

Institutional Ownership and Firm Performance: Evidence from Finland?[¥]

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Abstract

We investigate the relationship between two sets of institutional investors and firm performance. Previous studies have found conflicting results from different markets using different methodologies. Our first contribution in this paper is that, unlike previous studies that lump institutional investors together into a monolithic group, we study segmented classes of institutional investors. Secondly, we recognize the residual unexpected endogeneity performance and institutional ownership should be accounted for which is not possible using OLS or 2SLS estimation models. Using the 3SLS setup we find substantial improvements in the parameter estimates and explanatory power when the cross-equation error spatial correlation is accounted for. The empirical results suggest a significant two-way feedback between firm performance and institutional equity ownership. However, this effect is not symmetric. Institutional investors with likely investment and business ties with firms are associated with adverse firm performance and the impact is very significant in comparison to the negative effect of firm performance on institutional ownership.

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1. Introduction

This paper investigates the relationship between institutional ownership and firm performance. Prior studies examining this relationship have produced mixed results. Chaganti and Damanpour (1991) and Lowenstein (1991), for instance, find little evidence that institutional ownership is correlated with firm performance. McConnell and Servaes (1990), on the other hand, concluded that there is a positive relation between firm value and ownership by institutional investors. Seifert, Gonenc and Wright (2005) study the impact of institutional ownership on firm value in four countries (Germany, Japan, United Kingdom, United States) and find that the relationship is not consistent across countries. They conclude that these inconsistent results may reflect the fact that the influence of institutional investors is location specific.¹ This implies a call for more detailed studies to investigate this relationship. One main drawback in all the studies cited is that they have considered institutional investors as a monolithic group. Shleifer and Vishny (1986) as well as Pound (1988) theorizations and later empirical examinations by McConnell and Servaes (1990), however, suggest that shareholders are differentiable and pursue different agendas. In addition, Jensen and Meckling (1976) formally show that equity ownerships by different groups have different effects on the firm performance. Thus, it is very important to examine the effect of different classifications of institutional investors on firm value.

Pound (1988) explores the influence of institutional ownerships on firm performance and proposes three hypotheses on the relation between institutional shareholders and firm performance: *efficient-monitoring* hypothesis, *conflict-of-interest* hypothesis, and *strategic-alignment* hypothesis. The *efficient-monitoring* hypothesis says that institutional investors have greater expertise and can monitor management at lower cost than can small atomistic shareholders. Consequently, this argument predicts a positive relationship between institutional shareholding and firm performance. This proposition, implicitly, assumes only an investment relationship between institutional shareholding and the firm. The *conflict-of-interest* proposition suggests that in view of other profitable business relationships with the firm, institutional investors are coerced into voting their shares with management. For instance, an insurance company may hold a significant portion of a firm's stock and concurrently act as its primary insurer. Voting against management may significantly affect the firm's business relationship with the incumbent management (and perhaps others as well), whereas voting with the management results in no obvious penalty. The *strategic-alignment* hypothesis states that institutional owners and managers find it mutually advantageous to cooperate. Generally, cooperation reduces the beneficial effects on the firm value that could result from monitoring by large shareholders. Consequently, the *conflict-of-interest* hypothesis and the *strategic-alignment* hypothesis both predict a negative relation between institutional and the value of the firm. Heard and Sherman (1987) also argue that the dual activities of investment and business relationships could create a conflict of interest for these

¹ Other studies, e.g., Barclay and Holderness (1990) and Mikkelson and Ruback (1985, 1991) find that institutions can force value maximization in firms. Baysinger and Butler (1985), Jarrell and Lehn (1985) and Hansen and Hill (1991) also find that the level of institutional ownership is associated with increases in research and development expenditures by managers.

institutions. That is, for these institutions, the power gained from their ownership stake may be tampered somewhat by their reliance on the firm for business activity.

Firm performance may, however, also affect ownership stakes. This leads to a two-way causality or endogeneity problem, where, ownership affects performance and *vice versa*. This is especially interesting within the context of Finland where equity ownership is concentrated and rests with multiple institutional investors. Earlier studies like Demsetz (1983), Demsetz and Lehn (1985), Loderer and Martin (1997), Hermalin and Weisbach (1988), Cho (1998) and Demsetz and Villalonga (2001) consider the possible endogeneity concern between ownership structure and firm performance and address the endogeneity issue using the two-stage least squares (2SLS) framework. Demsetz and Villalonga (2001), however, point out that stronger evidence is needed to explore the endogeneity matter, particularly in the context of concentrated or diffused ownership structure.

This study, therefore, provides additional evidence on the interaction between institutional ownership and firm performance using disaggregated institutional ownership dataset from Finland and an empirical technique that provides a more robust way of exploring the endogeneity issue on the relationship between firm performance and institutional ownership. We contribute to the literature on ownership and performance in three main ways. First, distinct from previous studies, this paper employs the three-stage least squares (3SLS) estimation technique to investigate endogeneity between performance and ownership issue.² Demsetz and Villalonga (2001), as mentioned above, call for stronger evidence to explore the endogeneity issue. We suggest that the 3SLS would provide more robust evidence because, among other things, it captures cross-equation effects as error terms of individual equations in a system are assumed to be contemporaneously correlated. Also, the 3SLS estimation technique is more suitable for cross-sectional studies, where some of the institutional owners own multiple equity stakes in different firms across industries. As a result, ownership and performance issues can affect each other in various ways. These interactions can be captured through 3SLS estimation technique.

The second contribution of this study relate to the investigation of different dimensions of institutional ownership and their effect on firm performance. As noted above, prior studies have mostly considered institutional investors as a monolithic group. Using Pound (1988) hypotheses as a basis, Brickley, Lease, and Smith (1988) and Kochhar and David (1996), classifies institutional ownership in two groups, *pressure-resistant* and *pressure-sensitive* institutional investors. *Pressure-resistant* institutional investors are institutional investors that only have an investment relationships with firms in which they own equity. These include pension funds, mutual funds, endowments and foundations. On the other hand, *pressure-sensitive* institutional investors are likely to have both an investment and business relationships with firms in which they own an equity stake. These institutional shareholdings include equity holdings by insurance companies, banks, and non-bank trusts. Following this classification, we examine the effect of *pressure-resistant* and *pressure-sensitive* institutional ownership on firm performance. Based on Pound's (1988) conjectures, it is likely that there would be a negative relationship between *pressure-sensitive* institutional investors and firm

² Cho (1998) also employs 3SLS apart from 2SLS technique in his study. However, he only reports 2SLS estimation results as his findings from 3SLS remain qualitatively the same.

performance because of the likely business relationship this class of institutional investors have with firms in which they hold equity. The opposite should hold true for *pressure-resistant* institutional ownership.

