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Pension fund share transactions and board dynamics – the UK evidence

Abstract

Pension funds are one of the largest institutional investors in the UK. Given the importance afforded to the board of directors and the attention bestowed on the governance role of institutional shareholding, it is important to understand the potential influence of pension fund ownership on board structure. Specifically, is pension fund ownership positively related to a board composition that provides better monitoring of management?

The current study examines a sample of publicly traded companies listed on the London Stock Exchange between 1996 and 2005. It is found that consistent pension fund ownership increases are concurrent with and anticipate the improvement of board independence in the medium to long term. In contrast, deterioration in board independence or improvement of board independence to a much lesser extent follows consistent decreases in pension fund ownership. However, improvement/deterioration in board independence does not anticipate pension fund investment/disinvestment. The findings of this research suggest that pension funds play a positive role in improving the corporate governance of firms in which they have significant and long-term shareholdings, but they do not necessarily buy into companies that have good corporate governance in place.

Keywords: corporate governance, pension fund ownership, board dynamic.
JEL Classification: G23, G34.

Introduction

Institutional shareholding as a form of outside ownership concentration is regarded as a way of reducing agency costs and improving corporate governance. Theory suggests that despite the free-rider problem institutional investors should have the motivation and means to monitor management (Shleifer and Vishny, 1997). However, in the UK, institutional investors have been long criticised for taking a passive or indifferent stance on corporate governance issues (Mallin, 1997; Myner, 2001; Barca and Becht, 2001; Keasey et al., 2005), and corporate governance policy makers have called on institutional investors to be more proactive in shareholder activism. Previous studies, investigating the relationship between institutional investors and corporate governance, have produced mixed results, suggesting that significant shareholding alone may not be the sufficient condition for shareholder activism. It has been argued that, in exploring the governance role of large shareholders, institutional investors on an aggregate level should be replaced with a more differentiated classification. Some have suggested that pension funds are more likely to be involved in shareholder activism, while other institutional investors are either indifferent or feel constrained in this regard (Guercio & Hawkins, 1999; Faccio & Lasfer, 2000; Ryan & Schneider, 2002).

The pension fund industry has one of the largest institutional shareholdings. "With around one third of self-administered funds' assets in UK equities at the end of 2005, the scope for effective engagement in this market by pension funds and their agents remains considerable. This is particularly the case where big indexed funds hold a substantial proportion of a company's stock on behalf of a large number of beneficial owners, or where actively managed funds have a large shareholding in a particular company as a result of stock selection" (National Association of Pension Funds, 2007, pp. 4-5). In addition, pension funds have significant, predictable long-term cash outflows to their beneficiaries. This characteristic provides them with the incentives to develop a long-term investment perspective. It encourages a more patient stance towards improving the quality of corporate governance in firms in which they invest. Pension funds are also more pressure resistant than other financial institutions like banks and insurance firms, which often have business ties with their portfolio companies. Thus, this study is motivated by the hypothesised governance role of pension fund ownership deriving from the above pension fund attributes. It examines the influence of pension fund ownership on the key internal governance control mechanism, the board of directors, in a dynamic and longitudinal manner.

The rest of the paper is arranged as follows. Section 1 reviews the context of UK corporate governance with regard to institutional investors and the relevant literature. Section 2 develops the hypotheses. Section 3 describes the empirical models and the data. Section 4 presents the results. The last Section concludes and discusses the findings.

1. The UK institutional context and literature review

Following the release of a number of corporate governance reports in the UK, the role of institutional investors has been focused on providing an alterna-

tive control mechanism for effective corporate governance besides the board of directors. The Hampel Report (1998) specifically calls for an increased role for institutional investors in governance issues. The Myners Report (2001) argues specifically that pension funds are not pro-active enough in tackling underperformance in their investee firms. The Labour government has also made or threatened to make some legislative initiatives which affect institutional investors. A consultative document is in place which sets out proposed legislation for making active monitoring and communicating with investee firms a legal duty for pension funds (HM Treasury/DWP, 2002). In response, the Institutional Shareholders' Committee (2002) published a statement of principles which states that institutional shareholders have a responsibility to monitor and communicate with their investee firms. The Combined Code (Financial Reporting Concil, 2006), which is a part of the listing rules of the London Stock Exchange, incorporates the statement in its supporting principles for institutional shareholders entering into a dialogue with companies. In its provision for the evaluation of governance disclosures, it requires institutional shareholders to give due weight to all relevant factors when evaluating companies' governance arrangements, particularly those relating to board structure and composition.

On the academic front, the governance role of large investor has been long regarded as an important control mechanism (Agrawal and Knoeber, 1996; Shleifer and Vishney, 1997). Kahn and Winton (1998) believe that intervention by institutions is a function of the size of their stakes, firm specific factors and institutions' trading profits. Jennings (2005) argues that institutional incentives are critical for institutions to monitor management. Institutions with concentrated portfolios successfully monitor, while institutions with a larger percentage stake do not. Pension funds are better monitors than insurers, banks and mutual funds.

