-value for differences in medians (MW).

Variable	Mean	Median	Minimum	Maximum	p-t-stat MW
Panel A. Percentage Ownership %					
Managerial 1993	16.1	6.7	0	80.9	0.007
Managerial 1998	13.3	3.6	0	96.0	0.002
Financial Companies 1993	22.1	19.4	0	84.1	0.385
Financial Companies 1998	21.4	18.8	0	78.8	0.309
Pressure Resistant 1993	12.5	9.2	0	72.8	0.582
Pressure Resistant 1998	12.1	7.8	0	78.0	0.068
Pressure Sensitive 1993	10.9	7.3	0	61.8	0.006
Pressure Sensitive 1998	9.3	6.2	0	70.3	0.004
Other 1993	13.0	5.1	0	100.0	0.078
Other 1998	11.3	4.2	0	100.0	0.001
Panel B. Real British Pound Ownership (£m)					
Managerial 1993	17.7	1.5	0	2,670	0.250
Managerial 1998	12.1	0.6	0	859	0.001
Financial Companies 1993	69.1	10.2	0	3,226	0.924
Financial Companies 1998	68.1	9.2	0	2,313	0.040
Pressure Resistant 1993	30.5	4.5	0	1,263	0.782
Pressure Resistant 1998	32.3	2.2	0	1,988	0.000
Pressure Sensitive 1993	30.4	3.6	0	1,087	0.258
Pressure Sensitive 1998	24.9	2.0	0	2,198	0.006
Other 1993	61.0	1.2	0	10,661	0.946
Other 1998	63.7	0.7	0	26,602	0.013

Why did companies change their ownership structure? Are these changes driven by changes in the fundamental determinants of ownership structure? Have companies moved into a more appropriate optimal level of ownership structure in the late 1990s? In the remaining sections we investigate reasons for these observed changes in ownership structures of our sample firms. We contrast the determinants of ownership structures over the two sample periods. We then relate changes in ownership structure to changes in the explanatory variables to see whether these changes are consistent with the firm's changes in the contracting variables.

Table 3
Financial characteristics of the sample firms

Variable	Mean	Median	Minimum	Maximum
Panel A. 1993 Data				
Market value (£m)	531	53	0	24,380
Total assets (£m)	652	53	0	69,135
Total Debt (£m)	131	7	0	8,023
Long-term loan (£m)	95	2	0	7,865
Tobin's Q	1.36	1.06	0.00	23.23
Market-to-turnover	2.78	0.88	0.01	341.12
Return on assets %	7.8	9.0	-140.0	67.2
Annual abnormal returns	8.74	2.95	-85.7	221.0
Sigma %	34.2	30.1	0	217.4
Beta	0.85	0.88	0	2.05
RD/K %	6.6	0	0	910.0
I/K %	25.3	20.6	0	221.1
K/S %	52.1	23.4	0	684
Y/S %	2.32	7.1	-2230	820
Yield %	2.7	2.6	0	121.1
Lev %	10.6	5.9	0	100
Panel B. 1998 data				
Market value (£m)	1,084	55	0	144,104
Total assets (£m)	957	79	0	114,550
Total Debt (£m)	220	14	0	13,755
Long-term loan (£m)	172	7	0	10,918
Tobin's Q	1.19	0.89	0.15	23.30
Market-to-turnover	1.34	0.70	0.08	49.84
Return on assets %	6.1	9.2	-264.7	56.0
Annual abnormal returns	-22.7	-26.3	-123.3	384.7
Sigma	39.2	35.2	0	120.5
Beta	0.86	0.92	0	1.2
RD/K %	4.4	0	0	488.5
I/K %	21.0	16.8	0	161.5
K/S %	54.5	25.0	0	937.4
Y/S %	7.2	7.6	-620.0	153.0
Yield %	3.9	3.6	0	40.4
Lev %	16.7	12.6	0	92.0

B.   Financial Characteristics of Our Sample Firms

Table 3 reports the descriptive statistics for the financial variables. In Panel A we report the 1993 values and in Panel B the 1998 values. We use two measures of size. In terms of market value, the average size of our sample firms in 1993 is £531m compared to £1,084m in 1998. Our sample includes in both sample periods small (less than £1m) and large companies (more than £144bn in 1998).[5] The difference in means between the two periods is significant ($t = -2.11$). However, the difference in medians is not statically significant and, when we use total assets as a proxy for size, the difference in

means is also not significant, suggesting that our sample firms did not increase in size over the two sample periods.