Thirdly, this paper explores institutional ownership and firm performance for different industries. It has been argued in the literature (see, for instance, Gilson and Roe (1993) and Roe (1994)) that factors that affect firm performance, ranging from the nature of the board's role to the risk of bankruptcy, vary, among other things, by industry and country. Therefore, different industry and country studies provide further insights on relationship between ownership and firm performance.

This study makes some very important findings. Considering all institutional investors where institutional owners control multiple equity stakes in different firms, the empirical results suggest a significant two-way feedback between firm performance and institutional equity ownership. The magnitudes of this two-way effect, however, differ in the sense that institutional ownership is more sensitive to the firm performance than the other way around. The empirical investigations also suggest that, as proposed by Pound (1988), *pressure-sensitive* institutional ownership stakes adversely affects firm performance and the impact is very significant in comparison to the negative effect of firm performance on institutional ownership. These findings remain robust when we estimate, separately, the equations in presence all individual industry-specific dummy variables as well as in presence of different institutional ownership-specific dummies.

The rest of the paper is organized in the following way. In section two, we describe the data and descriptive statistics. Section three outlines the methodology. Section four contains results discussion. Section five concludes. All tables are provided in appendix 1. Appendix 2 summarizes data details.

2. Data and descriptive statistics

Generally, firms are selected from publicly traded companies in Finland satisfying two basic data requirements. First, for a firm to be included in the dataset, it is required that ownership data be available for the sample year, 2004. The ownership data used in this paper is collected from the respective firms' 2004 annual reports. A further requirement is that firms included in the dataset must be included in the Thomson Financial Database. All performance related data is assessed from Thomson Financial Database³. The final sample consists of 116 firms.

The sample shows 775 institutional ownership observations for the 116 firms. Of these, 433 and 342 observations were deemed as *pressure-sensitive* and *pressure-resistant* institutional shareholdings, respectively. Following Demsetz and Villalonga's (2001), firm performance is measured by Tobin's Q (denoted by *Tobin's Q*), which is defined as the sum of the year-end market value of common stocks and the book value of total debt divided by the book value of total assets.

The firms in the dataset are partially owned by multiple institutional owners. We, therefore, calculate the Herfindahl index of ownership shares by institutional

³ See Appendix 2 for detailed data related description.

shareholders (denoted by $Share^4$) to help identify ownership concentration. The Herfindahl index is calculated as:

$$Share_j = \sum_{i=1}^I share_{ij} \quad (1)$$

where, $share_{ij}$ is the share of institutional owner i in firm j . Large values of this index signify that the ownership is concentrated within a few large institutional owners and small values imply that many institutional owners share the ownership stake. Once we calculate the Herfindahl index, the number of observations drops to 180 from initial 775 (??). It is interesting to note that even if there are 116 firms to begin with, because of multiple ownerships and cross-ownerships across industrial firms, we end up with 180 observations. We take care of possible estimation issues in this set-up in our econometric methodology presented in the next section. We also separate the institutional ownership into two categories based on the nature of ownership: (I) shares owned by *pressure resistant* owners (denoted by “_pr”) and (II) shares owned by *pressure sensitive* owners (denoted by “_ps”). Pressure resistant firms are mainly owned by asset management entities (like pension funds) and they don’t interfere into firms’ day-to-day business activities. On the other hand, pressure sensitive firms are owned by financial institutions and they play major roles into firms’ operational and business decisions.

To address endogeneity or two way causality problem between performance and ownership, we use return on equity (denoted by ROE) as an alternative measure of performance. ROE is used as an instrument for firm performance in the empirical estimation later. Herfindahl index of ownership based on owners voting rights (proportion of decisive votes with the stakeholders), denoted by $Vote$ in appendix tables, is used as an alternative measure of ownership. $Vote$ is used as a plausible instrument for $Share$. Sales growth (denoted by $Salesg$) is used as an additional explanatory variable to investigate how sales growth affects ownership⁵. Higher sales growth may have a positive effect on the value of the firm, attracting additional ownership stakes. In regressing performance on ownership, cash flow (divided by total assets and denoted by $Cashf$) is added as another explanatory variable, which measures liquidity.

In accordance with the existing literature, we investigate the firm performance and ownership feedbacks on each other using *four* control variables:

(1) *Leverage* (denoted by $Levg$): Stultz (1988) theorizes that high (insider) ownership may increase leverage. This happens because owners with substantial controls may increase debt as a proportion of equity to maintain their ownership stakes. On the other hand, pecking order theory suggests a negative relationship between various measures of firm performance and leverage. To reconcile the two contradicting views, we use this control variable, which is measured as the ratio of total debts to assets (debt-to-equity ratio). Anderson and Reeb (2003) also control for debt in the capital structure in this way.

⁴ For clarity and ease of presentation, we drop the subscript j from $Share_j$ in the rest of the paper.

⁵ In Himmelberg, Hubbard and Palia (1999), they employ logarithm of sales as a control for firm characteristic and not as an explanatory variable.

(2) *Capital expenditure* (denoted by *Kexp*): Capital expenditures (scaled by total assets) can proxy for investment that may positively affect performance (see, Jensen (1986, 1989)). This variable is included as a control variable to take into account the possible influence of investment on ownership, as mentioned in Short (1994). Thomsen, Pedersen and Kvist (2006), in a recent study, throws light on this control, though they have used equity/assets ratio change as a proxy for changes in capital structure.

(3) *Market risk* (denoted by *Mktrisk*): This is measured by the standard deviation of monthly stock returns over the prior sixty months. Demsetz and Lehn (1985), using cross-sectional data for US, show that the level of (managerial) ownership is determined by the riskiness of the firm, measured by the volatility of the stock price. It is based on “moral hazard” type argument, which says that managers of riskier firms are more prone to face moral hazards. As a result, their ownership stakes would be greater to abet fluctuations in incentives. Whether the same kind of argument holds true for institutional ownership remains an interesting question, which is addressed in this paper as well. Andersen and Reeb (2003) also use the same control variable in their analysis.

(4) *Firm size* (denoted by $\ln(\text{Size})$, after taking logarithm for scale adjustment): It has often been argued that size should be negatively related to ownership (see, for instance, Demsetz and Lehn (1985)) since it is harder to own the same percentage in a large firm as compared to a small firm. We measure firm size by book value of total assets. In their study, Anderson and Reeb (2003) also utilize the same measure for firm size.

Additionally, the following nine industry-level dummies are also used for checking the industry-specific performance and ownership interactions: (1) information technology industry dummy (denoted by *Ites*), (2) industrials dummy (denoted by *Inds*), (3) consumer discretionary industry dummy (denoted by *Cond*), (4) consumer staples industry dummy (denoted by *Stap*), (5) materials industry dummy (denoted by *Mate*), (6) healthcare industry dummy (denoted by *Heal*), (7) real estate industry dummy (denoted by *Rest*), (8) telecommunication industry dummy (denoted by *Tele*) and (9) utilities industry dummy (denoted by *Util*). Demsetz and Villalonga (2001), Demsetz and Lehn (1985) and Cho (1998) also employ industry-specific dummies (utility industry, media industry and financial industry) in their studies.