The large body of research that has specifically explored the governance role of pension fund ownership is mainly conducted in the U.S. The results are mixed. A number of studies have documented the market-based, positive effect of pension fund ownership[1] (Smith, 1996; English et al., 2004; Cremers and Nair, 2005), while others disagree (Guercio and Hawkins, 1999; Faccio and Lasfer, 2000; Song and Szewczyk, 2003; Nelson, 2006).

Korpaff (2006) conducts an empirical survey on the impact of shareholder activism on target companies regarding changes in firm values, operating performance and governance features. He finds that the effect of shareholder activism on firm value is a topic of dispute. Apart from firm performance, shareholder activism frequently prompts firms to adopt specific but limited changes in their corporate governance rules. Shareholder activism could precede organizational changes such as restructurings and divestitures. However, with regard to the effect of shareholder activism on board composition, little empirical evidence is documented. Empirical evidence in this regard is also very scarce in the UK context. A notable result is provided by Faccio and Lasfer (2000). They examine non-financial companies quoted on the London Stock Exchange between 1995 and 1996 in which occupational pension funds hold large stakes. They predict that occupational pension funds are likely to have more incentives to monitor firms in which they hold large stakes than other financial institutions. However, they report findings, which are similar to those reported by many U.S. studies, that pension fund shareholdings do not add value to their portfolio companies. Moreover, they find that pension fund ownership do not lead firms to comply with the Code of Best Practice such as having a higher proportion of the board comprised of non-executive directors.

In summary, the primarily U.S.-based empirical research shows mixed results on the monitoring role of pension fund ownership in terms of firm value. However, in both the U.S. and the UK, there is very little research focused on the effect of pension fund ownership on board composition. This study contributes to the literature by providing empirical evidence on the effect of pension fund ownership on the board of directors in the UK context.

2. Research design and hypothesis development

The current study considers two interrelated issues to examine the potential influence of pension fund ownership on the board of directors. First, the board of directors as an endogenously determined institution may demonstrate a spurious correlation with some firm attributes such as pension fund ownership in an equilibrium context. A spurious correlation is found when board composition is affected by other factors that also have influence on pension fund ownership (Hermalin and Weisbach, 2003). The endogeneity problem is further exacerbated by the fact that any potential influence of pension fund ownership on the board of directors may not be evident in the short run. Thus, there is a problem for contemporaneous cross-sectional studies, where board composition is monitored for a short period. This study examines the changes in both pension fund ownership and board independence in a chronological order during a relatively long period, in order to address the above problem.

[1] The so-called CalPERS (California public employees retirement system) effect is often the focus.

Second, whether pension funds are committed to long-term equity holding should be a crucial factor in determining their involvement in potential shareholder activism. In an innovative way, this research uses the consistency in pension fund share transactions in terms of trading direction during a long period as an indicator of such long-term commitments. If pension funds consistently increase their ownership over a relatively long period, it is interpreted as a signal that they are committed to long-term equity holding. Because pension funds are unlikely to monitor management on a regular basis, pension funds may be motivated to create a board that can provide better monitoring of management. As a result, board independence is expected to improve over time. The opposite scenario is expected to occur when pension funds consistently reduce their ownership.

The timing relationship between the change in pension fund ownership and the change in board composition also has to be taken into consideration. Specifically, the change in pension fund ownership and the change in board composition (board dynamics) may take place simultaneously, or they could occur one after the other. Thus, there are three possible scenarios in which three interrelated hypotheses can be developed:

H1: Over the same period, there is a difference in board dynamics between firms with consistent pension fund ownership increases and firms with consistent pension fund ownership decreases.

H2: Following consistent pension fund ownership increases/decreases, there is a difference in subsequent board dynamics between firms with consistent pension fund ownership increases and firms with consistent pension fund ownership decreases.

H3: Improvement/deterioration in board independence precedes consistent pension fund ownership increases/decreases.

The first two hypotheses predict that, in contrast to the scenario, where pension fund ownership is consistently reduced, committed long-term pension fund ownership is concurrent with and/or anticipates the improvement of board independence. The third hypothesis predicts that consistent pension fund ownership increases (decreases) follow board independence improvement (deterioration) because pension funds may buy into firms with good corporate governance.

3. Data and methodology

3.1. Data. Sample firms are drawn from companies listed on the London Stock Exchange that have pension fund share transactions over a 10-year period between 1996 and 2005. Investment trusts are excluded because of their unique board structure. The pension fund share transactions are obtained from Hemscott. The investigated share transactions include only those of substantial pension fund shareholders, i.e., those pension funds own at least 3% of the equity share capital. Table 1 presents the variables used in this study.

Table 1. Variables used in the empirical analysis

Variable	Description
BD	Board dynamics – the change in the proportion of the board comprised of non-executive directors over a period.
DIRO	Director share ownership.
BLOCK	Block shareholding over 3% (inclusive).
GoodBoard	Takes the value of 1 if there are at least 50% of non-executive directors on the board at the beginning of the period, otherwise zero.
PenTrade	Takes the value of 1 if all the pension fund share transactions of a firm over a period are purchases, takes the value of 0 if all the pension fund share transactions of a firm over a period are sales.
MV	The natural log of the market value of equity.
ROCE	The return on capital employed ratio (datastream definition).