The two measures of debts both indicate that our sample firms have increased their debt financing over the two sample periods. The average total debt (long-term and short-term) in 1998 amounts to £220m compared to £131m in 1993. The differences in means and in medians of both measures between the two sample periods are statistically significant.

The next 4 rows report the descriptive statistics of the performance measures. There is a significant decrease in the performance of our sample firms in 1998. For example, in 1993 the average abnormal return is 8.74 per cent compared to -22.7 in 1998 ($t = 15.22$).

The next two rows report the levels of risk. In 1993 our sample firms had a sigma of 34 per cent and a beta of 0.85. In 1998 sigma increased to 39.2 per cent and beta to 0.86. The differences in means and median sigma are statistically significant ($t = 5.10$). While the t-statistics of the difference in mean beta is not statistically significant ($t = 1.10$), the difference in median is statistically significant at 0.05 level. Thus the results indicate that, over the sample period, the risk of our companies has increased significantly.

The next 6 rows report the levels of our proxy variables for the scope for discretionary spending. The relative R&D expenditure amounts to 6.6 per cent in 1993 but decreased to 4.4 per cent in 1998. However, the differences in means and median are not significant. In contrast, the drop in the investment rate, *I/K*, from 25 per cent in 1993 to 21 per cent in 1998 is statistically significant ($t = 4.25$ and *Mann Whitney-p =* 0.00). Although the 'hard' capital ratio, *K/S*, and the free cash flow measure, *Y/S,* have increased in 1998, the differences in means and medians between the two periods are not statistically significant.

The last two measures of the firm's scope for discretionary spending, *yield* and *leverage*, have increased substantially over the two sample periods. For example, dividend yield increased from 2.7 per cent in 1993 to 3.9 per cent. The t-statistics of the differences in means and medians are significant at the 0.01 level ($t = -10.22$ and *Mann Whitney-p =* 0.00). Similarly, leverage increased significantly from 10.6 per cent in 1993 to 16.7 per cent in 1998 ($t = -4.29$ and *Mann Whitney-p =* 0.00).

These results could indicate that the drop in ownership is related to the changes in the firm's contractual fundamentals. For example, in 1998 companies in the sample became less profitable, more risky, more debt-financed and pay higher dividends than in 1993. These factors have probably contributed to the drop in managerial ownership.

C.   Determinants of Changes in Ownership Structure

Table 4 reports the results of a set of regressions. In Equations (1) we include changes in the firm market value of equity as an explanatory variable. In Equation (2) and (3) we split market value of equity into changes in the number of shares and cumulative average returns and include only a subset of explanatory variables to correct for multicollinearity problem.

The first column of Table 4 shows that changes in managerial ownership variable is negatively related to changes in the holdings of other categories of investors,

in firm size, and changes in firm's idiosyncratic risk. However, it is positively related to changes in the relative proportion of tangible fixed assets (*K/S*) and performance, *Q*. The results imply that managers decrease their holdings when other categories of investors increase their stakes, firm size and the variability of stock returns (sigma) increases, and when the firm's performance and tangible fixed assets decrease.

These results are consistent with the contractual hypothesis. They suggest that large companies enjoy economies of scale in monitoring by rating agencies, leading to a lower optimal level of managerial ownership, thus the negative relationship between changes in firm market value and changes in managerial ownership. In addition, the negative relationship between changes in managerial ownership and changes in sigma suggest that companies trade-off managerial portfolio diversification and incentives for performance. This, in turn, is reflected in the positive relation between changes in managerial ownership and changes in firm's value *Q* and changes in tangible fixed assets, *K/S*.

The second and third columns of Table 4 report the results based on changes in the number of shares and cumulative returns. The results show that it is not the change in share prices that explains movements in managerial ownership but, rather, changes in the number of shares issued by the company. As companies repurchase (issue new) shares, managerial holding increases (decreases) suggesting that managers do not participate in such activities, probably as a result of insider information and poor long-term performance of new issues documented in the previous literature (e.g., Levis, 1995, Loughran and Ritter, 1997). Therefore, the dilution effect explains changes in managerial ownership rather than the sales of equities by managers.

