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STRUCTURE, AND CORPORATE
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FROM SWEDEN**

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ABSTRACT

Pension Reform, Ownership Structure, and Corporate Governance: Evidence from Sweden*

Sweden offers a unique natural experiment to analyze the microeconomic effects of institutionalized saving on ownership structure, corporate governance and performance of listed companies. First, the Swedish pension reform increased the participation of pension funds in the domestic stock market and caused a significant reshuffling in the ownership of the existing pension funds. Second, the availability of detailed data on firm ownership allows us to document the effects of the pension reform. We show that the effects of institutional investment on firm performance depend on the industry structure of pension funds. In particular, we find that firm performance improves if large independent private pension funds and public pension funds increase their equity stakes in the firm, but not if smaller pension funds and pension funds related to financial institutions and industrial groups increase their shareholdings. Additionally, controlling shareholders appear reluctant to relinquish control and the control premium increases if public pension funds acquire shares.

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Introduction

Demographic trends and aging populations are calling for pension reforms from pay-as-you-go to fully funded pension systems. Pension reforms may affect the financial system through various channels. So far, the economic profession has mainly explored the impact of pension reforms on national saving (see, for instance, Attanasio and Brugiavini, 2003, and Attanasio and Rohwedder, 2003).

The transition from an unfunded to a fully funded pension system relies on the introduction of pension funds investing individual savings in financial assets, including domestic equity. Pension reforms are thus expected to cause an increase in institutionalized saving (Khorana, Servaes and Tufano, 2005). Pension funds and other institutional investors in turn are widely believed to play an important role in corporate governance and may affect the development of the financial system.

First, stock valuation may increase as a consequence of the increased demand for equity. For given private benefits of control, this may drive up controlling shareholders' opportunity cost of holding the controlling block and increase the likelihood that controlling owners relinquish control (Helwege, Pirinsky and Stulz, 2007).¹

Second, and more importantly from a corporate governance point of view, pension funds acquiring large stakes in listed companies have an incentive to monitor managers and controlling shareholders, to engage in negotiations with management, to make proxy proposals, and to get involved in the choice of board members (Pagano and Roell, 1998). This could have an effect on corporate policies, may limit controlling shareholders' ability to extract private benefits of control, and could lead to a more dispersed ownership structure (Burkart, Panunzi and Shleifer, 2003).

¹ Pagano, Panetta and Zingales (1998) and Ritter (1991) also show that controlling owners time their primary equity sales after price increases.

For these reasons, there is a widespread belief among policymakers that pension reforms instigate mechanisms leading to improved corporate governance and increased shareholder discipline.

To the best of our knowledge, this paper is the first attempt to explore these issues. We exploit the Swedish pension reform as a laboratory. We believe that Sweden provides an ideal natural experiment for a number of reasons. First, in the implementation of the pension reform, one of the public pension funds that had traditionally been active in corporate governance was forced to sell most of its equity participations and to reallocate funds to the government and some newly created public pension funds. The reallocation of assets of this pension fund and the subsequent inflow of funds in public and private pension funds serve as ideal natural experiments for how substantial changes in institutional ownership structure affect firm performance.

Second, we have access to detailed data on the ownership structure of listed companies for the years preceding and following the pension reform. Hence, we can explore the effects of the increased presence of pension funds not only on firm valuation but also on ownership structure and various aspects of firm-level corporate governance.

To explore the causal effects of an increase in pension funds ownership, we exploit the dismissal of public pension funds' assets and the exogenous timing of their stockholdings' expansion to construct instruments. Thus, having mitigated concerns that the relation between changes in ownership and firm outcomes may be due to the fact that pension funds select firms on the basis of the expected performance, we show that an increase in the holdings of public pension funds as well as of large independent private pension funds is associated with an increase in shareholder value. In contrast, equity stakes by pension funds affiliated with industrial groups or financial institutions if anything decrease firm value.

The empirical evidence suggests that the effects on firm performance are due to differences in pension funds' monitoring activity and propensity to contrast controlling shareholders. For given size of their equity stakes, both public and private pension funds are more likely to be represented in board of nominating committees and thus to contribute to the choice of directors. Controlling shareholders appear reluctant to relinquish control to public and large independent private pension funds, but not to the remaining ones. When public pension funds buy a participation in a firm, the value of a marginal vote increases and controlling shareholders either increase their control blocks or exploit the pension funds whose vote they indirectly control to increase their voting power. Controlling shareholders also appear to exploit their related pension funds to acquire more votes when large independent private pension funds increase their holdings, but not if other pension funds related to financial institutions or other business groups do so.

Overall, our results suggest that the effects of institutional investors on firm performance depend on the industry structure of pension funds. In particular, only pension funds that are sufficiently large to acquire large blocks and are independent from industrial groups and financial institutions appear to affect positively firm performance. In contrast, pension funds related to business groups are used by the controlling families as a mechanism to enhance the entrenchment of corporate control. We also find that the increase in institutionalized saving did not bring about a decrease in ownership concentration. Our results suggest that if private benefits of controls are large, ownership concentration may even increase in response to institutional investors' monitoring. Interestingly, while we find a correlation between changes in holdings of the controlling shareholders (and their related funds) and public and large private independent pension funds, we do not find an analogous effect of changes in ownership of private independent pension funds on the value of a marginal vote. We present evidence suggesting that public pension funds are more successful

in affecting corporate policies (*ceteris paribus*, they are more likely to be represented in board nominating committees), possibly because they coordinate their actions to a larger extent.

Our paper is related to the literature on shareholder activism and institutional ownership. The existing literature has mostly focused on pension funds and other institutional investors in the U.S. and the U.K. and has failed to identify systematic effects of institutional ownership on firm value (Karpoff, 2001). Existing empirical evidence lends support to competing views. Del Guercio and Hawkins (1999) find that pension funds are successful at monitoring and promoting changes in target firms, while other researchers report that institutional owners are largely ineffective as monitors (Wahal, 1996; Gillan and Starks, 2000) and do not enhance shareholder value by monitoring firms (e.g., Karpoff et al., 1996). Some papers find that institutional shareholders degrade firm performance either because they do not have the skills to improve firm performance or because their objectives conflict with value maximization (Carleton, Nelson and Weisbach, 1998; Woidtke, 2002). Only a minority of studies finds evidence that institutional owners, and pension funds in particular, increase shareholder value by monitoring firms (e.g., Smith, 1996).

We complement the literature as follows. Unlike previous studies that have focused on the effects of investor activism on widely held firms in the U.S. or the U.K., we focus on a sample in which a large fraction of firms displays concentrated ownership, often through the use of dual class shares, pyramiding and cross-holdings. We can thus study the effects of institutional ownership in a financial system in which the presence of controlling owners is pervasive.

Furthermore, our contribution can be viewed as methodological. The mixed results of previous studies may depend on the following two challenges. First, previous studies rarely rely on changes in ownership and attempt to capture institutional investors' monitoring using specific episodes of activism. However, we generally do not observe institutional investors'

attempts to affect firm policies as only a minority of these attempts consist of shareholder proxy proposals. This makes it difficult to go beyond clinical studies of specific institutional investors (Carleton, Nelson and Weisbach, 1998; Becht, Franks, Mayer and Rossi, 2007). We can proxy for changes in the expected monitoring activity by using changes in institutional ownership. This allows us to assess the effects of institutional ownership in a large scale experiment instead of evaluating specific episodes of shareholder activism.

Second, most of the studies suffer from the problems common to all the literature on ownership and performance. It is impossible to draw conclusions about causal relations simply by saturating firm performance regressions with a large number of firm characteristics in addition to ownership information (see Demsetz and Lehn, 1985; Himmelberg et al., 1999; and Coles, Lemmon, and Meschke, 2006). As an alternative approach, instrumental variables could be employed to assess the independent effect of ownership structure on firm performance and resolve questions about the direction of causality, but the lack of valid instruments has thus far limited the use of this approach (Coles, Lemmon, and Meschke, 2006). We exploit the substantial exogenous shock to institutional ownership caused by the pension reform. By employing this exogenous variation in ownership, we thus mitigate concerns about endogeneity affecting the previous literature.

The rest of the paper is organized as follows. Section I describes the institutional context of the Swedish pension reform. Section II summarizes the data on ownership of Swedish firms by pension funds and other major shareholders. Section III introduces the methodology we employ to identify the effect of changes in ownership by pension funds on firm performance and other corporate governance outcomes, and particularly describes how we mitigate concerns about endogeneity. Section IV presents our empirical results on the effects of private and public pension fund ownership on firm valuation, ownership

concentration, and control premia. Section V provides more direct evidence about pension funds' involvement in corporate governance. Section VI concludes.

I. Background

A. The Swedish environment

Sweden offers a unique context in which to analyze issues related to ownership structure and corporate governance, as information is available on almost all shareholders of listed companies, and allows conclusions to be drawn, which go well beyond the Swedish market.

Ownership structures and corporate governance of Swedish companies vary a great deal. Faccio and Lang (2002) report that dual class shares pyramiding and cross-shareholdings are widely used, but there also exist a large percentage of widely held firms. Although cross-sectional variation in the quality of corporate governance is quite large, Sweden has high standards of investor protection (La Porta et al., 1998) and, by continental European standards, a highly capitalized stock market (stock market capitalization to GDP in 2002 was 85% vs. 110% in the United States and 37% in Germany).²

In 1999, prior to the pension reform, domestic institutional investors (i.e., banks, insurance companies, pension funds, mutual funds) directly held approximately 30 percent of the total market capitalization (International Federation of Stock Exchanges, 1999). In the same period, financial institutions held approximately 50 percent of the market capitalization in the U.S. and the U.K., 37 percent in Germany and 20 percent in Italy, France and the Netherlands.