Tables 1, 2 and 3 in appendix 1 show descriptive statistics of main dependent and independent variables (performance (*Tobin's Q*) and ownership (*Share*)), their instruments (*ROE* and *Vote*), control variables (*Levg*, *Kexp*, *Mktrisk*, *Size*) and exogenous variables (*Cashf* and *Salesg*) for all types of institutional owners, pressure resistant institutional owners and pressure sensitive institutional owners respectively. From these three tables, performance measured by Tobin's q and alternative measure of performance through return on equity (*ROE*) show consistent result in terms of their sample moment statistics. The average value of firm performance for all institutional owners (1.154) is in line with the existing studies. For instance, Cho reports Tobin's q of 1.100 in 1990 for 326 Fortune 500 firms; Demsetz and Villalonga finds Tobin's q to be 1.129 for 223 US firms and Seifert *et al.* tabulate Tobin's q of 1.286 for 319 German firms. It is interesting to note that, Herfindahl indexes for institutional ownership (*Share*) and voting rights (*Vote*) show that ownership is diffused across multiple firms for all types of institutional

owners. In comparison to that, firm ownership seems to be concentrated for pressure sensitive institutional owners.

Table 4 reports correlation results for all variables. *Share* and *Vote* show high correlation, which is expected between the original variable (in the case, *Share*) and the instrumental variable (in this case, *Vote*). Similarly, *Tobin's Q* and *ROE* exhibit moderately high correlation. Negative correlations between two exogenous variables (*Cashf* and *Salesg*) and ownership stakes (*Share*) outline that cash flow and sales growth may affect ownership in an adverse way. We find some support for our earlier conjecture regarding sales growth and firm performance (refer to the positive correlation between *Salesg* and *Tobin's Q*), i.e., higher sales growth may have a positive effect on the value of the firm. Looking at the correlations between controls (*Levg*, *Kexp*, *Mktrisk* and *Size*) and firm performance (*Tobin's Q*), we find a priori support for the pecking order theory, as *Tobin's Q* and *Levg* are negatively correlated. Correlation results between ownership (*Share*) and the above controls show some support for market risk (*Mktrisk*) and ownership (*Share*) argument (positive) provided earlier.

3. Methodology

In this setup, there is a potential two-way causality or endogenous relationship between ownership and firm performance. In that case, simple OLS estimation yields biased (as pointed out by Demsetz and Villalonga (2001) and Cho (1998)) as well as inconsistent estimators. There are two ways to address this problem: (i) to use instrumental variable two stage least squares (2SLS) technique or (ii) to employ instrumental variable three stage least squares (3SLS) technique. The main difference between 2SLS and 3SLS estimation technique is that 3SLS captures cross-equation effects as error terms of individual equations in the system are assumed to be contemporaneously correlated under 3SLS. This makes perfect sense for our cross-section dataset, as some of the institutional owners own multiple equity stakes in different firms. As a result, ownership and performance issues can affect each other in various ways. These interactions can be captured through 3SLS estimation technique.

Under 3SLS setup, choice of instruments plays the most important role. Therefore, we take a closer look (as in Bennedsen, Nielsen, Perez-Gonzalez and Wolfenzon (2006)) on the choice of instruments when we estimate the performance and ownership relationships in the following way.

$$Tobin'sQ = \alpha_0 + \alpha_1 \cdot Share + \alpha_2 \cdot Levg + \alpha_3 \cdot Kexp + \alpha_4 \cdot Mktrisk + \alpha_5 \cdot Ln(Size) + \alpha_6 \cdot Cashf + \varepsilon_1 \quad (2)$$

$$Share = \beta_0 + \beta_1 \cdot Tobin'sQ + \beta_2 \cdot Levg + \beta_3 \cdot Kexp + \beta_4 \cdot Mktrisk + \beta_5 \cdot Ln(Size) + \beta_6 \cdot Salesg + \varepsilon_2 \quad (3)$$

where, *Tobin's Q* and *Share* are two dependent variables in this system of equations, showing possible two-way relationship as *Share* and *Tobin's Q* also show up on the right hand sides of individual regression equations. ε_i s is error terms for individual equations

(2) and (3), which are assumed to be contemporaneously correlated.⁶ We take the return on equities (denoted by *ROE*) as a plausible instrument for firm performance measured by Tobin's Q (denoted by *Tobin's Q*). For ownership, we employ the Herfindahl index of proportion of decisive vote shares (denoted by *Vote*) controlled by owners as an instrument for owners equity stakes. Leverage (*Levg*), capital expenditure (*Kexp*), market risk (*Mktrisk*) and logarithm of firm size (*Ln(Size)*) are control variables in both equations. *Cashf* is the unique exogenous variable in equation (2) and *Salesg* is the unique exogenous variable in equation (3). This uniqueness is helpful to correctly identify⁷ the system (comprising of the above two equations, (2) and (3)) before estimation.

To cross-check the validity of instruments chosen, first, we perform Hausman's (1978) test for endogeneity by regressing and reporting the coefficient of the residuals in the second stage regression. These residuals are generated from the first stage regression when we regress the endogenous variable on all possible instruments and exogenous variables. In all of the cases involving industry-specific dummies and without industry-specific dummies, we find that Hausman test points to possible endogenous relationships with the chosen instruments working as correct proxies (see the first column in table 5 of appendix 1 for reference). Thereafter, we test whether the instruments are statistically relevant. Following the suggestion of Staiger and Stock (1997) as well as Hahn and Hausman (2002), we use the joint significance of *F-test* statistics when we regress the endogenous variable on instrument and all other exogenous variables to measure relevance of those particular instruments. We report this as 'Relevance' in the second column of table 5. Afterwards, in the third column of table 5, we report one of the necessary conditions for choice of instruments, i.e., the correct instruments should be highly conditionally correlated with endogenous variables. In our case, we find that *Vote* is very highly correlated with *Share*. Similarly, *ROE* is also positively correlated with performance variable. In the end, we perform Sargan's (1958) test for overidentifying restrictions in the instrumental variable estimation.⁸ A quick look at the last column of table 5, where we present these test results denoted by 'Overidentification' reveals one interesting fact: *ROE* and interactive terms of *ROE* as instruments met with the overidentification criteria. However, *Vote* and interactive terms of *Vote* show that all instruments are not orthogonal to the error. Therefore, we employ different sets of instruments involving *Vote* and interactive terms of *Vote*.