The dummy variable, *PenTrade*, describing pension fund share transactions is of particular importance in this study. It is an indicator of the existence of a long-term equity holding commitment made by pension funds, a characteristic identified as an important factor differentiating pension funds from other institutional investors. This commitment is interpreted by examining the consistency in pension fund share transactions over a relatively long period. Specifically, the dummy variable takes the value of one if there are consistent pension fund share purchase transactions over the period, a signal of committed long-term equity holding; it takes the value of zero if there are consistent pension fund share sale transactions, a negative signal of the "exit" strategy taken by pension funds. Only firms with consistent pension fund share purchase transactions and those with consistent pension fund share sale transactions are included in the sample. Firms with mixed pension fund share transactions are excluded because it is difficult to interpret the underlying intention of these transactions.

The block shareholding variable and director share ownership variable are constructed using the London Stock Exchange Year Books 1996-2005. Director share ownership includes both executive and non-executive director shareholdings, because the London Stock Exchange Year Books only provide director ownership on an aggregate level. This is not regarded as a significant problem because non-executive director ownership is usually at a very low level in comparison to executive director ownership.

Board structure information is also collected from the London Stock Exchange Year Books. It includes the proportions of the board comprised of non-executive directors on an annual basis, which are used to calculate the board dynamic variable. Board dynamics are measured by the change in the proportion of the board comprised of non-executive directors during a period. Because initial board composition is important for the measurement of the change in board composition, the difference in board composition between the beginning of the period and the end of the period is scaled down by board composition at the beginning of the period.

The dummy variable denoting the existence of an initial good (independent) board structure is introduced because the initial board composition could affect the magnitude of subsequent board composition change. A board with a majority of non-executive directors is less likely to improve its board independence during the same length of period in comparison to a board with a minority of non-executive directors.

Two additional control variables are collected from datastream. The natural log of the market value of equity is used to control for the size effect. The return on capital employed ratio reflects profitability of the firm.

Table 2 presents the descriptive statistics of control variables: director shareholding, block shareholding, firm size and firm profitability. The average executive director shareholding across sample firms is around 16%. The mean of accumulated block shareholdings is about 40%.

Table 2. Descriptive statistics of control variables

Sample	Variable	Mean	Std. Dev.	Min.	Max.
Test of contemporaneous board dynamics	*Diro* (%)	15.00	17.86	0	64.59
	Block (%)	41.57	18.91	0	82.09
	MV	145.83	446.44	2.52	3420.82
	ROCE (%)	1.79	19.86	-92.15	41.05
Test of subsequent board dynamics	*Diro* (%)	16.49	17.64	0	60.09
	Block (%)	38.23	20.51	0	81.00
	MV	157.81	522.35	1.95	3420.82
	ROCE (%)	-2.46	33.88	-125.23	76.56
Test of lagged board dynamics	*Diro* (%)	18.63	19.22	0	60.09
	Block (%)	38.39	21.37	0	81.00
	MV	61.07	68.74	2.84	261.22
	ROCE (%)	-6.09	37.07	-105.59	112.28

Notes: *Diro* is director ownership; *Block* is block shareholding over 3%; *ROCE* is the return on capital employed ratio; *MV* is the market value of equity (£ ,000,000).

3.2. Empirical models. This study takes three steps to test the hypotheses outlined earlier. The first step investigates if changes in board composition in the medium to long term are associated with consistent pension fund share transactions over the same period. The 10-year study period between 1996 and 2005 is divided into two sub-periods, i.e., 1996 to 2000 and 2001 to 2005. The lengths of these periods are believed to be long enough to allow changes in board composition to materialise. Contemporaneous board dynamics over the two 5-year periods and the 10-year period are analysed in relation to consistent pension fund share transactions.

Linear regressions of contemporaneous board dynamics on consistent pension fund share transactions are represented in equation (1).

$$Board\ \ dynamics = \alpha + \beta_1 PenTrade + \\ + \sum_{k=1}^{k} \gamma_k \left(Control\ \ variables\right). \quad (1)$$

The dependent variables are board dynamics during the 5-year periods between 1996 and 2000 and between 2001 and 2005, and during the 10-year period between 1996 and 2005. This equation is also used for the estimation of a sample which includes the combined observations from the above two 5-year periods.

The second step examines whether consistent pension fund share transactions anticipate changes in board composition in the medium to long term. In this case, there is no subjective definition as to the start and the end of the study period. Instead, the start of the period, year 0, is the year when pension funds make the first of a number of consistent share transactions over the whole 10-year period between 1996 and 2005. Board dynamics are then monitored from 1 year after the first of a number of consistent pension fund share transactions up to 5 years, if possible, after the transaction.

Linear regressions of subsequent board dynamics on consistent pension fund share transactions are represented in equation (2).

$$Board\ \ dynamics = \alpha + \beta_1 PenTrade + \\ + \sum_{k=1}^{k} \gamma_k \left(Control\ \ variables\right). \quad (2)$$

The dependent variables, subsequent board dynamics, are the changes in the proportion of the board comprised of non-executive directors, 1, 2, 3, 4 or 5 years after the first of a number of consistent pension fund share transactions.