While the amount of stock market capitalization held by financial institutions has been quite stable in all countries, in Sweden, the share of stock market capitalization held by

² Table A.1 in the Appendix presents details about the Swedish primary exchange.

pension funds and mutual funds involved in the pension reform increased from 13.6% to 19%. In the same period, the share held by the other financial institutions, especially the insurance companies slightly decreased (International Federation of Stock Exchanges, 2007).

B. The pension reform

On January 1, 2000, Sweden introduced a multi-tier pension system that incorporates elements of both defined benefits and defined contribution plans. Employers pay 18.5 percent of an employee's salary into the fund for future pension liabilities: 16 percent of this contribution goes into the *Income Pension* (IP) system, the defined benefit pay-as-you-go component of the new system, and the remaining 2.5 percent goes into the *Premium Pension* (PP) system, the defined-contribution component of the new scheme. For individuals with no or low pensions, the new pension system provides a guarantee pension, completely funded by the government from general tax revenues. In addition, there exist private pension savings schemes, which consist of employer contributions to the pension savings of employees with relatively high salaries and of voluntary savings by individuals. Most of the private pension savings are invested in mutual funds.

The pension reform caused a significant reshuffling in the ownership of some existing public pension funds and created new, potentially large shareholders in the Swedish stock market and enhanced the resources available to the existing public and private pension funds, which are entitled to manage the pension savings.

In the first phase of the reform, a few large public pension funds dismissed large blocks in Swedish equities. Six public funds had been established in 1960 in order to provide a buffer for occasional deficits arising from situations in which social security disbursements would exceed income from contributions. Among the six buffer funds existing before 2001, only one, the AP4 fund (henceforth, AP4), was an active investor in the Swedish stock market, with a portfolio that consisted almost exclusively of Swedish equities. AP4 was also

particularly active in corporate governance. The AP6 fund's mandate was to invest primarily in private equity. The remaining four funds, AP1, AP2, AP3 and AP5, were constrained to invest primarily in fixed income securities. As a part of the transition, the buffer funds transferred approximately SEK 150 billion to the government budget to compensate for increased transitory pension expenses. For this reason, AP4 had to sell essentially all its equity participations. Table 1 shows that AP4 experienced a decrease in equity holdings between December 2000 and June 2001, as did the AP6 fund which increased its focus on private equity. All other funds increased their equity holdings starting in June 2001. This generated substantial reshuffling in the holdings of public pension funds.

AP4, which in December 2000 held more than 3 percent of the market capitalization, sold participations equivalent to 2.5 percent of the votes in 51 of the 238 Swedish listed companies between December 2000 and June 2001.³ These holdings were only in part transferred to the other public pension funds. On average, the other public pension funds increased their participations in these 51 companies by only 0.9 percent over this period. No other category of investors systematically increased its holdings at the time of AP4's sales. The remainder was bought by private pension funds and other market participants.⁴ This suggests that these holdings were not systematically transferred to other public or private pension funds but were largely sold in the market under normal market conditions.

This reshuffling of pension funds' holdings thus represents a significant and largely exogenous decrease in institutional ownership, which we can use to provide a first analysis of the effects of changes in institutional ownership on firm valuation and ownership structure.

In the second phase of the pension reform, public and private pension funds started to expand their assets. Five public pension funds, also called AP Funds, were created from the

³ By June 2001, as a result of these sales, AP4 held participations equivalent to only 1.5 percent of the votes in 52 listed companies.

⁴ Since market participants could not know whether AP4 participations would have been sold to other public pension funds or to what extent (and which) stockholdings would have been sold, the effects of AP4 sales can be considered unanticipated.

reorganization of the buffer funds, which were merged in the course of 2000 and separated into five independent funds, AP1, AP2, AP3, AP4, and AP6. These five funds manage the “defined benefits” pension assets and invest about 60 percent of their assets in domestic and foreign equities. They became operational on January 1, 2001. Each fund was endowed with assets of approximately SEK 125 billion and all became active in the Swedish stock market at the beginning of 2001. As a result of the distribution of the buffer funds, the share of equity decreased substantially in the portfolio of the AP4 pension fund, while it increased in the AP1, AP2 and AP3 funds.⁵

Second, the PP contributions created an inflow of assets into a multitude of private pension funds, including mutual funds. Employees can now direct their PP money into a choice of approximately 500 private pension funds, selected by the government after negotiation of the fees. If an employee does not select a fund, the money is managed by the default public pension fund, AP7 (also known as the Premium Savings Fund). The AP7 pension fund was also newly created at the end of 2000 and started trading at the beginning of 2001. The return earned on PP investments depends on the performance of the selected funds. The default AP7 pension fund is the single largest PP investor with 31 percent of total PP investments.

All private and public pension funds experienced increases in funds under management due to inflows of compulsory contribution and other savings (arising from employer contributions and voluntary savings). The increase of new investments in domestic and foreign equity has been on average SEK 20 billion per year. Even though this amount is less than 1 percent of the Swedish stock market capitalization in 2001, it is a large amount considering that in 2000 only SEK 100 million of the public pension funds’ assets was held in equity. The increase in domestic equity investments, even though substantial, has been limited

⁵ The defined benefit investments are subject to a number of investment restrictions, including: (i) at least 30% of assets must be invested in low-risk interest-bearing securities, and (ii) no more than 10% of a fund’s assets may be invested in a single company or issuer.

by the fact that foreign equity holdings by especially the public pension funds increased to an even greater extent, as the reorganization of the public pension system coincided with the removal of foreign investment restrictions. In addition, the choice of funds in the PP system includes a large number of mutual funds specializing in foreign equity.

Table 1 describes the consequences of these inflows on the Swedish stock market. In terms of cash flow rights, the public and private pension funds gradually increased their stockholdings from 13.6 percent in 2000 to 19 percent of total equity in mid-2005, an increase of nearly 40 percent. It is interesting to note that the increase of pension funds' stockholdings in terms of voting rights is significantly less pronounced. This depends on the fact that since most of A shares that confer to the holders superior voting rights are not listed pension funds tend to buy B shares, which confer inferior voting rights. By mid-2005 the public pension funds owned approximately 4 percent of total equity and the private pension funds owned close to 15 percent of total equity.

In what follows, we use the dismantlement of AP4 and the subsequent increase of public and private pension funds' stockholdings as alternative natural experiments to identify the effects of changes in institutional saving on corporate governance and firm performance and eventual differences between different types of institutional investors.

C. The pension funds

The pension reform created new actors in the Swedish stock market and increased the resources available to a variety of existing actors. Even though government owned, the six new public pension funds enjoy substantial independence from political power. Their board members are nominated by the government, employers' and employees' organizations. The boards in turn recruit the management teams, mostly from the financial industry. The stated objective of guaranteeing the highest possible return to pension fund assets is emphasized by the fact that the managers are compensated on the basis of the funds' performance like in

private funds. Their salaries are not subject to caps as it happens with public pension funds in the United States.

The independence of the Swedish public pension funds from political power is also revealed by the fact that, differently from U.S. public funds, they tend to invest a large fraction of their assets in foreign equities. They thus appear concerned with returns rather than with employment or investment in strategic sectors in Sweden.

For several reasons, the public pension funds as investors may have become among the most active players in corporate governance in the Swedish stock market. First, they are relatively large. The total stockholding of the average public pension fund is SEK 15.2 billion, compared to just SEK 1.3 billion for the average independent private pension fund. Related private pension funds also tend to be large, with total stockholdings averaging about SEK 24.8 billion. Given that public pension funds make relative sizeable investments, they may have difficulties in just voting with their feet when they are dissatisfied with company performance and may be forced to take a long-term view on their investment. This should make them more inclined to monitor firms (Shleifer and Vishny, 1986; Maug, 1988; Kahn and Winton, 1998).

Second, differently from several private funds, the public pension funds are independent from financial institutions, insurance companies and industrial groups. Hence, they are unlikely to have objectives that are in conflict with monitoring and the maximization of shareholder value, contrary to other institutional investors whose costs of monitoring may be higher because of fears of damaging the relationships with firm management and principal shareholders and of losing potential and existing business (Chen, Harford and Li, 2007).

Third, the public pension funds' portfolio managers receive incentive packages and bonuses based on their investment performance. Therefore, their main objective is likely to be the maximization of shareholder value.

Anecdotal evidence suggests that the public pension funds indeed have been active in corporate governance and that they tend to coordinate in episodes of activism.⁶ In fact, these pension funds have become active members of board nominating committees and have attempted to influence corporate policies. For instance, in April 2002, the public pension funds, supported by some private pension funds, together strongly opposed a three-year employee stock option scheme at Skandia, a large insurance company, because the scheme was judged too generous. As a consequence the board withdrew the initial proposal and offered a less generous one-year scheme, accepted by the pension funds and a vast majority of the company's shareholders.⁷

Table 2 shows that the magnitude of pension funds' positions in Swedish listed companies is quite different. On average, AP4 and AP6's holdings in domestic companies amount to more than 2 percent of firms' voting rights, far more than the other public and private pension funds. Hence, not surprisingly, they have lower portfolio turnover (i.e., new positions as a percentage of total positions) than the other pension funds and, for this reason, may have a greater incentive to affect corporate policies.