⁶ 3SLS is appropriate if right-hand side variables are correlated with the error terms, and there is both heteroskedasticity, and contemporaneous correlation in the residuals. We have checked for the presence of heteroskedasticity using White's (1980) heteroskedasticity test and contemporaneous correlation in the residuals using Breusch-Godfrey test before applying 3SLS technique.

⁷ System identification entails checking and satisfying both the rank and order conditions (see, Hsiao (1983)). We have checked those and find that the system is correctly identified.

⁸ Sargan's test statistic is a special case of Hansen's (1982) *J* statistic, and it is distributed as a χ^2_{L-K} under the null hypothesis that all instruments are orthogonal to the error term. *L* denotes numbers of instruments and *K* denotes the numbers of parameters. Without dummies, we have 21 degrees of freedom for the χ^2_{L-K} test statistic, which shows a critical value of 30.014 under 5% significance level. Note that we want to accept the null hypothesis in this case to get the desired result.

The estimation results of these two equations are reported as M1 in the first two columns of table 6 for all types of institutional owners. Additionally, we checked the robustness of estimated interaction between *Tobin's Q* and *Share* in presence of industry-specific dummies in the above two equations. The results of these 3SLS estimation are reported as M2 (includes utility industry dummy as in Demsetz and Lehn (1985) and Demsetz and Villalonga (2001)) and M3 (excluding utility industry dummy) in the last four columns of table 6 for all types of institutional owners.

Thereafter, we explore the robustness of institutional ownership-specific effects on the firm performance by estimating the following system of equations with ownership-specific interactive dummies in the following way:

$$\begin{aligned} Tobin'sQ = & \gamma_0 + \gamma_1.Share + \gamma_2.Share * dum_pi + \gamma_3.Levg + \gamma_4.Levg * dum_pi + \gamma_5.K exp \\ & + \gamma_6.K exp * dum_pi + \gamma_7.Mktrisk + \gamma_8.Mktrisk * dum_pi + \gamma_9.Ln(Size) \\ & + \gamma_{10}.Ln(Size) * dum_pi + \gamma_{11}.Cashf + \gamma_{12}.Cashf * dum_pi + \varepsilon_3 \end{aligned} \quad (4)$$

$$\begin{aligned} Share = & \delta_0 + \delta_1.Tobin'sQ + \delta_2.Tobin'sQ * dum_pi + \delta_3.Levg + \delta_4.Levg * dum_pi + \delta_5.K exp \\ & + \delta_6.K exp * dum_pi + \delta_7.Mktrisk + \delta_8.Mktrisk * dum_pi + \delta_9.Ln(Size) \\ & + \delta_{10}.Ln(Size) * dum_pi + \delta_{11}.Salesg + \delta_{12}.Salesg * dum_pi + \varepsilon_4 \end{aligned} \quad (5)$$

where, $i = r$ or s , depending on whether it is a pressure resistant firm (representation will be dum_pr) or a pressure sensitive firm (representation will be dum_ps). As like the above system, *Tobin's Q* and *Share* are two dependent variables in this system of equations, showing possible two-way relationship as *Share* and *Tobin's Q* also show up on the right hand sides of individual regression equations. ε_i s is error terms for individual equations (4) and (5), which are assumed to be contemporaneously correlated. Non-interactive terms in the above two equations will show the effect of the other institutional ownership. For example, if we run the above system for pressure resistant type institutional owners, then non-interactive terms will report the effect for pressure sensitive type owners in the data sample. The results of these estimations are reported under M1 in the first two columns of table 7 in the first appendix.⁹ Afterwards, we estimate the above equation in presence of industry-specific dummies interacted with ownership-specific dummies to explore the robustness of the reported results. These findings are reported under M2 and M3 in the last four columns of table 7 in the first appendix.

4. Results and discussions

Overall results

Table 6 shows results coming from the 3SLS estimation of systems identified in equations (2) and (3) for all types of institutional ownerships, after controlling for

⁹ We have also reported table 8 in the appendix where estimation results are reported for pressure sensitive type institutional owners. But as we have pointed out earlier, these two tables point to the same interactive results.

industry-specific dummies. We report three sets of results: (i) first set of results are denoted by M1, where, no industry-specific dummies are used; (ii) the second set of results are labeled as M2, where, utility industry dummy (as in Demsetz and Lehn (1985) and Demsetz and Villalonga (2001)) and seven other industry-specific dummies are incorporated in the estimation and (iii) the third set of results are termed as M3, where, except utility industry dummy, all other industry-specific dummies are employed in the estimation.¹⁰

Overall results point to the following important issues. First, within a cross-section of firms and owners, where owners control multiple equity stakes in different firms, there is considerable two-way feedback between business performances and controlling equity stakes related decision making. Second, the magnitudes of the effects outlined above differ in the sense that ownership decisions are more sensitive to the business performance than the other way around. We find that ownership stakes adversely affects firm performance and the impact is very high in comparison to the negative effect of firm performance on institutional ownership. Third, findings from above remains robust when we separately estimate the equations in presence all individual industry-specific dummy variables as well as in presence of different institutional ownership-specific dummies.

Looking at the results from all types of institutional owners related estimation from table 6, we conclude that institutional ownership adversely affects firm performance after controlling for debt-to-equity ratio (through *Levg*), capital expenditure (through *Kexp*), market risk (through *Mktrisk*) and firm size (through *Ln(Size)*). This effect is robust (remains negative and significant) in presence of industry-specific dummies. This result can be aligned with the recent findings by Thomsen *et al.* (2006) for continental Europe, though their focus is on blockholder ownership. Also, our finding can be interpreted as supporting Fama and Jensen's (1983) view, albeit, from blockholder's perspective. Additionally, the results also show that, firm performance is not a positive determinant for ownership stakes. Loderer and Martin (1997) also report that Tobin's Q is a negative predictor of insider ownership. Taken together, the findings show significant two-way causality between firm performance and ownership, with institutional ownerships impact on firm performance being more pronounced.

Looking at the controls, we find that firm size plays a positive role in determining ownership stakes for institutions, thus, supporting earlier findings from La Porta, Lopez de Silanes, Shleifer and Vishny (2000). This is not consistent, however, in presence of dummies, but becomes robust for pressure sensitive owners later (see table 7 for reference). We find strong support for pecking order theory, as leverage adversely affects firm performance, and remains robust in presence of industry dummies. As argued in Demsetz and Lehn (1985) for managerial ownership context, we also find that market risk has a positive influence on institutional ownership for Finland. Within industries, only utilities industry exerts positive influence on equity ownership.

¹⁰ We have also estimated models with different sets of industries and the findings from those validate the robustness of performance and ownership results. These models are not reported here due to space constraint but the findings are always available from the corresponding author.