The third step explores if board composition changes anticipate consistent pension fund ownership changes in the medium to long term. Board dynamics are monitored from 1 year before the first of a number of consistent pension fund share transactions to 5 years, if possible, before the transaction.

Linear regressions of consistent pension fund share transactions on lagged board dynamics are represented in equation (3).

$$PenTrade = \alpha + \beta_1 Board\ \ dynamics + \\ + \sum_{k=1}^{k} \gamma_k \left(Control\ \ variables \right). \quad (3)$$

This estimation equation traces lagged board dynamics prior to the consistent pension fund share transactions. The independent variables are the pro-portion of the board comprised of non-executive directors in the year of the first of consistent pension fund share transactions compared with that of 1, 2, 3, 4 or 5 years before. The equation examines whether pension funds buy into companies in which corporate governance has improved, or they reduce their shareholdings of companies in which corporate governance has deteriorated.

4. Results

The empirical results of this study are presented in the following three sections which include the results of both univariate and multivariate analyses. The univariate analysis includes parametric and non-parametric tests on the association between board dynamics and consistent pension fund ownership increases/decreases. The multivariate analysis applies ordinary least squares to the estimation equations outlined above.

4.1. Contemporaneous board dynamics. Table 3 presents the comparison of contemporaneous board dynamics between firms with consistent pension fund ownership increases and those with consistent ownership decreases.

Table 3. Descriptive statistics of board dynamics during the periods of consistent pension fund share transactions

Sample period	*PenIn*			*PenOut*			P-value of the difference in means	Kruskal-Wallis p-value
	Mean	Median	Obs.	Mean	Median	Obs.		
1996-2000	0.382	0.143	17	-0.074	-0.174	8	0.291	0.057
2001-2005	0.139	0.143	38	-0.269	-0.167	7	0.001	0.002
1996-2005	0.298	0.183	26	-0.017	0.000	6	0.114	0.019

Notes: The Table reports and compares the statistics of contemporaneous board dynamics $BD_{t_0 - t_1}$ between firms with consistent pension fund share purchase transactions and sale transactions.

$$BD_{t_0 \sim t_1} = \frac{Ned_{t_1} - Ned_{t_0}}{Ned_{t_0}},$$

where Ned_{t_0} is the proportion of the board comprised of non-executive directors at the beginning of the period, Ned_{t_1} is the proportion of the board comprised of non-executive directors at the end of the period. The column *PenIn* contains board dynamics of firms over a period during which pension fund ownership increases consistently. The column *PenOut* contains board dynamics of firms over a period during which pension fund ownership decreases consistently.

There is a clear contrast between these two groups of firms. Between 1996 and 2000, sample firms in which pension funds consistently increases their ownership experiences an average board independence improvement of 38.2%, whereas firms in which pension funds consistently reduces their ownership suffers a deterioration of 7.4% in board independence. The difference is a large margin of 45.6%. Over the period between 2001 and 2005, board independence in firms in which pension funds consistently increase their ownership improves by 13.9%, whereas board independence in firms in which pension funds consistently reduce their ownership deteriorates by 26.9%. The large difference of 40.8% is statistically significant. Over the 10-year period between 1996 and 2005, firms in which pension funds consistently increase their ownership improve their board independence by 29.8%. Board independence in firms in which pension funds consistently reduce their ownership deteriorates slightly by 1.7%.

The above results are corroborated by those produced by the non-parametric tests, which also demonstrate significant differences in board dynamics. The median differences in board dynamics between the two types of firms are 31.7%, 31.0% and 18.3% over the three periods. Although the p-value of the Kruskal-Wallis test over the period between 1996 and 2000 is slightly over the traditional threshold of significance, 5%, the result is regarded significant for two reasons. First, the difference of 0.7% is relatively small. Second, non-parametric tests tend to inflate the p-value, especially in small samples (Hazard, 1997).

The finding from the univariate analysis is broadly consistent with the hypothesis that over the same medium to long term periods, firms with consistent pension fund ownership increases outperform the ones with consistent pension fund ownership decreases in terms of board independence improvement.

However, the difference in board composition change demonstrated in the univariate analysis could result from a possible spurious correlation of board structure with factors other than consistent pension fund ownership increases (decreases). Table 4 presents the results of linear regressions that control for director ownership, block shareholding, firm performance and firm size.