Notwithstanding the public pension funds appear to have different investment strategies, we analyze the effects of public pension fund ownership without distinguishing between the different public pension funds because as discussed above anecdotal evidence suggests that they tend to coordinate their attempts to affect corporate policies.⁸

The pension reforms determined an inflow also in private funds. We obtain the full list of eligible private pension funds (i.e., mutual funds and other investment companies that have been qualified to participate in the PP system) from the Financial Supervisory Authority of

⁶ Black and Coffee (1994) argue that in Europe, where differently from the U.S. communication between institutional investors is easy and unregulated, coordination among investors with similar incentives is much more frequent.

⁷ In general, the public pension funds tend to be mentioned as a group when episodes of shareholders activism become public information. Most of shareholder activism, however, is thought to take the form of informal discussions with management (Bengtsson, 2005).

⁸ In a robustness check that we do not report, it indeed appears that the larger and smaller public pension funds have similar effects on firm performance.

Sweden.⁹ At the end of 2000, a total of 462 investment funds managed by 67 different fund managers were available to investors in the PP. By the year 2004, the number of funds reached 681 and the number of assets managers exceeded 80, and total PP funds under management exceeded SEK 137 billion (in historical prices). About 60 percent of the fund managers are based outside of Sweden, largely from the United States or elsewhere in Europe, but foreign fund managers manage less than 10 percent of total investments.

Private pension funds include a heterogeneous set of institutions. First, funds greatly differ in size. While funds acquiring large positions in firms may have an incentive to become active investors, smaller funds, especially domestic and foreign mutual funds, tend to acquire small positions and have high portfolio turnover. We expect these funds to remain passive and to exercise negligible effects on corporate governance. The largest private pension funds are AMF Pension Fondförvaltning, Folksam LO, HQ Fonder, Länsförsäkringar Fondförvaltning, Nordea Fonder, Robur Fonder, SEB Fonder, and SPP Fonder, all of which are domestic funds.

Second, funds differ in ownership. Some private pension funds are independent from industrial groups and financial institutions (but may or may not be related to some employment associations). We refer to these pension funds as *independent private pension funds*. If private pension funds acquire large positions and have low portfolio turnover, they are likely to have similar incentives to the ones of the public pension funds as they are also large and do not appear to suffer from interests conflicting with the maximization of shareholder value.

Other funds are related to Swedish banks, insurance companies or industrial groups. We refer to these pension funds as *related private pension funds*. As pointed out by previous literature (see, for instance, Brickley, Lease, and Smith, 1988), these funds may be subject to conflict of interest and for this reason may monitor firms to a lesser extent. Most importantly,

⁹ See Table A.2 for a list of the private funds and asset managers included in our sample.

they are controlled by the same shareholders that control some of the listed companies. Hence, these funds can potentially contribute to make control more entrenched.

Table 2 reveals that in comparison to independent pension funds, related private pension funds tend to have much larger stakes in companies that are related to the same principal shareholder that indirectly control the votes they control, and also tend to invest in a broader set of firms (in addition to the investment in the related firm). Portfolio turnover for related pension funds is much lower than that of independent pension funds, indicating that, on average, independent pension funds have shorter horizons on their investments.

Table 2 also reports the number of companies for which a pension fund is among the largest five shareholders, by type of pension fund. While pension funds tend to be significant shareholders in most firms, they rarely are the principal shareholder. In total there are 4 firms for which a public pension fund and 16 firms for which a private pension fund were the principal shareholder at some point during the period 2000-2005. We exclude companies where pension funds are the principal shareholder from the empirical analysis when analyzing the effects of changes in pension funds holdings on ownership concentration.

The principal shareholders in most firms tend to be individuals, followed by financial institutions. Family ownership of firms is widespread.¹⁰ Still, public pension funds frequently are among the top-5 largest shareholders. For example, in June 2005, the AP2 fund was among the top-5 largest shareholders in 13 firms, the AP3 fund in 8 firms, and the AP4 fund in 11 firms. In mid-2001, the AP4 fund was the 10th largest shareholder for the median firm. Private pension funds are also among the largest shareholders of Swedish companies. Together with the private pension funds, public pension funds are the most prominent shareholders across all firms.

¹⁰ Among listed firms that are controlled by individuals or families are some of Sweden's best known companies, including Electrolux, Ericsson, Atlas Copco, Investor, SEB, and WM-data (all controlled by Marcus Wallenberg and family), Hennes & Mauritz (Stefan Persson and family), Axel Johnson (Antonia Ax: Son Johnson and family), Hagstromer & Qviberg (Mats Qviberg and Sven Hagstromer and families), Lundbergs and Industrivärden (Fredrik Lundberg and family), and Stenagruppen (Dan Sten Olsson and family).

II. Data and Descriptive Statistics

A. Data Sources

Under Swedish law, *Värdepapperscentralen AB* (VPC), the Central Security Registry, is required to publish two lists each year of all stockholders owning more than 500 shares of Swedish listed companies. Using these records, we obtain biannual information on the top 200 shareholders of Swedish listed companies from December 1999 to June 2005. Overall, these records provide information on the owners of over 95 percent of the market capitalization of Swedish publicly traded companies. For the average company, we have ownership information on 83 percent of total equity, and for all companies taken together we have information on 87 percent of total equity (as measured in terms of voting shares). While our ownership data is complete at the end of our sample period in 2005, we have data on ownership for only 63 percent of listed firms in 1999. We also have ownership information on several firms that have de-listed during the sample period. We include these firms where possible in the analysis.

Our ownership data set contains holdings held both directly by the owner and indirectly via brokerage houses and custodian banks, allowing us to trace the identity of shareholders and compute ultimate ownership. The ownership data are broken down by class of shares and we also have information on the voting ratio applicable to each class of shares. Moreover, we have information on foreign shareholders of Swedish companies, including holders of American Depositary Receipts (ADRs).

Using these data, we compute the number of stocks controlled by a single investor that are held directly and indirectly through other listed companies. We also obtain information

that allows us to identify the shares held by family members and other closely related owners.¹¹ We can thus compute direct and indirect holdings of the controlling groups.

We complement the information on individual stockholdings with data on corporate return and risk characteristics from *SIX Trust*, which provides information on the closing prices and dividend yields of the companies listed on the Stockholm Stock Exchange, and with accounting variables from *Market Manager*. Finally, we hand-collect data on shareholders' participation in board nominating committees.

B. Firm Ownership and Control Structures

Another advantage of using Swedish data is that companies' ownership structures vary a great deal. Companies with disperse ownership coexist with companies that have complex, concentrated ownership structures and employ dual class shares, pyramiding and cross-holdings. The most common mechanism to enhance control rights involves the use of dual class shares, which deviates from the one-share-one-vote rule and allows owners to have a larger share of control than cash flow rights. Pyramiding and cross-holdings are also widely used, especially in medium-sized companies.

As a consequence of dual class shares, pyramiding and cross-holdings, a large difference can arise between the control rights and the cash-flow rights of the principal shareholder. This has been shown to lead to significant agency costs in Sweden even if investor protection is quite strong on average (Cronqvist and Nilsson, 2003). For this reason, we take pyramiding and cross-holdings into account to determine the control rights of the principal shareholder, as is now common in the literature (see, for instance, Claessens et al., 2002, and Faccio and Lang, 2002). When tracing indirect ownership, we maintain pension funds as independent entities, although in some instances they are controlled by the same

¹¹ See Sundin and Sundqvist (2001) for a detailed description of the methodology.

shareholders that control listed companies. Because of our distinct interest in the role of pension funds, we analyze the investment policies of these funds and their effects separately.

While direct ownership involves shares registered in the shareholder's name, indirect ownership through pyramiding and cross-holdings involves shares held by entities that the ultimate shareholder controls. Since the principal shareholders are frequently themselves financial institutions or corporate entities, we identify the ultimate shareholders of these financial institutions or corporate entities. Often, we need to trace through a chain of indirect ownership stakes that involves numerous corporations to identify the ultimate owner of the votes.

We classify a firm as having a controlling owner if the largest shareholder has direct and indirect voting rights that sum to 10 percent or more.¹² For example, a shareholder has x percent indirect control of firm A if she controls directly firm B (i.e., if she holds at least 10 percent of the voting rights of firm B) that, in turn, directly controls x percent of the votes of firm A. The control chain from A to B can be a long sequence of firms, each of which has control (greater than 10 percent voting rights) over the next one. If there are several chains of ownership, we sum the control rights across all of these chains. When multiple shareholders have over 10 percent of the votes, we pick the largest controlling owner.

We also compute the direct and indirect cash-flow rights of the controlling shareholder. For example, if the controlling shareholder of firm A holds a fraction y of cash-flow rights in firm B and firm B in turn holds a fraction x of the cash-flow rights in firm A, then the controlling shareholder's indirect cash-flow rights in firm A are equal to the product of x and y . If there is a chain of controlling ownership, then we use the products of the cash-flow rights along the chain. To compute the controlling shareholder's total cash-flow rights we sum all direct and indirect cash-flow rights.