Columns 4 to 6, report the results of the changes in holdings of pressure-resistant investors. The results indicate that changes in the holdings of pressure-resistant shareholders are negatively related to changes in the ownership of other groups, firm market value, new shares issued and changes in yield but positively related to changes in variability of stock returns, *Sigma*. The relationship with changes in firm value Q is weak. There is also an impact of the dilution effect on the changes in the holdings of pressure-resistant investors as the coefficient of change in the number of shares is negative and significant (column 5).

The last 6 columns report the results of the changes in the holdings of pressure-sensitive investors and *Other* investors. We note the strong and positive relationship between changes in the two holdings but a negative relationship with changes in the holdings of managers and pressure-resistant shareholders. The relationship with changes in other variables, including size is, in most cases, weak, with the exception of the negative relationship with changes in the dividend yield.

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Table 4
Regression results on the determinants of changes in ownership structure

	Mgt			Pr			Ps			Other		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Constant	-0.03	-0.02	-0.03	-0.007	-0.002	-0.004	-0.02	-0.013	-0.014	-0.017	-0.021	-0.023
	(-4.71)	(-5.22)	(-5.22)	(-1.09)	(-0.35)	(-0.90)	(-3.44)	(-2.56)	(-2.49)	(-2.40)	(-3.40)	(-3.50)
Δ Mgt				-0.27	-0.25	-0.23	-0.16	-0.17	-0.18	-0.33	-0.32	-0.32
				(-6.46)	(-5.56)	(-5.23)	(-4.73)	(-4.70)	(-4.78)	(-7.50)	(-7.31)	(-7.32)
Δ Pr	-0.23	-0.22	-0.21				-0.11	-0.13	-0.13	-0.27	-0.26	-0.26
	(-6.46)	(-5.67)	(-5.47)				(-3.36)	(-3.78)	(-3.82)	(-6.63)	(-6.43)	(-6.45)
Δ Ps	-0.22	-0.21	-0.221	-0.17	-0.20	-0.20				0.138	0.143	0.138
	(-4.73)	(-4.40)	(-4.62)	(-3.36)	(-3.78)	(-3.79)				(2.62)	(2.72)	(2.62)
Δ Other	-0.26	-0.22	-0.227	-0.25	-0.21	-0.21	0.08	0.11	0.11			
	(-7.50)	(-6.19)	(-6.29)	(-6.63)	(-5.30)	(-5.30)	(2.62)	(3.53)	(3.32)			
Δ Mv	-0.042			-0.03			-0.001			-0.018		
	(-5.46)			(-3.40)			(-0.14)			(-2.07)		
Δ NS		-0.04			-0.026			-0.00			-0.005	
		(-3.99)			(-2.70)			(-0.07)			(-0.61)	
CAR$_{93-98}$			-0.006			-0.002			-0.009			-0.006
			(-0.86)			(-0.32)			(-1.72)			(-1.01)
Δ K/S	0.02	0.021	0.018	0.01			-0.006			-0.01	-0.14	-0.015
	(2.59)	(2.27)	(1.94)	(1.18)			(-0.82)			(-1.13)	(-1.57)	(-1.68)
Δ Sigma	-0.04			0.002	0.04	0.03	0.008	0.03		0.003		
	(-2.40)			(0.12)	(2.01)	(1.54)	(0.58)	(1.84)		(0.14)		
Δ RD/K	-0.03			0.02	0.046	0.04	-0.014			-0.04	-0.042	-0.043
	(-1.30)			(0.89)	(1.64)	(1.46)	(-0.64)			(-1.50)	(-1.45)	(-1.48)
Δ I/K	0.002			0.005			0.003	0.007	0.007	0.005		
	(0.39			(0.91)			(0.80)	(1.48)	(1.49)	(0.80)		
Δ Yield	0.04			-0.28	-0.35	-0.32	-0.22		-0.27	-0.45	-0.45	-0.47
	(0.23)			(-1.51)	(-1.93)	(-1.69)	(-1.48)		(-1.72)	(-2.28)	(-2.45)	(-2.54)
Δ Lev	-0.006	0.05		-0.03			0.007			-0.04		
	(-0.17)	(1.58)		(-0.89)			(0.23)			(-1.02)		
Δ Q	0.05	0.02	0.018	0.02			-0.01			0.014		
	(4.00)	(2.02)	(1.47)	(1.57)			(-1.09)			(1.05)		
Adj. R^2	0.192	0.18	0.144	0.116	0.113	0.101	0.081	0.106	0.108	0.164	0.173	0.173
p-of F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