Robustness check

Tables 7 and 8 report robustness checks results with pressure resistant and pressure sensitive institutional dummies interacted with performance and ownership measures, as outlined in equations (4) and (5) above. For non-interactive dummies, the results need to be interpreted in the following way. Take, *Tobin's Q*, for instance in table 7. It shows the performance impact from pressure sensitive institutional owners as *Tobin's Q*dum_pr* reflects firm performance for pressure resistant owners.

The robustness results from table 7 clearly show support to Pound's (1988) argument, that for pressure sensitive institutional owners, ownership stakes adversely affects performance, measured by *Tobin's Q*. This is in line with evidence from continental Europe in Thomsen *et al.* (2006). This finding remains consistent in presence of industry-specific dummies as well. Similarly, for pressure sensitive owners, firm performance negatively affects shareholding stakes, as in Loderer and Martin (1997). Therefore, considerable two way feedbacks between firm performance (*Tobin's Q*) and institutional ownership (*Share*) are consistent and robust for pressure sensitive firms in Finland.

Looking at the controls, we find that firm size plays a positive role in determining ownership stakes for pressure sensitive institutions, thus, supporting earlier findings from La Porta, Lopez de Silanes, Shleifer and Vishny (2000). We find some support for pecking order theory for pressure sensitive owners, as leverage adversely affects firm performance, and remains robust in presence of industry dummies involving utilities. Within industries, utilities industry exerts positive influence on equity ownership for pressure sensitive owners.

We find support for table 6's overall findings from additional robustness checks (see table 8) that ownership stakes adversely affects performance, measured by *Tobin's Q*, for pressure resistant firms as well. Table 8 also reports one interesting finding involving firm performance and ownership decision. It shows that firm performance has no influence on institutional ownership stakes, which partially support the existing literatures (see, for instance, Demsetz and Villalonga (2001) and Thomsen *et al.* (2006)) finding that ownership decisions are invariant to firm performance.

5. Conclusion

This paper looks at a new dimension of ownership, *viz.*, institutional ownership (as in Pound (1988)) and its interaction with firm performance for 116 firms across nine industries in Finland. Institutional ownership is separated between pressure sensitive owners (for example, insurance companies, banks, and non-bank trusts) and pressure resistant owners (for instance, public pension funds, mutual funds, endowments and foundations). There is evidence that these institutional owners own stakes in multiple firms across industries, leading to a possible two way causality or endogeneity problem between firm performance and ownership structure. Three stage least squares (3SLS) is employed to address this problem for the first time in the literature. Choice of instruments in the 3SLS setup is carefully investigated. To explore firm performance and ownership issue in this framework, two exogenous variables (cash flow and sales growth) and four control variables (leverage, capital expenditure, market risk and firm size) are employed

in accordance to the existing literature (see, Demsetz and Villalonga (2001), Anderson and Reeb (2003)). Additionally, nine industry specific dummies for information technology industry, industrials industry, consumer discretionary industry, consumer staples industry, materials industry, healthcare industry, real estate industry, telecommunications industry and utilities industry are also used to check for robust and consistent results.

The results show that there is considerable two-way feedback between business performances and controlling equity stakes related decision making. The magnitudes of the effects outlined above differ in the sense that ownership decisions are more sensitive to the business performance than the other way around. We find that ownership stakes adversely affects firm performance (as proposed in Pound (1988) for pressure sensitive institutional owners) and the impact is very high in comparison to the negative effect of firm performance on institutional ownership. This result can be aligned with the recent findings by Thomsen *et al.* (2006) for continental Europe, though their focus is on blockholder ownership. Also, our finding can be interpreted as supporting Fama and Jensen's (1983) view, albeit, from blockholder's perspective. Findings from above remain robust when we separately estimate the equations in presence all individual industry-specific dummy variables as well as in presence of different institutional ownership-specific dummies. The results also show that, firm performance is not a positive determinant for ownership stakes, as in Loderer and Martin's (1997) result regarding insider ownership. Additional robustness checks show that firm performance has no influence on institutional ownership stakes, which partially support the existing literatures (see, for instance, Demsetz and Villalonga (2001) and Thomsen *et al.* (2006)) finding that ownership decisions are invariant to firm performance. Institutional ownership stakes and firm performance interactions in Europe and US will be examined for future research.

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Appendix 1: Tables

Table 1. Descriptive Statistics for *All Types* of Institutional Owners

Variables	Mean	Median	Standard deviation	Maximum	Minimum	Skewness	No. of obs.
<i>Tobin's Q</i>	1.154	0.958	0.740	4.526	0.117	2.407	180
<i>ROE</i>	7.417	7.100	25.196	189.500	-57.000	3.824	180
<i>Share</i>	0.017	0.002	0.055	0.366	0.000	5.000	180
<i>Vote</i>	0.019	0.001	0.057	0.366	0.000	4.661	180
<i>Levg</i>	0.240	0.244	0.165	0.630	0.000	0.266	180
<i>Kexp</i>	8.240	6.008	9.620	72.472	0.320	4.384	180
<i>Mktrisk</i>	0.033	0.029	0.017	0.133	0.016	2.888	180
<i>Size</i>	1386.430	120.900	3883.102	22456.000	8.506	4.015	180
<i>Cashf</i>	1.279	0.809	1.829	12.116	-0.288	3.549	180
<i>Salesg</i>	0.071	0.025	0.213	1.576	-0.246	4.231	180

Notes: *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth.

Table 2. Descriptive Statistics for *Pressure Resistant Type* Institutional Owners

Variables	Mean	Median	Standard deviation	Maximum	Minimum	Skewness	No. of obs.
<i>Tobin's Q</i>	1.145	0.956	0.739	4.526	0.117	2.422	92
<i>ROE</i>	6.818	7.050	25.475	189.500	-57.000	3.643	92
<i>Share</i>	0.011	0.001	0.043	0.361	0.000	6.411	92
<i>Vote</i>	0.014	0.001	0.048	0.361	0.000	5.338	92
<i>Levg</i>	0.243	0.248	0.167	0.630	0.000	0.236	92
<i>Kexp</i>	8.310	5.963	9.719	72.472	0.320	4.222	92
<i>Mktrisk</i>	0.034	0.028	0.017	0.133	0.016	2.683	92
<i>Size</i>	1355.001	119.027	3856.649	22456.000	8.506	4.065	92
<i>Cashf</i>	1.225	0.818	1.818	12.116	-0.288	3.585	92
<i>Salesg</i>	0.076	0.025	0.217	1.576	-0.246	3.883	92

Notes: *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth.