¹² Since 10 percent of voting rights is frequently sufficient to exert control, this cut-off is used extensively in the literature (e.g., La Porta et al. 1999; La Porta et al., 2002).

C. Descriptive Statistics on Pension Fund Holdings and Control of Listed Companies

Table 3 presents summary statistics for the firms in our sample. The table highlights that pension funds, and in particular public pension funds, tend to invest in firms that are larger than average.¹³ This is consistent with the findings of previous literature showing that institutional investors prefer to hold stocks of large and liquid companies (Grinblatt and Keloharju, 2000; Kang and Stulz, 1997) and, as we show in Section III, will help us identifying the causal effects of pension funds ownership. It is also interesting to note that the wedge between voting rights and cash-flow rights tends to be positive for principal shareholders, averaging about 9 percent. This suggests that principal shareholders and pension funds differ in an important way as the wedge is positive on average for principal shareholders but negative for pension funds, averaging about -0.7 percent (not reported).

Mean difference tests further indicate that firms with pension fund shareholdings tend to have higher market to book ratios than other firms, although there is no difference in return on assets between these two groups of firms. Other variables of interest, such as leverage ratio, stock returns, ownership concentration, R&D expenses, and stock turnover do not differ across these two groups of investors.

III. Identification

In order to identify a causal impact of changes in pension fund ownership on firm performance and ownership structure, we need to mitigate concerns that pension funds pick companies on the basis of expected performance.

These concerns are less pronounced for the first phase of the reform as AP4's sales were forced by the implementation of the pension reform. Given that AP4 sold most of its stockholdings, it seems reasonable to assume that it was unable to choose to sell only the

¹³ The table reports mean difference tests that are based on pre-existing differences in firm characteristics in June 2000.

stocks of some firms whose valuation was expected to decrease for other factors. Also, the size of the sales was unlikely to be large enough to cause a significant drop in stock prices.

To further mitigate concerns that AP4 sold to a larger extent shares in companies that were expected to perform more poorly, we instrument the change in AP4 holdings between December 2000 and June 2001 with a dummy that takes value 1 if in June 2000 AP4 held any stocks in a given firm. Column (1) of Table 4 shows that our instrument has a strong negative correlation with the change in AP4 holdings between December 2000 and June 2001.

Contrary to the dismissal of shareholdings by AP4, the increase in shareholdings by private and public pension funds in the second phase of the pension reform was gradual. In particular, while the timing in the expansion of shareholdings was largely determined by the implementation of the pension reform and thus exogenous with respect to the evolution of firm characteristics, pension funds clearly select stocks on the basis of expectations of future performance. Hence, a mere correlation between pension funds' shareholdings and the evolution of firm valuation or ownership concentration would not imply causality. For instance, pension funds and principal shareholders could have in common a long horizon on their investments. For this reason, they could choose to increase their shareholdings when firm stocks are temporarily undervalued.

To overcome these concerns, we exploit the exogenous timing of the Swedish pension reform to construct instrument as follows. First, we notice that after 2001, pension funds began to acquire positions in the Swedish stock market. The timing of expansion in their assets can be considered exogenous because after January 2001 pension funds looked for opportunities to buy blocks of various sizes without putting a price pressure on the market.

Second, pension funds' stock selection is driven not only by expectations on future performance but also by preferences for firms with some ex ante characteristics unrelated to long-term performance. For instance, pension funds may have attempted to build a portfolio

comparable to that of other domestic mutual funds and, like most other institutional investors, may have favored stocks of large and liquid companies. Hence, we conjecture that increases in pension funds' holdings over time are related to (i) the average rate of expansion of pension funds' assets, (ii) whether or not a stock is included in the OMX30 index of the 30 most frequently traded stocks in the market¹⁴, (iii) the company's market capitalization, and (iv) the company's weight in the portfolio of other mutual funds. In particular, in periods of strong asset expansion, pension funds may have predominantly bought companies that had a large market capitalization and carried a significant weight in the index or in the portfolios of domestic mutual funds.

We exploit this intuition to construct two sets of instruments for the changes in pension funds' holdings as follows. First, we use a company's market capitalization in 2000, its weight in the portfolios of mutual funds in 2000 – the year preceding the pension reform – as well as a dummy variable that indicates whether a firm's stock was included in the OMX30 index in 2000 or not as instruments to capture that pension funds had a stated preference for these stocks. Second, we use time fixed effects interacted with the companies' market capitalization, weights in the mutual funds' portfolios and the OMX30 index dummy variable, all calculated at year-end 2000, as instruments to capture the deterministic component of changes in mutual funds holdings. In this way, we exploit variation due to the fact that, depending on the inflow in pension assets over time, pension funds expanded their holdings faster in companies with the characteristics that they prefer.

The variation in pension funds' holdings we capture with our instruments is likely to be exogenous since, as we discuss above, the rate of asset expansion across all firms was

¹⁴ Faulkender and Petersen (2006) use whether or not a firm is included in a broad stock market index (the Standard and Poor's (S&P)500 index in their case) as an instrument for a firm's bond rating to explain firm leverage. Like Faulkender and Petersen (2006), we presume that being part of a stock market index does not affect future stock returns and performance. Shleifer (1986) shows an abnormal positive return at the time of inclusion of stocks in the S&P 500 index. However, this is a temporary increase in returns that lasts about 20 days since the announcement of index inclusion.

largely deterministic, and the firm's predetermined market capitalization, weight in mutual funds' portfolios or whether or not a firm is included in the OMX30 index in 2000 (prior to the pension reform) are unlikely to be related to the changes of the largest shareholders' blocks or to changes in firm performance after the pension reform. In fact, all these firm characteristics were already public knowledge in 2001 (the start of our sample when we explore the second phase of the pension reform). Hence, any information about future firm performance should already have been incorporated in prices and in the actions of market participants. The results we present are also invariant to the inclusion of firm fixed effects (or the use of first differences), time-varying firm characteristics (such as a proxy for firm size), and time fixed effects, which control for systematic factors that may have affected firms around the time of the pension reform. In practice, with our instruments we compare any changes in firm performance and ownership concentration across companies for which different categories of pension funds show different propensity to invest following more or less large inflows into the pension system. We see no reason why firm characteristics in 2000 should have an independent effect on the extent of future *changes* in performance and ownership concentration.

Columns (2) and (3) in Table 4 are examples of the first stage regressions that we use in the second stage to instrument for pension funds' holdings during the second phase of the pension reform after June 2001. These regressions show that in some years, private and public pension funds increased their holdings to a larger extent in firms that in 2000 were included in the OMX30 index, in firms that had larger market capitalization, and in firms in which Swedish mutual funds had a larger ownership share. The F-test of the validity of instruments (i.e., test on the joint significance of the excluded instruments) developed by Bound et al. (1995) supports the choice of our instruments.

IV. Results

A. Firm performance

Table 5 shows that an increase in public pension funds' holdings appears to positively affect firm valuation, as measured by the firm's market to book value, both when we use the forced dismissal of the AP4's holdings and the post June 2001 increase in holdings to capture changes in public pension fund holdings. The effect is highly significant from an economic point of view. Based on the regression results presented in column (1), a one standard deviation increase in the cash flow rights of public pension funds improves average firm performance by about 80 percent. This increase in performance amounts to about 2.0 times the standard deviation of the firm performance measure and can therefore be considered substantial. The result is robust to controlling for the equity stake of the principal shareholder and the ratio between control and cash flow rights of the principal shareholder, referred to as the wedge, which proxies for the entrenchment effect of ownership concentration. Other control variables include firm size, proxied by the logarithm of the number of employees, the ratio of R&D expenses to total assets, leverage, and stock turnover.

This result is also robust to estimating the regression in first differences and using a dummy variable that takes a value of one if AP4 had holdings in a given firm in June 2000, and zero otherwise, as instrument for the change in the cash flow rights of AP4, as described above (column 2).¹⁵ We also include industry and year-fixed effects. Note that, since we compare changes in firm valuation of firms with and without AP4 stockholdings, our results in column (2) cannot be interpreted to depend on market-wide movements. Also, we include industry fixed effects which should capture any industry level differences in exposure to business cycles and market movements.

¹⁵ When using first differences or firm fixed effects, we do not control for firm characteristics that exhibit low variation over time such as the number of employees and the R&D expenses. Results are similar when we do include these controls.

An increase in public pension funds' holdings appears to positively affect firm performance during the second phase of the pension reform as well (column 3). This result is robust to using firm fixed effects (column 4) and using the instrumentation strategy described in Section III (columns 5 to 8), although the size of the effect drops somewhat when using instrumental variables. In column (8) we use instruments and also include firm fixed effects. Hence, our results are not subject to the criticism that the predetermined firm characteristics we use as instruments may affect long run performance. Our results suggest that firms in which public pension funds invest more outperform other firms.

These findings corroborate our interpretation of the effects of AP4 stockholdings' dismissal. Interestingly, only public pension funds appear to have a positive and consistent effect on firm valuation. This is consistent with previous U.S. empirical evidence suggesting that public pension funds, such as Calpers, are more active in corporate governance than private mutual funds, such as Fidelity (Davis and Kim, 2007). This result can also be justified on several grounds. First, being larger than most private funds, public pension funds tend to hold larger blocks in listed companies. Hence, they should have stronger incentives to monitor. Second, public pension funds may be less subject to management influence than private pension funds, especially those related to industrial groups or financial institutions, as these are likely to derive benefits from the companies they invest in (Brickley, Lease and Smith, 1988).