Table 4. Linear regressions of contemporaneous board dynamics

$$BD_{t-t+\tau} = \alpha + \beta_1 PenTrade + \beta_2 Diro_t + \beta_3 Block_t + \\ + \beta_4 ROCE_t + \beta_5 MV_t + \mu_t$$

	1	2	3	4
PenTrade	0.175	0.427	0.268	0.283
	(0.88)	(3.12)***	(2.18)**	(2.63)**
Diro	-0.008	-0.003	-0.006	-0.004
	(1.81)*	(1.32)	(1.41)	(1.69)*
Block	-0.002	0.001	0.003	-0.000
	(0.43)	(0.44)	(0.53)	(0.17)
ROCE	0.003	-0.003	-0.001	-0.003
	(0.06)	(2.40)**	(0.22)	(2.39)**
MV	-0.093	-0.010	-0.034	-0.026
	(1.76)*	(0.33)	(0.87)	(0.92)
Constant	0.512	-0.238	0.104	0.022
	(1.35)	(0.95)	(0.29)	(0.11)
Observations	23	45	32	68
R-squared	0.12	0.29	0.19	0.16
Prob. > F	0.252	0.015	0.000	0.004

Notes: The dependent variable is board dynamics between time t and time $t + \tau$. Column 1 is the period between 1996 and 2000; column 2 is the period between 2001 and 2005; column 3 is the period between 1996 and 2005; column 4 is the combined sample of the two 5-year periods (column 1 and column 2). The independent variables are: *PenTrade* is a dummy variable denoting whether pension funds consistently increase or decrease their ownership, it takes the value of 1 if pension funds make purchase transactions only over the period, otherwise zero; *Diro* is director ownership; *Block* is block shareholding over 3%; *ROCE* is the return on capital employed ratio; *MV* is the natural log of the market value of equity. Except for the dummy variable of *PenTrade*, all independent variables take their values as at the beginning of the period, time *t*. Robust t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4 shows that consistent pension fund ownership increases have a significant and positive relationship with the improvement of board independence over the 5-year period between 2001 and 2005 (column 2) and the 10-year period between 1996 and 2005 (column 3). The relationship is stronger over the 5-year period than over the 10-year period. In terms of board independence improvement, firms in which pension fund consistently increase their ownership outperform those suffering consistent pension fund ownership reductions by a large margin of 42.7% during the 5-year period between 2001 and 2005. The difference over the 10-year period is 26.8%. However, the relationship between consistent pension fund ownership increases (decreases) and board independence improvement, though positive, is not significant over the 5-year period between 1996 and 2000. The limited number of observations available for the period may be a factor. The result (column 4) is significant and positive in the combined sample of the two 5-year periods.

As a robustness check, the regressions in Table 4 are controlled for the initial board composition of the sample firms. The results show that the coefficients of the initial board composition dummy variable are significantly and consistently negative. In other words and unsurprisingly, during the five or ten-year period, boards with a majority of non-executive directors at the beginning of the period experience less board independence improvement than those with a minority of non-executive directors at the beginning of the period. More importantly, at the same time, the results with respect to pension fund ownership increases (decreases) are consistent with those in Table 4. These results are not reported here.

In addition, previous studies (e.g., Lasfer, 2006) have documented an inverse relationship between managerial ownership and board independence either from a management entrenchment or governance mechanism substitution perspective. However, the coefficients of director share ownership in Table 4, though negative, are not statistically significant.

In sum, the results suggest that consistent pension fund ownership increases are positively associated with the improvement of board independence over the same period to a larger extent in comparison to the improvement, if not deterioration, in firms where pension funds consistently reduce their ownership. They indicate that pension funds, when committed to significant long-term equity holding, play a positive role in improving corporate governance in contemporaneous terms.

4.2. Subsequent board dynamics. Pension fund ownership change could be concurrent with board dynamics. Board dynamics are monitored *after* the first of a number of consistent pension fund share transactions is made, so that the first pension fund share transaction is certain to precede subsequent board dynamics. This first pension fund share transaction is considered significant because it can be perceived as a signal of a potential "activism" or "exit" strategy given the fact that there are following consistent share transactions. The samples here include firms with either consistent pension fund ownership increases or decreases over the entire 10-year period.

Table 5. Descriptive statistics of board dynamics following consistent pension fund share transactions

Sample	*PenIn*			*PenOut*			P-value of difference in means	Kruskal-Wallis p-value
	Mean	Median	Obs.	Mean	Median	Obs.		
Year 1	0.0467	0.0000	44	-0.1091	0.0000	16	0.100	0.030
Year 2	0.1242	0.0000	29	-0.1927	-0.2500	16	0.026	0.002
Year 3	0.0765	0.0000	21	-0.1762	-0.2500	16	0.013	0.003
Year 4	0.1980	0.1429	17	-0.1790	-.01214	16	0.048	0.006
Year 5	0.3139	0.1667	12	-0.0635	-0.1833	12	0.022	0.009

Notes: The Table reports and compares the statistics of subsequent board dynamics $BD_{t\sim t+\tau}$ between firms with consistent pension fund share purchase transactions and sale transactions.

$$BD_{t\sim t+\tau} = \frac{Ned_{t+\tau} - Ned_t}{Ned_t},$$

where $Ned_{t+\tau}$ is the proportion of the board comprised of non-executive directors 1, 2, 3, 4 or 5 years after the first of consistent pension fund share transactions. Ned_t is the proportion of non-executive directors in the year when the first of consistent pension fund share transactions is made. The column *PenIn* contains board dynamics in firms over the 10-year period between 1996 and 2005 during which pension fund ownership increases consistently. The column *PenOut* contains board dynamics in firms over the same 10-year period during which pension fund ownership decreases consistently.