Table 3. Descriptive Statistics for *Pressure Sensitive* Type Institutional Owners

Variables	Mean	Median	Standard deviation	Maximum	Minimum	Skewness	No. of obs.
<i>Tobin's Q</i>	1.163	0.967	0.754	4.526	0.117	2.393	88
<i>ROE</i>	8.042	7.450	25.031	189.500	-57.000	4.033	88
<i>Share</i>	0.022	0.002	0.066	0.366	0.000	4.154	88
<i>Vote</i>	0.022	0.002	0.066	0.366	0.000	4.110	88
<i>Levg</i>	0.239	0.241	0.163	0.630	0.000	0.299	88
<i>Kexp</i>	8.166	6.067	9.570	72.472	0.320	4.561	88
<i>Mktrisk</i>	0.032	0.028	0.016	0.133	0.016	3.143	88
<i>Size</i>	1419.288	127.924	3932.404	22456.000	11.918	3.964	88
<i>Cashf</i>	1.303	0.889	1.850	12.116	-0.240	3.514	88
<i>Salesg</i>	0.066	0.025	0.211	1.576	-0.246	4.415	88

Notes: *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth.

Table 4. Correlation Data for *All Types* of Institutional Owners

Variables	<i>Tobin's Q</i>	<i>ROE</i>	<i>Share</i>	<i>Vote</i>	<i>Levg</i>	<i>Kexp</i>	<i>Mktrisk</i>	<i>Size</i>	<i>Cashf</i>
<i>Tobin's Q</i>	1.000								
<i>ROE</i>	0.258	1.000							
<i>Share</i>	-0.129	-0.049	1.000						
<i>Vote</i>	-0.124	-0.040	0.983	1.000					
<i>Levg</i>	-0.281	0.087	0.032	0.029	1.000				
<i>Kexp</i>	-0.171	0.180	-0.041	-0.037	-0.031	1.000			
<i>Mktrisk</i>	0.162	-0.074	0.091	0.122	-0.239	-0.215	1.000		
<i>Size</i>	0.116	0.022	0.133	0.169	0.067	-0.096	-0.086	1.00	
<i>Cashf</i>	-0.245	0.084	-0.029	-0.025	-0.027	0.338	-0.248	0.078	1.000
<i>Salesg</i>	0.070	0.281	-0.053	-0.056	-0.117	0.028	-0.096	-0.084	-0.065

Notes: *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth.

Table 5. Validity of Instruments

Instruments	Hausman's Test	Relevance	Correlation	Overidentification
<i>ROE</i>	-0.007	9.121***	0.258	28.810
<i>Industry dummies</i>	-0.009	7.087***		
<i>Vote</i>	-1.429	746.849***	0.983	44.170**
<i>Industry dummies</i>	-3.154	341.925***		

Notes: 'Hausman's test' is reporting the coefficient of the residuals in the second stage regression. Under 'Relevance', we are reporting the joint significance of the F-test statistics when we regress the endogenous variable on instrument and all other exogenous variables. 'Correlation' shows simple relationship between the endogenous variable and possible instruments. Under 'Overidentification', we perform Sargan's test with the null hypothesis that all instruments are orthogonal to the error term. *** denotes 1%, ** denotes 5% and * denotes 10% level of significance.

Table 6. 3SLS Results for All Types of Institutional Owners

Variables	M1	M1	M2	M2	M3	M3
	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>
<i>Constant</i>	1.700*** (0.237)	0.001 (0.024)	2.101*** (0.434)	-0.001 (0.040)	1.652*** (0.494)	0.144*** (0.041)
<i>Tobin's Q</i>		-0.018*** (0.008)		-0.015** (0.008)		-0.015** (0.008)
<i>Share</i>	-1.974*** (0.917)		-1.968*** (0.923)		-1.968*** (0.923)	
<i>Levg</i>	-1.203*** (0.323)	-0.014 (0.027)	-0.752*** (0.363)	0.001 (0.029)	-0.752*** (0.363)	0.001 (0.029)
<i>Kexp</i>	-0.008* (0.006)	-0.000 (0.000)	-0.006 (0.005)	-0.001 (0.001)	-0.006 (0.005)	-0.001 (0.001)
<i>Mktrisk</i>	1.704 (3.255)	0.517*** (0.261)	-2.978 (3.212)	0.378* (0.259)	-2.978 (3.212)	0.378* (0.259)
<i>Ln(Size)</i>	-0.015 (0.029)	0.004*** (0.002)	-0.014 (0.030)	0.002 (0.003)	-0.014 (0.030)	0.002 (0.003)
<i>Cashf</i>	-0.083*** (0.030)		-0.034 (0.030)		-0.034 (0.030)	
<i>Salesg</i>		0.001 (0.019)		0.005 (0.019)		0.005 (0.019)
<i>Ites</i>			-0.054 (0.354)	0.018 (0.029)	0.396 (0.420)	-0.127*** (0.032)
<i>Inds</i>			-0.632** (0.339)	0.010 (0.028)	-0.181 (0.408)	-0.136*** (0.031)
<i>Cond</i>			-0.456 (0.353)	-0.002 (0.029)	-0.006 (0.424)	-0.148*** (0.032)
<i>Stap</i>			-0.907*** (0.363)	-0.003 (0.030)	-0.458 (0.435)	-0.149*** (0.033)
<i>Mate</i>			-0.599* (0.352)	0.024 (0.029)	-0.149 (0.411)	-0.121*** (0.031)
<i>Heal</i>			-0.367 (0.465)	0.002 (0.038)	0.082 (0.516)	-0.143*** (0.040)
<i>Rest</i>			-0.634* (0.418)	0.001 (0.034)	-0.185 (0.487)	-0.145*** (0.037)
<i>Tele</i>					0.450 (0.518)	-0.145*** (0.040)
<i>Util</i>			-0.450 (0.518)	0.145*** (0.040)		
<i>Adjusted R square</i>	0.143	0.014	0.203	0.094	0.203	0.094

Notes: *** denotes 1%, ** denotes 5% and * denotes 10% level of significance. Standard errors are reported in parentheses. *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth. *Ites* is information technology industry dummy; *Inds* is industrials dummy; *Cond* is consumer discretionary industry dummy; *Stap* is consumer staples industry dummy; *Mate* represents materials industry; *Heal* is healthcare industry dummy; *Rest* is real estate industry dummy; *Tele* is telecommunication industry dummy and *Util* is utilities industry dummy. We use *ROE* as an instrument for performance and *Vote* as an instrument for ownership share. Above results are generated using a combination of individual instruments and interactive instruments with other controls, exogenous variables and industry-specific dummies.