The reason why we do not find a consistent effect of private pension funds on firm valuation may be because this category of funds includes a heterogeneous group of institutional investors: Some private pension funds are mutual funds with diversified portfolios and small positions in each company. Others private pension funds are related to industrial groups and domestic banks, and, for this reason, may be vulnerable to conflicts of interest and not be able to exercise an independent monitoring activity. Some private pension

funds are even controlled by the same shareholders who are in control of the firms in which they invest.¹⁶ It is thus not surprising that these funds do not attempt to affect corporate policies.

For this reason, in columns (6) to (8), we distinguish between the holdings of private pension funds that are independent from domestic financial institutions and industrial groups (referred to as independent private pension funds) and pension funds that are ultimately owned by the same shareholders in control of the industrial companies in which they invest (related pension funds). We still find that only public pension funds positively affect firm performance.

A possible concern with the interpretation of our results is that public pension fund holdings affect stock prices due to their relative large size compared to many private pension funds. This is unlikely since as shown in the descriptive statistics both private and public pension funds tend to invest in large companies. Nevertheless, we check whether our results are due to price pressure or simply the result of an increase in stock prices due to a higher demand for stocks as follows. First, we look at companies in which private pension funds increase their stockholdings by a large amount. If the effects we observe were due to demand effects, we should observe a positive correlation between firm valuation and private pension funds stockholdings as we do for public pension funds. Instead, we observe that large changes in private pension funds stockholdings continue to have no statistically significant effect on firm valuation and, if anything, the effect is negative (results not reported). Even in this subsample, only the changes in the holdings of public pension funds appear to positively affect firm performance. Second, in all regressions, we directly include stock turnover, defined as the ratio of stock traded to the total number of stocks, to control for liquidity. Our

¹⁶ There are 6 groups of family-controlled pension funds, each of which consists of several funds: Hagstromer and Qviberg related funds (HQ), Wallenberg/Investor related funds (SEB), Lundberg/Industrivarden related funds (SHB), Stenbeck/Kinnevik related funds (Aktie-Ansvar/AA), Kamprad/Ikea related funds (Catella/IKEA), and Dinkelspiel related funds (Ohman).

estimates are unaffected by the exclusion of this control. In unreported regressions, we use the bid-ask spread as proxy for stock turnover and obtain similar results.

Next, we look at firm operating performance as measured by return on assets (column 9). This measure does not depend on stock prices and therefore cannot be affected by pension funds demand for equity. We still observe that only public pension funds have a positive and significant effect on firm performance. We can thus rule out that the effects we observe depend on an increase in the demand for equity.

In columns (9) and (10) of Table 5 we explore the possibility that the relative size of pension funds matters for the effect of their stakes on firm valuation. Specifically, we distinguish between private independent pension funds that are large investors in the Swedish stock market (top-10 pension fund investors in the Swedish stock market in terms of total holdings) and the rest. We find that these large independent pension funds improve firm performance in a statistically significant way, while large non independent pension funds and smaller private pension funds do not. This is the case also for private pension funds that on average take large positions in listed companies (not reported). Only if they are independent from industrial groups and banks, large private pension funds and/or private pension funds that generally take large positions in the companies in which they invest appear to affect positively firm performance. Hence, from a corporate governance perspective, private pension funds that are both large and independent appear comparable to public pension funds.

B. Ownership structure

The effects of pension funds' ownership are not confined to firm valuation. As shown in Table 6, the principal shareholder's percentage of voting rights increases in firms in which public pension funds increase their holdings. Hence, an increase in institutional investment seems to lead to an increase in ownership concentration. Once again, the effect is significant

also from an economic point of view. Taking the instrumental variables estimates in Column 2, a one standard deviation increase in the holdings of public pension funds explains approximately 21 percent of the standard deviation of the change in the holdings of the principal shareholder.

In the second phase of the pension reform, we find no effect of changes in the holdings of public and private pension funds on the control rights of the principal shareholders. Only when public pension funds increase their holdings by a significant amount and have initially only a small stake, the effect becomes marginally significant (column 4). There are no reactions for smaller increases or when pension funds vary their holdings but already hold large stakes.

As noted before, several private pension funds in our dataset are controlled by the same shareholders that control listed companies as principal shareholders. On average, when these related pension funds invest in the same companies that these shareholders control, they hold a stake of about 3.5 percent of the company's cash flow rights (while the principal shareholder controls on average about 30.8 percent of the voting rights). Principal shareholders could increase their voting rights by increasing the shareholdings of related pension funds in the companies they control. Hence, we check whether the pension funds related to the controlling shareholder of a given firm increase their control block when the public pension funds increase their shareholding.

In Table 6 (columns 6 and 7), we find that principal shareholders use their related pension funds to increase their holdings when public pension funds do so. On average, if public pension funds increase their holdings by one standard deviation, related pension funds increase their holdings in related firms by 4.5 percent. Related pension funds also increase their holdings if independent pension funds do so. Consistently with the results on firm performance that suggests that large pension funds have stronger incentives to monitor, we

find that controlling shareholders accumulate votes through the related pension funds especially when large private independent pension funds increase their holdings. We find no evidence of a similar reaction to changes in holdings of other private pension funds. Quite to the contrary, the related pension funds appear to sell, possibly to diversify their portfolio, when other non independent private pension funds increase their holdings. This is consistent with the interpretation that controlling shareholders do not fear that these institutional investors may attempt to influence corporate policies. Furthermore, it suggests that our results cannot be explained by the fact that pension funds have similar investment strategies, as we observe a positive reaction only for pension funds that are supposedly more active in corporate governance.

Overall, our results indicate that controlling shareholders may use the pension funds they control to secure more votes at low additional cost. In particular, the results suggest that conflict of interests are more pronounced at related pension funds, as they are used to protect the control benefits of principal shareholders to a larger extent than the security benefits accruing to all shareholders pro-rata. This finding is consistent with the results in Cocco and Volpin (2005) who find that U.K. pension funds that are not independent from corporate managers are run in the interest of the firm's shareholders instead of the pension fund's trustees.

C. Control premium

The positive correlation between changes in the stockholdings of some pension funds and the principal shareholders' direct or indirect shareholdings may be driven by the desire of the latter to maintain control on corporate policies. If the presence of these pension funds indeed increases the probability of disagreement on corporate policies, we should observe that the value of a marginal vote is larger after an increase in these funds' stockholdings.

It is common to measure the market value of a marginal corporate vote implicitly as the difference between the prices of multiple and limited-voting shares (see, for instance, Zingales, 1995, Rydqvist, 1996, and Nenova, 2003), also known as the control premium. The premium of multiple voting shares is commonly believed to depend on the likelihood that a vote will be pivotal in a proxy contest and the price it will fetch in case of such a contest (Zingales, 1995). The likelihood that a vote will be pivotal in a proxy contest clearly depends on ownership concentration because the probability that a marginal vote is pivotal is zero if the largest owner holds more than 50 percent of the votes. The price of such shares at a proxy contest depends on the magnitude of private benefit of control.

Pension funds' stockholdings may affect the control premium in several ways: First, the premium of control may increase in the size of pension funds' shareholdings because votes become more valuable as controlling shareholders attempt to resist pension funds' influence during proxy contests. Second, pension funds may affect the value of a marginal vote by changing the probability of a takeover. The latter could in turn change either because pension funds significantly affect the ownership concentration of firms or because they are more or less likely to tender their shares in the event of a takeover. In either case, the control premium should increase if principal shareholders attempt to resist interferences in corporate policies or takeovers.¹⁷ Finally, pension funds may monitor management and controlling shareholders in a way that decreases private benefits of control. This would lead to a decrease of the control premium.

Whatever is the exact channel through which pension funds may try to affect corporate governance and policies, we expect that AP4's sale of its stockholdings had two opposing effects on the control premium. On the one hand, the sale could have resulted in a decrease of the control premium if controlling shareholders were attempting to resist changes prior to the

¹⁷ In effect, takeovers can be seen as a severe form of interference in corporate policy.

sale; on the other hand, the control premium could have increased if the monitoring role of AP4 effectively decreased private benefits of control prior to the sale.

To explore the effect of pension funds' holdings on the value of control vote, we identify a total of 29 listed companies with dual-class shares, for which both A and B shares are listed (A being multiple voting shares and B being limited voting shares). We then calculate the control premium for these 29 companies as the ratio between one voting right and one cash flow right, corrected in order to make voting premiums comparable across companies with different voting arrangements, similarly to Zingales (1995) and Rydqvist (1996). Next, we run a regression of the changes in the voting premium during a six months period on contemporaneous changes in the cash flow rights of public pension funds. To capture contemporaneous changes in ownership structure that may affect the probability that the marginal vote is pivotal, we control for changes in the share of votes of the principal shareholder (see also Zingales, 1994, and Nenova, 2003).¹⁸

In Table 7, we report parameter estimates of the relationship between changes in pension fund holdings and changes in control premiums, controlling for contemporaneous changes in ownership structure. Given the small number of observations the results are only marginally statistically significant. However, we find that the control premium decreases between December 2000 and June 2001 in firms in which public pension funds decrease their participations. Most importantly, the effect is highly significant from an economic point of view: a one standard deviation change in the holdings of AP4 explain 20 percent of the standard deviation of the changes in the control premium.