D.   Results Based on Alternative Proxy Variables

In Table 1 we define the variables used in this study. However, since the literature does not offer a single measure of firm size, scope for discretionary spending, free cash flow, managerial risk aversion and firm value, we test the sensitivity of the reported results by using a number of alternative variables to proxy for the hypotheses.

In terms of size, when we use log of total assets or log of sales, the results are qualitatively similar to those reported above. For example, when we use change in total assets as a proxy for size in Table 4, we find a coefficient of –0.03 (t = -3.30) in the change of managerial ownership equation, -0.02 (t = -2.18) in the change of pressure-resistant equation, 0.001 (t = 0.18) in the change of pressure-sensitive equation and – 0.022 (t = -2.21) in the change of the holdings of *Other* investors equation. Similar results are obtained using change in sales. We have also tested for robustness of the results in Table 5 by using change in beta as a measure of risk. We find a coefficient of –0.03 (t = -2.12) in the managerial ownership equation, 0.00 (t = 0.03) in the pressure-resistant equation, 0.02 (t = 1.73) in the change of pressure-sensitive equation and – 0.05 (t = -2.86) in the change of the holdings of *Other* investors equation.

V.   CONCLUSIONS

In this paper we show that the ownership structure of our sample companies has changed significantly in the last decade. We show that the median managerial ownership has decreased from 6.7 per cent to 3.6 per cent, 9.2 per cent to 7.8 per cent for pressure-resistant investors, 7.3 per cent to 6.2 per cent for pressure-sensitive investors and from 5.1 per cent to 4.2 per cent for the remaining shareholders. We then explain the rationale behind this change. We find that the fundamental determinants of ownership structure have not changed. In both 1993 and 1998 periods, ownership structure can be explained by proxy variables that measure size, scope for discretionary spending and risk aversion. We also find a negative relationship between the ownership variables themselves, where, for example, companies with high pressure-resistant investors have low managerial ownership. The results suggest that companies adopt an optimal ownership structure that minimises agency conflict.

ENDNOTES

1. Other possibilities include; for example, making share options a bigger part of total remuneration and structuring the board in such a way as to make it able to monitor managers.
2. Extel Financial (Extel Cards) provides only the shareholding information for the current year. We were not able to extend our analysis using company accounts because only few companies disclose the information on shareholding by category of shareholders. Due to our large sample size, other options such as the use of the Jordan ownership database and of the company share registers were not feasible because the data is not in machine-readable form. Other databases such as the Crawford's Directory of City Connections provide shareholding above 5 per cent, while our analysis is based on 3 per cent threshold.

3. When the identity of the shareholder is not disclosed, the database reports the ownership under "nominee" holdings. We have also analysed the reported "nominee" holdings and allocate these, where possible, to the ultimate shareholder. When the disaggregated data is not available, we left the holdings under "nominees".
4. In this study, we define ownership as a shareholder, other than directors, that individually holds at least 3% of a company's ordinary shares. This level is set by disclosure rules (Company Act 1995, Sections 198 and 199). The threshold was 5 per cent from 1985 to 1989.
5. We use all 2100 UK quoted companies. We find that the average (median) market value of equity in 1998 of £752m (£43m) with a minimum of £0.044m and a maximum of £144bn. For the FTSE 100 companies, the average (median) market value of equity is £11,946m (£5,623m) with a minimum of £204m and a maximum of £144bn. The respective values in 1993 are: £399m (£43) with a minimum of 0 and a maximum of £36bn for the 1980 quoted UK companies and £5.4bn (£3.05bn) with a minimum of £90m and a maximum of £36bn for the FTSE 100 companies. This suggests that our sample is representative and it is not tilted towards small or large companies.

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