Table 5 presents the comparative descriptive statistics of subsequent board dynamics between the two groups of firms. The number of observations decreases from sample year 1 to sample year 5 because the board dynamic variable of some firms cannot be constructed within the 10-year period.

The results from Table 5 are in line with the expectation that consistent pension fund ownership increases have a positive correlation with subsequent board independence improvement. Both parametric and non-parametric tests show a significant difference in subsequent board independence improvement between firms receiving consistent pension fund ownership increases and those suffering consistent pension fund ownership reductions. Firms, in which there are consistent pension fund ownership increases, improve their board independence by 4.6% during one year's time. The improvement is enlarged to 31.4% after 5 years.

On the other hand, there is a consistent reduction in the proportion of the board comprised of non-executive directors in firms in which pension fund ownership decreases consistently. Unlike firms with consistent pension fund ownership increases whose board independence improves as time elapses, there is not an obvious trend among firms with consistent pension fund ownership decreases. Board independence has deteriorated by 10.9% one year after the first of consistent pension fund share sale transactions. The deterioration continues until year 4 at 17.9% then returns to a much lower level of 6.3% in year 5. One explanation of this phenomenon is that the damage to board independence due to the exit of active institutional investors – pension funds – can be limited over a relatively long period, because there is a general trend for publicly traded firms to improve their corporate governance due to other exogenous factors (e.g., legal environment). Note also that pension funds will be active only when their ownership is maintained at a high level or is increasing along with gradual improvement in board independence. However, once they make a decision to exit they will have no influence, so that the effect need not be spread across time.

Interestingly, the mean and median differences in terms of board independence improvement begin to widen considerably 2 years after the first of consistent pension fund share transactions. The mean difference of 15.6% is only significant at the 0.10 level in year 1. The median difference in terms of rank is significant in the non-parametric tests in year 1. The effect becomes evident 2 years after the first of consistent pension fund share transactions. The mean difference widens considerably to 31.7% and the median difference becomes 25%. They remain significant until year 5, but the significance of the differences starts to weaken slightly after year 3.

These results are consistent with those in Table 2, where board composition changes over a fixed period (either 5-year or 10-year) are compared. However, the findings from Table 5 provide more insights into the year-by-year process through which board composition change diverges between firms with consistent pension fund ownership increases and those with consistent decreases.

The above findings are also tested using multivariate linear regressions. The results are presented in Table 6.

Table 6. Linear regressions of subsequent board dynamics

$$BD_{t-t+\tau} = \alpha + \beta_1 PenTrade + \beta_2 Diro_t + \beta_3 Block_t + \beta_4 ROCE_t + \beta_5 MV_t + \beta_6 GoodBoard + \mu_t$$

	Year 1	Year 2	Year 3	Year 4	Year 5
PenTrade	0.176	0.410	0.338	0.224	0.312
	(1.92)*	(2.87)***	(4.01)***	(2.45)**	(2.45)**
Goodboard	-0.073	-0.329	-0.247	-0.218	-0.380
	(0.74)	(2.52)**	(2.78)***	(1.97)*	(3.06)***
Diro	0.002	-0.001	0.004	0.001	-0.002
	(0.50)	(0.19)	(1.19)	(0.31)	(0.38)
Block	-0.002	0.002	0.004	0.001	-0.001
	(0.88)	(0.57)	(1.88)*	(0.30)	(0.28)
MV	-0.008	-0.047	0.004	0.051	0.065
	(0.21)	(0.67)	(0.10)	(1.41)	(1.26)
ROCE	-0.000	-0.001	-0.000	0.002	0.003
	(0.08)	(0.99)	(0.07)	(0.88)	(1.04)
Constant	-0.010	0.027	-0.347	-0.159	-0.039
	(0.04)	(0.07)	(1.81)*	(0.78)	(0.13)
Observations	60	45	37	33	24
R-squared	0.10	0.30	0.47	0.28	0.43
Prob. > F	0.305	0.003	0.001	0.005	0.015

Notes: The dependent variable, $BD_{t-t+\tau}$, is the change in the proportion of the board comprised of non-executive directors 1, 2, 3, 4 and 5 years (i.e., τ) after the first of consistent pension fund share transactions (i.e., time t). The independent variables are: *PenTrade* is a dummy variable denoting whether pension funds consistently increase or decrease their ownership, it takes the value of 1 if pension funds make purchase transactions only, otherwise zero; *Diro* is director shareholding; *Block* is block shareholding over 3%. *ROCE* is the return on capital employed ratio. *MV* is the natural log of the market value of equity; *Goodboard*, a dummy variable takes the value of 1 if the proportion of the board comprised of non-executive directors is at least 50%, otherwise zero. Except for *PenTrade*, all independent variables take the value in the year of the first of consistent pension fund share transactions (either purchase or sale), time *t*. Robust t-statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6 shows a significant and positive relationship between consistent pension fund ownership increases and board independence improvement 2 years after the first of consistent pension fund share transactions. The coefficient of the pension fund ownership dummy variable is positive in year 1, however only significant at the 0.10 level. The relationship remains significant and positive up to 5 years after the transaction. Also, except for year 1, the dummy variable of initial board composition has a consistent inverse relationship with the relative magnitude of board independence improvement (deterioration). When firms already have a considerable amount of non-executive representation on their boards, it is less likely that board independence will be improved.