Table 7. 3SLS Results for *All Types* of Institutional Owners: Robustness Check

Variables	M1	M1	M2	M2	M3	M3
	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>
<i>Constant</i>	1.697*** (0.237)	-0.009 (0.022)	2.030*** (0.434)	0.008 (0.037)	1.751*** (0.506)	0.136*** (0.038)
<i>Tobin's Q</i>		-0.018*** (0.009)		-0.027*** (0.012)		-0.026** (0.014)
<i>Tobin's Q*dum_pr</i>		0.011 (0.012)		0.011 (0.021)		0.011 (0.024)
<i>Share</i>	-1.777* (1.152)		-3.464*** (1.273)		-3.063*** (1.244)	
<i>Share*dum_pr</i>	-1.422 (2.079)		-1.233 (2.069)		-1.483 (2.066)	
<i>Levg</i>	-1.269*** (0.457)	-0.020 (0.036)	-0.752* (0.514)	-0.000 (0.038)	-0.725 (0.528)	0.016 (0.040)
<i>Levg*dum_pr</i>	0.139 (0.621)	0.027 (0.047)	0.102 (0.684)	0.010 (0.049)	0.019 (0.418)	-0.023 (0.054)
<i>Kexp</i>	-0.010 (0.007)	-0.001 (0.001)	-0.006 (0.007)	-0.000 (0.001)	-0.006 (0.008)	0.000 (0.001)
<i>Kexp*dum_pr</i>	0.002 (0.010)	0.001 (0.001)	0.001 (0.010)	-0.000 (0.000)	-0.000 (0.011)	-0.001 (0.000)
<i>Mktrisk</i>	1.500 (4.090)	-0.005 (0.336)	-4.040 (4.617)	-0.171 (0.340)	-3.078 (4.674)	0.068 (0.350)
<i>Mktrisk*dum_pr</i>	0.337 (4.644)	0.934*** (0.405)	3.951 (6.032)	0.917*** (0.435)	2.061 (6.217)	0.457 (0.455)
<i>Ln(Size)</i>	-0.009 (0.038)	0.011*** (0.003)	-0.005 (0.041)	0.007*** (0.003)	0.005 (0.042)	-0.010*** (0.003)
<i>Ln(Size)*dum_pr</i>	-0.016 (0.044)	-0.012*** (0.003)	-0.009 (0.054)	-0.007*** (0.004)	-0.037 (0.053)	-0.015*** (0.003)
<i>Cashf</i>	-0.082*** (0.042)		-0.036 (0.042)		-0.033 (0.042)	
<i>Cash*dum_pr</i>	-0.001 (0.060)		-0.002 (0.060)		-0.005 (0.060)	
<i>Salesg</i>		0.007 (0.027)		0.010 (0.025)		0.020 (0.026)
<i>Salesg*dum_pr</i>		-0.011*** (0.003)		-0.014 (0.035)		-0.033 (0.036)
<i>Ites</i>			0.095 (0.413)	0.024 (0.034)	0.271 (0.478)	-0.134*** (0.036)
<i>Ites*dum_pr</i>			-0.195 (0.404)	-0.007 (0.040)	0.027 (0.428)	0.053 (0.051)
<i>Inds</i>			-0.543 (0.384)	0.012 (0.029)	-0.369 (0.452)	-0.146** (0.032)
<i>Inds*dum_pr</i>			-0.094 (0.377)	-0.011 (0.030)	0.141 (0.407)	0.053 (0.039)
<i>Cond</i>			-0.333 (0.422)	-0.004 (0.032)	-0.161 (0.498)	-0.166*** (0.034)
<i>Cond*dum_pr</i>			-0.218 (0.446)	-0.004 (0.036)	0.024 (0.477)	0.065 (0.046)
<i>Stap</i>			-0.846** (0.438)	-0.017 (0.032)	-0.675 (0.514)	-0.179*** (0.035)
<i>Stap*dum_pr</i>			-0.064 (0.501)	0.014 (0.036)	0.181 (0.539)	0.084*** (0.042)

Table 7. 3SLS Results for *All Types* of Institutional Owners: Robustness Check (continued)

Variables	M1	M1	M2	M2	M3	M3
	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>	Dep.var: <i>Tobin's Q</i>	Dep.var: <i>Share</i>
<i>Mate</i>			-0.395 (0.440)	0.039 (0.032)	-0.267 (0.481)	-0.128*** (0.034)
<i>Mate*dum_pr</i>			-0.288 (0.514)	-0.041 (0.038)	0.030 (0.538)	0.041 (0.046)
<i>Heal</i>			-0.308 (0.581)	0.002 (0.044)	-0.121 (0.633)	-0.157*** (0.045)
<i>Heal*dum_pr</i>			-0.079 (0.705)	0.001 (0.056)	0.136 (0.718)	0.063 (0.063)
<i>Rest</i>			-0.561 (0.537)	-0.008 (0.040)	-0.395 (0.611)	-0.174*** (0.043)
<i>Rest*dum_pr</i>			-0.127 (0.677)	0.004 (0.050)	0.144 (0.712)	0.081 (0.058)
<i>Tele</i>					0.224 (0.661)	-0.170*** (0.048)
<i>Tele*dum_pr</i>					0.151 (0.805)	-0.084 (0.071)
<i>Util</i>			0.184 (0.664)	0.211*** (0.044)		
<i>Util*dum_pr</i>			-1.135 (0.953)	-0.218*** (0.067)		
<i>Adjusted R square</i>	0.115	0.087	0.118	0.168	0.117	0.131

Notes: *** denotes 1%, ** denotes 5% and * denotes 10% level of significance. Standard errors are reported in parentheses. *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth. *Ites* is information technology industry dummy; *Inds* is industrials dummy; *Cond* is consumer discretionary industry dummy; *Stap* is consumer staples industry dummy; *Mate* represents materials industry; *Heal* is healthcare industry dummy; *Rest* is real estate industry dummy; *Tele* is telecommunication industry dummy and *Util* is utilities industry dummy. *dum_pr* stands for pressure sensitive type institutional ownership dummy. Non-interactive terms are denoting effects of the other type of institutional ownership. We use *ROE* as an instrument for performance and *Vote* as an instrument for ownership share. Above results are generated using a combination of individual instruments and interactive instruments with other controls, exogenous variables and industry-specific dummies.