¹⁸ In non-reported specifications we also control for changes in the Shapley value (instead of changes in the voting rights of the principal shareholder). The Shapley value is a power index and measures the probability of being pivotal to the voted decision. The Shapley value is defined as the Milnor and Shapley (1978) power index for oceanic games of a given shareholder. The oceanic voting game has a finite number of atomic players (i.e., all large shareholders) and an "ocean" of players with infinitesimal weight (small shareholders). The Shapley value measures the extent to which each large owner is pivotal to the voted decision. As atomic players, we only consider the five largest shareholders in terms of voting rights; all other shareholders are considered part of the group of non-atomic players. The results using the Shapley value are broadly consistent with those obtained when we use the changes in voting rights of the principal shareholder.

We also explore whether the decrease in the control premium may depend on price pressure on A shares due to the fact that AP4 may have sold more A shares than B shares. In particular, we check whether the effect of AP4 dismissals on the control premium is concentrated in companies in which AP4 held a larger proportion of A shares, by including the proportion of A shares relative to total shares AP4 held in December 2000. Our estimates were qualitatively invariant.

Hence, our results suggest that the effects of the AP4 dismissals on firm valuation are related to corporate governance and that principal shareholders attempted to resist AP4 influence. As a consequence, when AP4 sold its stakes, the value of an additional vote decreased.

The effects of public pension funds on the value of a vote are similar in the second phase of the pension reform. Private pension funds irrespective of their type do not appear to have an analogous effect on the control premium. This suggests that public pension funds may attempt to affect corporate policies to a larger extent.

Overall, this evidence is consistent with the notion that principal shareholders are averse to the dilution of control benefits. This is consistent with the findings of Cronqvist and Nilsson (2005) who show that Swedish controlling shareholders avoid equity issue methods that dilute control benefits or subject them to more monitoring.

D. Additional robustness tests

All results we present are robust to various robustness checks that for brevity we do not report. First, the effect on firm valuation is larger in firms in which public pension funds hold larger stakes (more than 1 percent of cash flow rights). Additionally, the improvements in performance following an increase in pension funds shareholdings seem to be concentrated in companies in which public pension funds increase their holdings significantly and have

initially only a small stake. Public pension funds have no statistically significant effects if they increase their holdings in firms in which they have large stakes.

Second, we further explore the hypothesis that some pension funds being active in corporate governance mitigate agency problems as follows. Several studies have shown that agency problems are more pronounced in family-controlled firms (Giannetti and Simonov, 2006; Cronqvist and Nilsson, 2003). We then investigate whether the pension funds that are supposedly more active in corporate governance have a larger positive effect on firm performance in family-controlled firms. We find that indeed this is the case. Interestingly, the related pension funds have significant negative effects on the performance of family-controlled firms. Also, the beneficial effects of public and large independent pension funds are smaller for companies with A and B shares and for companies that are controlled indirectly through other companies. To the extent that control is more entrenched in these companies, our results suggest that the positive effects of institutional investor activism may be limited in countries in which complex ownership structures are prevalent.

Finally, since we are concerned by fact that our results may be affected by new listings, we repeated all the exercises reported in this section using a balanced panel of firms which are in the sample for all periods. The results are qualitatively similar to the ones we present.

V. Are pension funds really active in corporate governance?

So far, we have shown that some pension funds appear to improve firm performance and that the an increase in the holdings of public pension funds is correlated with an increase in the value of marginal votes and principal shareholders' attempts to control more votes either directly or indirectly through related pension funds.

This evidence *implicitly* suggests that large independent pension funds and public pension funds, in particular, are active in corporate governance. In this section, we provide more explicit evidence that these pension funds are indeed involved in corporate governance.

An important way in which shareholders influence corporate policies is by nominating board members. In order to capture shareholder involvement, we hand-collect data on board nominating committees from 2005 firm annual reports and explore which shareholders are more likely to be represented in these committees. On average, slightly more than 1 percent of the top 200 shareholders are represented in nominating committees.

In Table 8, as expected, we find that the probability that any shareholder is represented in the nominating committee is increasing in their percentage of voting (or cash-flow) rights. For given shareholdings, private and especially public pension funds are more likely to be represented on nominating committees than other shareholders; in contrast, foreign investors are less likely to be represented on nominating committees. These differences are statistically and economically significant. Following a marginal increase in their shareholdings, public pension funds are twice as likely as other private pension funds to gain a seat in the firm's board nominating committee.

These estimates also reveal why large independent pension funds may have more limited effects on the control premium. It appears that independent large pension funds are not more likely than other pension funds to obtain representation in the nomination committees, thus limiting their ability to influence corporate policies. Because public pension funds gain relatively easy access to nomination committees, they are more effective in exerting corporate governance and affecting the control premium of the firm.

Finally, and unsurprisingly, whether pension funds are represented in nomination committees matters for firm performance (estimates not reported). Firms with public pension

funds or independent pension funds with large positions on their nominating committees have *ceteris paribus* better performance.

VI. Concluding remarks

Our paper represents a first attempt to evaluate the effects of pension reforms on ownership structure and corporate governance. We use the Swedish pension reform of 2000 as a natural experiment to explore how substantial changes in institutional ownership structure affect firm valuation and corporate governance. Specifically, we exploit the substantial exogenous shock to institutional ownership caused by the Swedish pension reform to investigate its effects on firm performance, the value of control and ownership concentration. By employing this exogenous variation in ownership, we mitigate concerns about endogeneity affecting much of the existing literature on corporate ownership and performance. We further address endogeneity concerns by exploiting the time-series dimension in our ownership data, which is much more detailed than the type of data generally used in the literature, and allows us to compute ultimate ownership for each major shareholder of each firm. This allows us to assess the effects of institutional ownership in a large scale experiment instead of evaluating specific episodes of shareholder activism.

Using the dismantlement of one of the main public pension funds (the AP4 fund) and the successive expansion of the new public and private pension funds' stockholdings as two alternative natural experiments, we consistently find that an exogenous increase in the holdings of public pension funds is associated with an increase in shareholders' value. Private independent pension funds with the ability or the reputation for taking large positions in the companies in which they invest have similar positive effects on firm performance. In contrast, for pension funds affiliated to industrial groups, we find, if anything, the opposite, suggesting that the positive effects on firm performance are due to differences in monitoring activity of

unaffiliated pension funds and their propensity to affect corporate policies. We conclude that independence from financial institutions and family interests is a prerequisite for value-enhancing monitoring activity by pension funds.

We also find that the control premium increases when public pension funds buy a participation in a firm and that the controlling shareholders either increase their control blocks or exploit the affiliated pension funds to increase their voting power when public pension funds and large independent pension funds increase their holdings. This suggests that controlling shareholders are reluctant to relinquish control to pension funds and that related pension funds are used by controlling families as a mechanism to enhance the entrenchment of corporate control.

Overall, we find that the increase in institutionalized saving did not result in a decrease in ownership concentration. Our results suggest that if private benefits of controls are large, ownership concentration may even increase in response to institutional investors' monitoring. Our results go against the conventional wisdom that an increase in institutionalized saving decreases ownership concentration and private benefits of controls, and offer a more malign view of the impact of institutional holdings on ownership concentration and corporate control.

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Table 1**Equity market shares for different classes of pension funds**

This table reports the stockholdings (as a percentage of the total market) for different types of public and private pension funds. Stockholdings are reported in terms of voting rights (panel A) or cash flow rights (panel B) and weighted by firm market capitalization. We include only firms for which we have ownership information.

	Date	Public pension funds	Of which:						Private pension funds	Total pension funds
			AP1	AP2	AP3	AP4	AP6	AP7		
Panel A: Voting rights	Jun 2000	2.81	0	0	0.40	2.08	0.33	0	9.18	11.99
	Dec 2000	3.27	0	0	0.55	2.30	0.41	0	9.75	13.03
	Jun 2001	3.07	0.42	0.74	0.67	0.77	0.38	0.10	9.84	12.91
	Dec 2001	3.28	0.45	0.77	0.78	0.90	0.27	0.10	10.32	13.60
	Jun 2002	3.93	0.61	0.88	0.83	1.12	0.34	0.15	11.27	15.21
	Dec 2002	3.85	0.62	0.88	0.92	1.15	0.15	0.13	10.63	14.48
	Jun 2003	4.05	0.73	0.99	0.94	1.19	0.03	0.17	10.89	14.94
	Dec 2003	3.86	0.67	0.98	0.96	1.10	0.01	0.14	11.30	15.16
	Jun 2004	3.50	0.61	0.95	0.93	0.87	0.00	0.14	11.14	14.64
	Dec 2004	3.69	0.65	1.05	0.89	0.93	0.00	0.17	12.00	15.69
	Jun 2005	3.78	0.68	1.05	0.87	0.94	0.01	0.23	11.97	15.75
Panel B: Cash-flow rights	Jun 2000	4.05	0	0	0.49	3.13	0.43	0	9.57	13.62
	Dec 2000	4.23	0	0	0.59	3.15	0.49	0	10.93	15.16
	Jun 2001	3.84	0.60	0.93	0.73	0.96	0.45	0.17	12.02	15.86
	Dec 2001	4.13	0.66	0.96	0.84	1.14	0.36	0.17	12.74	16.87
	Jun 2002	4.46	0.76	0.98	0.88	1.24	0.38	0.22	13.58	18.04
	Dec 2002	4.55	0.78	1.03	1.05	1.33	0.18	0.18	12.94	17.49
	Jun 2003	4.85	0.91	1.12	1.11	1.43	0.03	0.25	13.52	18.37
	Dec 2003	4.55	0.82	1.12	1.09	1.31	0.01	0.20	14.34	18.89
	Jun 2004	4.43	0.81	1.15	1.08	1.17	0.01	0.21	14.65	19.08
	Dec 2004	4.24	0.74	1.16	0.98	1.14	0.00	0.22	14.61	18.85
	Jun 2005	4.38	0.77	1.15	0.97	1.17	0.01	0.31	14.68	19.06