The above results suggest that consistent pension fund ownership increases have a positive relationship not only with contemporaneous but also subsequent board dynamics in terms of board independence improvement. From a time perspective, this relationship starts to gain significance 2 years after the first of consistent pension fund share transactions. In addition, the explanatory power of the model increases considerably from 10% in year 1 to 30% in Year 2, and peaks at 47% in year 3. As far as the results indicate, the correlation between consistent pension fund share transactions and board dynamics is most evident 3 years after the first of consistent pension fund share transactions. This may be indicative of a medium to long-term effect of pension fund ownership on corporate governance. It provides further support for the argument that long-term investment perspective is crucial for the emergence of any meaningful shareholder activism. This finding may also provide some explanation for the mixed result from previous research with regard to the relationship between pension fund ownership and board composition, especially in cases where board composition is only examined in the short term.

4.3. Prior board dynamics. The results from the tests of both contemporaneous and subsequent board dynamics clearly demonstrate a difference in board composition change between firms receiving consistent pension fund ownership increases and those suffering consistent pension fund ownership decreases. However, it is possible that there is a reciprocal relationship between board dynamics and consistent pension fund ownership increases (decreases). In other words, consistent pension fund share transactions may result from prior board dynamics as well as influence subsequent board dynamics.

Board dynamics, *prior to* a period during which consistent pension fund share transactions are made, are examined. The results are shown in Table 7. Board composition in terms of the proportion of the board comprised of non-executive directors in the year, when the first of consistent pension fund share transactions is made, is compared with that of 1, 2, 3 or 4 years before on a percentage increase (decrease) basis. The number of observations in the samples in Table 7 decreases from year 1 to year 5, because the board dynamic variable of some firms cannot be constructed within the 10-year period.

Table 7. Descriptive statistics of board dynamics prior to periods of consistent pension fund share transactions

Sample	*PenIn*			*PenOut*			P-value of difference in means	Kruskal-Wallis p-value
	Mean	Median	Obs.	Mean	Median	Obs.		
Year 1	0.0890	0.0000	32	0.0773	0.0000	11	0.927	0.809
Year 2	0.1408	0.0208	26	0.0813	0.0000	8	0.725	0.870
Year 3	0.0508	0.0000	23	0.0194	-0.0208	6	0.778	0.685
Year 4	-0.0554	0.0000	17	0.0778	0.0000	3	0.542	0.592

Notes: The Table reports and compares the statistics of prior board dynamics, $BD_{t \sim t-\tau}$, between firms with subsequent, consistent pension fund share purchase transactions and sale transactions.

$$BD_{t \sim t-\tau} = \frac{Ned_t - Ned_{t-\tau}}{Ned_{t-\tau}},$$

where $Ned_{t-\tau}$ is the proportion of the board comprised of non-executive directors 1, 2, 3 or 4 years before the first of consistent pension fund share transactions. Ned_t is the proportion of the board comprised of non-executive directors when the first of consistent pension fund share transactions is made. The column *PenIn* contains board dynamics in firms over the 10-year period between 1996 and 2005 during which pension fund ownership increases consistently. The column *PenOut* contains board dynamics in firms over the same 10-year period during which pension fund ownership decreases consistently.

Overall, there is improvement in board independence among sample firms in Table 7. Both mean and median board dynamics are generally positive before consistent pension fund share transactions are made. However, the differences in board composition change between firms with consistent pension fund ownership increases and decreases are relatively small. In fact, there is virtually no difference between group medians. More importantly, the results of neither parametric nor non-parametric tests are significant. Hence, this preliminary finding does not support a significant correlation between improved (deteriorated) board independence in the prior years and consistent pension fund share purchase (sale) transactions that follow.

In addition, the potential relationship between board dynamics and subsequent consistent pension fund share transactions is examined in a model that controls for firm size, ownership structure and firm performance. The results are shown in Table 8.

Table 8. Logit regressions of consistent pension fund share transactions on prior board dynamics

$$PenTrade = \alpha + \beta_1 Diro_t + \beta_2 Block_t + \beta_3 ROCE_t + \\ + \beta_4 MV_t + \beta_5 BD_{t-t+\tau} + \mu_t$$

	1	2	3	4
ROCE	-0.021	-0.025	-0.024	-0.017
	(1.17)	(1.45)	(1.96)*	(1.20)
Diro	-0.019	-0.024	-0.033	-0.036
	(1.09)	(1.13)	(1.32)	(1.34)
Block	-0.003	0.010	0.019	0.031
	(0.23)	(0.56)	(0.99)	(1.20)
MV	0.010	0.001	-0.008	0.002
	(1.07)	(0.11)	(0.67)	(0.10)
BD_{t-t-1}	-0.703			
	(0.68)			
BD_{t-t-2}		-0.215		
		(0.20)		
BD_{t-t-3}			0.178	
			(0.07)	
BD_{t-t-4}				-1.763
				(0.75)
Constant	1.165	1.150	1.540	1.024
	(1.35)	(1.11)	(1.37)	(0.77)
Observations	43	34	29	20
Prob. > chi²	0.610	0.601	0.421	0.293