Table 8. 3SLS Results for *All Types* of Institutional Owners: Additional Robustness Check

Variables	M1	M1	M2	M2	M3	M3
	Dep.var:	Dep.var:	Dep.var:	Dep.var:	Dep.var:	Dep.var:
	<i>Tobin's Q</i>	<i>Share</i>	<i>Tobin's Q</i>	<i>Share</i>	<i>Tobin's Q</i>	<i>Share</i>
<i>Constant</i>	1.697*** (0.237)	-0.009 (0.022)	2.079*** (0.433)	-0.005 (0.036)	1.609*** (0.507)	0.126*** (0.039)
<i>Tobin's Q</i>		-0.006 (0.009)		-0.010 (0.013)		-0.009 (0.014)
<i>Tobin's Q*dum_ps</i>		-0.011 (0.012)		-0.011 (0.020)		-0.012 (0.024)
<i>Share</i>	-3.200** (1.736)		-3.181** (1.651)		-3.125** (1.656)	
<i>Share*dum_ps</i>	1.422 (2.079)		0.947 (2.087)		1.384 (2.083)	
<i>Levg</i>	-1.129*** (0.441)	0.006 (0.034)	-0.683 (0.485)	0.014 (0.035)	-0.716* (0.494)	-0.003 (0.037)
<i>Levg*dum_ps</i>	-0.139 (0.621)	-0.027 (0.047)	-0.083 (0.684)	-0.009 (0.049)	-0.042 (0.718)	0.023 (0.054)
<i>Kexp</i>	-0.007 (0.008)	-0.000 (0.000)	-0.006 (0.008)	-0.000 (0.001)	-0.006 (0.007)	-0.000 (0.000)
<i>Kexp*dum_ps</i>	-0.002 (0.010)	-0.000 (0.000)	-0.001 (0.010)	0.000 (0.000)	-0.000 (0.011)	0.000 (0.000)
<i>Mktrisk</i>	1.838 (4.008)	0.930*** (0.306)	-1.323 (4.284)	0.773*** (0.303)	-1.897 (4.361)	0.551** (0.313)
<i>Mktrisk*dum_ps</i>	-0.337 (4.644)	-0.934*** (0.405)	-2.590 (6.034)	-0.923*** (0.435)	-1.369 (6.219)	-0.462 (0.455)
<i>Ln(Size)</i>	-0.025 (0.036)	-0.000 (0.002)	-0.013 (0.039)	-0.001 (0.003)	-0.024 (0.038)	-0.005** (0.002)
<i>Ln(Size)*dum_ps</i>	0.016 (0.044)	0.012*** (0.003)	-0.001 (0.054)	0.008*** (0.004)	0.017 (0.053)	0.015*** (0.003)
<i>Cashf</i>	-0.083*** (0.043)		-0.037 (0.043)		-0.038 (0.043)	
<i>Cash*dum_ps</i>	0.001 (0.060)		0.003 (0.060)		0.007 (0.060)	
<i>Salesg</i>		-0.004 (0.025)		-0.000 (0.024)		-0.010 (0.024)
<i>Salesg*dum_ps</i>		0.011 (0.036)		0.015 (0.035)		0.034 (0.036)
<i>Ites</i>			-0.135 (0.402)	0.019 (0.032)	0.414 (0.492)	-0.083** (0.044)
<i>Ites*dum_ps</i>			0.213 (0.404)	0.005 (0.041)	0.070 (0.428)	-0.054 (0.052)
<i>Inds</i>			-0.663** (0.389)	0.006 (0.029)	-0.105 (0.487)	-0.093*** (0.039)
<i>Inds*dum_ps</i>			0.088 (0.377)	0.010 (0.030)	-0.065 (0.407)	-0.054 (0.039)
<i>Cond</i>			-0.560 (0.412)	-0.003 (0.032)	0.000 (0.000)	-0.102*** (0.042)
<i>Cond*dum_ps</i>			0.225 (0.447)	0.003 (0.037)	0.073 (0.477)	-0.065 (0.046)
<i>Stap</i>			-0.940*** (0.441)	0.004 (0.032)	-0.378 (0.538)	-0.095*** (0.041)
<i>Stap*dum_ps</i>			0.086 (0.502)	-0.016 (0.036)	-0.069 (0.539)	-0.085*** (0.042)

Table 8. 3SLS Results for All Types of Institutional Owners: Additional Robustness Check
(continued)

Variables	M1	M1	M2	M2	M3	M3
	Dep.var:	Dep.var:	Dep.var:	Dep.var:	Dep.var:	Dep.var:
	<i>Tobin's Q</i>	<i>Share</i>	<i>Tobin's Q</i>	<i>Share</i>	<i>Tobin's Q</i>	<i>Share</i>
<i>Mate</i>			-0.706*	0.004	-0.123	-0.087***
			(0.430)	(0.033)	(0.519)	(0.041)
<i>Mate*dum_ps</i>			0.246	0.039	0.031	-0.042
			(0.514)	(0.038)	(0.538)	(0.046)
<i>Heal</i>			-0.405	0.005	0.146	-0.096**
			(0.581)	(0.044)	(0.642)	(0.052)
<i>Heal*dum_ps</i>			0.093	-0.001	-0.042	-0.063
			(0.706)	(0.056)	(0.717)	(0.063)
<i>Rest</i>			-0.703	0.000	-0.128	-0.092***
			(0.536)	(0.040)	(0.614)	(0.048)
<i>Rest*dum_ps</i>			0.138	-0.004	-0.031	-0.082
			(0.677)	(0.050)	(0.538)	(0.058)
<i>Tele</i>					0.506	-0.089**
					(0.668)	(0.055)
<i>Tele*dum_ps</i>					-0.032	-0.086
					(0.805)	(0.072)
<i>Util</i>			-0.970	-0.000		
			(0.763)	(0.056)		
<i>Util*dum_ps</i>			0.876	0.216***		
			(0.953)	(0.067)		
<i>Adjusted R square</i>	0.115	0.087	0.136	0.184	0.134	0.147

Notes: *** denotes 1%, ** denotes 5% and * denotes 10% level of significance. Standard errors are reported in parentheses. *Tobin's Q* measures firm performance; *ROE* stands for return on equity, which is an alternative measure for performance; *Share* denotes the Herfindahl index of ownership shares by institutional shareholders; *Vote* is an alternative Herfindahl index of ownership based on owners voting rights; *Levg* denotes leverage; *Kexp* measures capital expenditure; *Mktrisk* stands for market risk measured as the standard deviation of monthly stock returns for prior sixty months; *Size* depicts firm size; *Cashf* denotes cash flow and *Salesg* shows sales growth. *Ites* is information technology industry dummy; *Inds* is industrials dummy; *Cond* is consumer discretionary industry dummy; *Stap* is consumer staples industry dummy; *Mate* represents materials industry; *Heal* is healthcare industry dummy; *Rest* is real estate industry dummy; *Tele* is telecommunication industry dummy and *Util* is utilities industry dummy. *Dum_ps* stands for pressure sensitive type institutional ownership dummy. Non-interactive terms are denoting effects of the other type of institutional ownership. We use *ROE* as an instrument for performance and *Vote* as an instrument for ownership share. Above results are generated using a combination of individual instruments and interactive instruments with other controls, exogenous variables and industry-specific dummies.

Appendix 2: Data Details

Variables, definitions, and sources

Variable	Definition	Sources
Tobin's Q	sum of year-end market value of common stock and book value of total debt divided by book value of total debt.	Thomson Financial