Table 2
Pension fund holdings

This table presents averages across the sample and sample period (2000-2005) of the size of pension funds' percentage of voting rights; the percentage of cash flow rights; the number of stocks in pension funds portfolios; the portfolio turnover, calculated as the value-weighted turnover rate of all positions¹⁹; the total size of Swedish stockholdings (in billions of SEK) by type of pension fund; the share of Swedish stockholdings in the total market capitalization (expressed in %); and the number of times each type of pension fund is either the largest shareholder or one of the five largest shareholders (in terms of voting rights) in a listed company. For private pension funds, we also report statistics on the subgroups of independent and related private pension funds. Independent private pension funds are private pension funds that are independent from industrial groups and financial institutions. Related private pension funds are private pension funds that are related to Swedish banks, insurance companies or industrial groups in companies controlled by the same principal shareholder that indirectly controls their votes.

Type of investor	Voting rights (in %)	Cashflow ights (in %)	Number of stocks in portfolio	Portfolio turnover	Stockholdings (in billions of SEK)	Total market share of Swedish stockholdings (in %)	Number of firms in which investor is largest shareholder	Number of firms in which investor is a top-5 shareholder
AP1	0.83	0.97	26	0.36	13.01	0.61	0	1.0
AP2	0.92	1.05	88	0.41	18.78	0.90	0.5	5.9
AP3	1.71	1.91	53	0.25	17.60	0.80	2.0	11.6
AP4	2.41	2.74	48	0.24	31.96	1.29	0	17.1
AP6	2.61	2.57	34	0.43	6.72	0.27	0	7.0
AP7	0.14	0.19	50	0.45	3.19	0.15	0	0
Private pension funds	1.27	1.57	35	0.37	14.56	0.63	13.2	295.5
-- Independent private pension funds	0.82	1.11	22	0.67	1.31	0.06	0	17.8
-- Related private pension funds	1.76	2.20	49	0.29	24.79	1.10	9.3	149.5

¹⁹ Portfolio turnover is computed as: $T_{it} = \frac{\sum_{j=1}^L |N_{i,j,t}^A P_{j,t}^A + N_{i,j,t}^B P_{j,t}^B - (N_{i,j,t-1}^A P_{j,t-1}^A + N_{i,j,t-1}^B P_{j,t-1}^B) - (N_{i,j,t-1}^A \Delta P_{j,t}^A + N_{i,j,t-1}^B \Delta P_{j,t}^B)|}{\sum_{j=1}^S (N_{i,j,t}^A P_{j,t}^A + N_{i,j,t}^B P_{j,t}^B + N_{i,j,t-1}^A P_{j,t-1}^A + N_{i,j,t-1}^B P_{j,t-1}^B) / 2}$, where i denotes pension fund i, j denotes

listed company j, and t denotes time t, T denotes turnover rate of pension fund i at time t, N denotes the number of shares, P denotes the share price, A indicates type A shares, B denotes type B shares, and L denotes the total number of listed companies.

Table 3
Firm characteristics

This tables reports averages across the sample firms and the sample period of the main variables used in the empirical analysis. Data are biannual. * indicates 5% significance of t-test of mean differences between the following two groups: firms with no pension funds and firms with public pension funds. ** indicates 5% significance of t-test of mean differences between the following two groups: firms with no pension funds and firms with private pension funds. We perform the tests of mean differences for firm characteristics in June 2000.

Variable	Average	Median	Standard deviation	# of obs	t-test of mean differences
<u>All firms:</u>					
CF rights of public pension funds	1.71	0.00	3.44	3135	
CF rights of private pension funds	9.70	7.55	9.35	3135	
Voting rights of the largest shareholder (in %)	32.76	28.77	21.64	3135	
Wedge for the largest shareholder (in %)	9.17	0.00	12.96	2942	
6-month return (in %)	7.89	3.33	51.59	2980	
Log of market capitalization (in SEK)	20.44	20.19	2.16	4024	
Log of the number of employees	3.03	2.83	1.79	2498	
Ratio of R&D expenses to total assets	0.03	0.00	0.14	2721	
Leverage	0.32	0.29	0.24	2721	
Stock turnover (in %)	0.26	0.17	0.33	1802	
Market to book ratio	4.45	1.79	63.49	2589	
Return on assets (ROA)	0.27	0.05	0.50	2721	
<u>Firms without pension fund shareholdings:</u>					
Voting rights of the largest shareholder (in %)	35.16	31.40	23.47	409	
Wedge for the largest shareholder (in %)	10.19	0.71	16.21	408	
6-month return (in %)	8.06	0.00	59.99	389	
Log of market capitalization (in SEK)	18.00	18.01	1.29	393	*, **
Log of the number of employees	2.14	1.79	1.34	312	*, **
Ratio of R&D expenses to total assets	0.08	0.00	0.30	345	
Leverage	0.36	0.33	0.26	345	
Stock turnover (in %)	0.21	0.08	0.33	192	
Market to book ratio	1.41	1.06	1.24	333	*, **
Return on assets (ROA)	0.40	0.06	0.61	345	
<u>Firms with public pension fund shareholdings:</u>					
CF rights of public pension funds	3.73	2.80	4.28	1438	
CF rights of private pension funds	14.17	13.26	9.24	1438	
Voting rights of the largest shareholder (in %)	30.76	25.20	21.18	1438	
Wedge for the largest shareholder (in %)	8.45	0.00	12.52	1251	
6-month return (in %)	1.90	1.40	34.54	1387	
Log of market capitalization (in SEK)	21.78	21.67	2.01	1415	
Log of the number of employees	3.66	3.30	1.94	1112	
Ratio of R&D expenses to total assets	0.02	0.00	0.10	1210	
Leverage	0.33	0.33	0.22	1210	
Stock turnover (in %)	0.30	0.22	0.38	630	
Market to book ratio	7.01	2.12	93.39	1194	
Return on assets (ROA)	0.21	0.02	0.41	1210	
<u>Firms with private pension fund shareholdings:</u>					
CF rights of public pension funds	1.95	0.07	3.61	2681	
CF rights of private pension funds	11.34	9.75	9.14	2681	
Voting rights of the largest shareholder (in %)	32.40	28.33	21.35	2681	
Wedge for the largest shareholder (in %)	9.07	0.00	12.39	2491	
6-month return (in %)	8.04	4.24	50.42	2546	

Variable	Average	Median	Standard deviation	# of obs	t-test of mean differences
Log of market capitalization (in SEK)	20.84	20.53	2.02	2575	
Log of the number of employees	3.24	3.00	1.79	2043	
Ratio of R&D expenses to total assets	0.02	0.00	0.09	2203	
Leverage	0.31	0.29	0.22	2203	
Stock turnover (in %)	0.27	0.18	0.35	1170	
Market to book ratio	5.08	1.98	69.92	2134	
Return on assets (ROA)	0.25	0.04	0.46	2203	

Table 4
First stage regression

In regressions (1) the dependent variable is the change in cash flow rights of AP4 between December 2000 and June 2001 (first phase of pension reform). In regressions (2) and (3), the dependent variable is the share of cash flow rights of public and private pension funds, respectively, and all observations starting from June 2001 are included (second phase of pension reform). Regressions are estimated using OLS. AP4 is a dummy variable that indicates whether AP4 is a shareholder in the firm in June 2000 or not. OMX30 in 2000 is a dummy variable that indicates whether the stock is part of the OMX 30 index in June 2000 or not. All other variables are defined in Table 3. The constant is included in all regressions, but the coefficient is omitted. Standard errors between parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