Note: The dependent variable, *PenTrade*, is a dummy variable denoting whether there are consistent pension fund share purchase transactions (taking the value of 1) or sale transactions (taking the value of 0) over the 10-year period between 1996 and 2005. The independent variable, $BD_{t-t-\tau}$, is the proportion of the board comprised of non-executive directors in the year of the first of consistent pension fund share transactions (i.e., year t) compared with that of 1, 2, 3 and 4 years (i.e., τ) before.

$$BD_{t-t-\tau} = \frac{Ned_t - Ned_{t-\tau}}{Ned_{t-\tau}}.$$

MV is the natural log of the market value of equity; *Diro* is director shareholding; *Block* is block shareholding over 3%. *ROCE* is the return on capital employed ratio. These independent variables take the value in the year of the first of consistent pension fund share transactions (either purchase or sale). Robust z-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

In Table 8, the results from the logit regressions of consistent pension fund ownership increases (decreases) on previous board dynamics are in line with those of the descriptive statistics in Table 7. Board composition change over a period of 1, 2, 3 or 4 years, preceding the first of consistent pension fund share transactions, is not statistically related to whether pension funds subsequently make consistent share purchase or sale transactions. The result regarding board composition change 5 years, preceding the first of consistent pension fund share

transactions, is not reported because the number of observations is too small. A robustness test is also conducted on the relationship between the presence/absence of an independent board (i.e., at least 50% of the board directors are non-executives) and subsequent, consistent pension fund ownership increases/decreases. The result does not support the existence of such a relationship either and is not reported here.

According to the above results, there is no evidence to suggest that pension funds buy into firms that have improved their board independence.

Conclusions and discussion

The findings of this study derive from a direct examination of the share transactions made by pension funds in relation to contemporaneous and subsequent board dynamics over a relatively long period between 1996 and 2005. Two important, albeit subtly different, issues are addressed simultaneously: the effect of medium to long-term pension fund ownership on board dynamics and the short- to long-term effect of this ownership. This study also investigates board dynamics that precede pension fund share transactions in order to address the issue of potential endogeneity.

The empirical analysis recognises that both pension fund ownership and board structure are dynamic variables. The two tools for shareholders in terms of exit and voice (Hirschman, 1970) are operationlised in this context. The consistency of pension fund share transactions is interpreted as representing the existence or absence of long-term equity holding commitment, which in turn is expected to influence board dynamics. Specifically, consistent pension fund share purchase transactions over a relatively long period are perceived as a signal that pension funds are committed to long-term shareholding. As a result, pension funds are more likely to be engaged in shareholder activism. The effect of such activism is likely to be witnessed with respect to board dynamics in the medium to long term. On the other hand, consistent share sale transactions indicate that pension funds are taking an exit strategy and they are unlikely to be involved in the corporate governance of firms in which they are reducing their shareholding.

Overall, the results from both univariate and multivariate analyses demonstrate a positive association between consistent pension fund ownership increases and board independence improvement over a relatively long period. When pension funds consistently increase their shareholding, firms improve their board independence considerably in both contemporaneous and subsequent board dynamics terms. In the case of subsequent board dynamics, this effect is most salient three years after the first of consistent pension fund share transactions is made. On the other hand, board independence in firms, in which pension funds consistently reduce their shareholding, improves to a much lesser extent or even deteriorates. After controlling for ownership structure, firm size, firm performance and initial board composition, the results of linear regressions of both contemporaneous and subsequent board dynamics confirm this finding. All of the linear regressions are tested against outliers and are based on robust standard errors.

However, the tests on board dynamics prior to the year in which the first of consistent pension fund share transactions is made reveal no significant relationship between board independence improvement and subsequent, consistent pension fund ownership increases.

Overall, the empirical findings of this study suggest that there is evidence of improvements in the corporate governance of firms in which pension funds have made significant long-term investments. However, there is no evidence that suggests that pension funds buy into firms that have already improved their corporate governance (i.e., board independence). In short, committed and consistent pension fund investment precedes considerable improvement in corporate governance, but not vice versa.

The findings of this study imply that pension funds do not invest in firms, in order to improve their corporate governance *per se*. The purposes of their investment are to maintain a balanced portfolio and generate stable returns in the long run. However, after the initial investment(s), consistent ownership increases suggest that there should be more motivation as well as leverage for pension funds to play an active part in improving the corporate governance structure of their portfolio firm(s), because they will benefit from the improvements achieved in the long run. In firms, where pension funds consistently reduce their ownership for whatever reasons after the initial investment(s), the influence of activist shareholding on the board of directors is declining or absent. Over time, as suggested by the findings of this study, there is a clear contrast in terms of board independence improvement between firms with consistent pension fund ownership increases and decreases. In addition, a practical implication is that pension funds in the UK may not be as vocally proactive as their U.S. counterparts, but shareholder activism may take place without high profile public exposure (e.g., Warner, 2007), even though the exact form of activism requires further research.

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