	(1) First phase of pension reform	(2) Second phase of pension reform	(3)
AP4	-1.625*** (0.273)		
CF rights of AP funds other than AP4	-0.180** (0.086)		
CF rights of private pension funds	0.013 (0.027)		
Log of market capitalization	-0.070 (0.060)	0.453*** (0.039)	1.391*** (0.133)
6-month return		-0.542*** (0.141)	-1.509*** (0.407)
OMX30 in 2000		0.105 (0.414)	-2.745*** (0.979)
OMX30 in 2000*2002		0.421 (0.480)	-1.320 (1.357)
OMX30 in 2000*2003		1.130** (0.444)	-0.525 (1.430)
OMX30 in 2000*2004		0.774* (0.415)	-0.503 (1.457)
OMX30 in 2000*2005		0.629 (0.475)	-1.328 (1.792)
Market cap in 2000		0.000 (0.000)	0.000 (0.002)
Market cap in 2000*2002		-0.001 (0.001)	-0.008*** (0.003)
Market cap in 2000*2003		-0.001 (0.001)	-0.001 (0.003)
Market cap in 2000*2004		0.000 (0.000)	0.000 (0.000)
Market cap in 2000*2005		0.001 (0.001)	0.002 (0.003)
CF rights of mutual funds in 2000		0.073*** (0.015)	0.547*** (0.060)
CF rights of mutual funds in 2000*2002		0.037* (0.019)	0.097 (0.067)
CF rights of mutual funds in 2000*2003		0.007 (0.016)	0.019 (0.063)
CF rights of mutual funds in 2000*2004		0.003 (0.016)	0.011 (0.064)
CF rights of mutual funds in 2000*2005		0.000 (0.000)	0.000 (0.000)
Time fixed effects	No	Yes	Yes
Industry fixed effects	No	Yes	Yes
Observations	230	2058	2058
R-squared	0.39	0.32	0.56
F-test of excluded instruments	--	14.47	29.08
F-test of excluded instruments (p-value)	--	0.000	0.000

Table 5
Firm performance

The dependent variable in Columns (1) to (8), (10), and (11) is the market to book ratio. In Column (9), the dependent variable is the firm's return on assets. In Column (2), we use the change in market to book ratio and ownership of various pension funds between December 2000 and June 2001 as dependent variable. In all other columns, all dependent and independent variables are in levels. Instruments for the IV estimates in Columns (5), (7), (8), and (11) are defined as in Columns (2) and (3) of Table 3. In Column (2), the instrument for the cash flow rights of AP4 variable is a dummy that takes value equal to 1 if AP4 had equityholdings in the company in June 2000. The first phase of pension reform refers to December 2000 and June 2001 when the dismissal of AP4 funds took place. The second phase of pension reform refers to the expansion of pension funds holdings starting in June 2001. Large (private or public) pension funds are those that are among the ten largest pension fund investors in the Swedish stock market, while small pension funds are those that are not among the ten largest pension fund investors. The constant is included in all regressions, but the coefficient is omitted. The coefficient of stock turnover is multiplied by 1,000,000. Standard errors between parentheses are corrected for heteroskedasticity and clustering at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	First phase of pension reform		Second phase of pension reform								
			Market to Book Ratio						ROA	Market to Book Ratio	
	Levels	First differences				Levels					
	OLS	IV	OLS	OLS	IV	OLS	IV	IV	OLS	OLS	IV
CF rights of AP4	2.676*	0.351*									
	(1.570)	(0.175)									
CF rights of AP funds other than AP4	1.219	-0.032									
	(1.257)	(0.139)									
CF rights of public pension funds			1.878**	2.924***	2.324***	1.908**	0.851**	2.053**	0.008*	2.346***	0.990*
			(0.832)	(0.389)	(0.712)	(0.848)	(0.291)	(0.669)	(0.004)	(0.327)	(0.519)
CF rights of private pension funds	-0.059	-0.130**	-0.100	-0.195	-0.270						
	(0.139)	(0.058)	(0.066)	(0.137)	(0.107)						
CF rights of independent private pension funds						0.181	-0.306	-0.282	-0.001		
						(0.156)	(0.342)	(0.520)	(0.003)		
CF rights of related private pension funds						-0.330	1.507	-2.314	-0.004		
						(0.727)	(2.860)	(2.079)	(0.005)		
CF rights of other private pension funds						-0.258	0.185	0.229	0.001		
						(0.173)	(0.124)	(0.246)	(0.002)		
CF rights of large, independent private pension funds										1.616***	1.376*
										(0.368)	(0.804)
CF rights of large, private pension										-0.611**	-0.222

funds that are NOT independent										(0.271)	(0.384)
CF rights of small, private pension funds										-0.330*	-0.278
										(0.170)	(0.179)
CF rights of the largest shareholder	-0.049	0.026	1.878**	2.924***	0.059***	1.908**	0.038***	0.015	0.008*	0.086*	0.051***
	(0.044)	(0.039)	(0.832)	(0.389)	(0.017)	(0.848)	(0.009)	(0.036)	(0.004)	(0.052)	(0.016)
Wedge for the largest shareholder	-0.006***	-0.002**	-0.000	-0.001	-0.002*	-0.001	-0.0001	-0.001	-0.002**	-0.002	-0.001
	(0.002)	(0.001)	(0.006)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.001)
Log of the number of employees	-0.049		-0.266		0.048	-0.231	-0.081			-0.732	0.010
	(0.044)		(0.687)		(0.088)	(0.681)	(0.122)			(0.584)	(0.129)
R&D expenses to total assets	-0.007***		-3.545		-2.708	-3.313	-4.100***			-6.440	-4.380**
	(0.001)		(4.178)		(1.670)	(3.791)	(1.394)			(9.340)	(1.926)
Leverage	-0.886	2.276**	0.826	15.260***	-0.365	1.031	0.354	0.634		3.022	0.369
	(0.752)	(0.861)	(1.658)	(4.063)	(0.565)	(1.827)	(0.643)	(1.140)		(3.777)	(1.159)
Stock turnover	1.080*	-0.229	-0.334	-0.188	-0.242	-0.273	-0.069	-0.449		-0.478	0.425
	(0.616)	(0.114)	(0.315)	(0.369)	(0.126)	(0.027)	(0.127)	(0.092)		(0.415)	(0.131)
Industry fixed effects	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
Firm fixed effects	No	No	No	Yes	No	No	No	Yes	Yes	No	No
Time fixed effects	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	420	221	1761	1915	1566	1761	1566	1686	990	1263	1150
R-squared	0.03	0.33	0.05	0.29	0.26	0.06	0.33	0.51	0.93	0.09	0.13

Table 6
Changes in the holdings of the largest shareholder and related pension funds

The dependent variable in Columns (1) to (5) is the change in voting rights of the largest shareholder; in Columns (6) and (7) the dependent variable is the voting rights of related private pension funds in related firms. In Columns (1) and (2) we use the change in the holdings of the largest shareholder and the changes in ownership of various pension funds between December 2000 and June 2001. In Column (4), we include only observation of firms for which at t-1 public pension funds had less than 0.1 percent of the cash flow rights and in the aggregate increase their holdings by 0.5 percent (large increases in public pension funds holdings). In Columns (6) and (7), we include only observations relative to firms in business groups that control some pension funds. In Column (2), the instrument is a dummy that takes value equal to 1 if AP4 had holdings in the company in June 2000. The constant is included in all regressions, but the coefficient is omitted. Standard errors between parentheses are corrected for heteroskedasticity and clustering at the firm level. * significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	First phase of pension reform			Second phase of pension reform			
	Change in the holdings of the principal shareholder				Change in the holdings of related pension funds in related firms		
	OLS	IV	OLS	OLS	OLS	OLS	OLS
Δ CF rights of public pension funds	0.487*	0.832**	0.066	1.510*	0.055	0.278***	0.282***
	(0.295)	(0.369)	(0.146)	(0.869)	(0.119)	(0.077)	(0.077)
Δ CF rights of private pension funds	0.038	0.559	0.094	0.943			
	(0.069)	(0.402)	(0.100)	(0.870)			
Δ CF rights of independent private pension funds						0.081*	-0.053
						(0.050)	(0.069)
Δ CF rights of other private pension funds						-0.257***	-0.249***
						(0.032)	(0.032)
Δ CF rights of large, independent private pension funds					-0.020		0.250***
					(0.098)		(0.069)
Δ CF rights of large private pension funds that are NOT independent					0.119		
					(0.089)		
Δ CF rights of small, private pension funds					0.112		
					(0.113)		
Log of market capitalization	0.134	0.137	0.108**	0.769	0.107**	0.031	0.031
	(0.266)	(0.143)	(0.054)	(1.078)	(0.054)	(0.046)	(0.046)
Return	0.591	1.824**	-0.436	-2.717	-0.429	0.152	0.122
	(1.481)	(0.830)	(0.338)	(5.040)	(0.321)	(0.404)	(0.407)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	193	193	1909	27	1909	300	300
R-squared	0.02	0.05	0.02	0.49	0.22	0.21	0.23

Table 7
Change in the control premium

The dependent variable is the change in control premium. In Column (1) we consider the change between December 2000 and June 2001. In Column (2), we consider the change after June 2001. All regressions are estimated by OLS. A constant is included in all regressions, but the coefficient is omitted. Standard errors between parentheses are corrected for heteroskedasticity. * significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)
	First phase of pension reform	Second phase of pension reform
Δ CF rights of public pension funds	0.001* (0.000)	0.001* (0.001)
Δ CF rights of private pension funds	0.001** (0.001)	
Change in voting rights of the largest shareholder	-0.001* (0.000)	-0.000 (0.000)
Δ CF rights of large, independent private pension funds		0.000 (0.000)
Δ CF rights of small, independent private pension funds		0.000 (0.000)
Δ CF rights of small private pension funds		-0.000 (0.000)
Observations	29	261
R-squared	0.08	0.03

Table 8
Nominating committees

The dependent variable is a dummy that takes value 1 if shareholder *i* has a seat on the nomination committee of firm *j* and value zero otherwise. CF rights is the percentage of cash flow rights of shareholder *i* in firm *j*. Public pension fund is a dummy that takes value 1 if shareholder *i* is a public pension fund and value zero otherwise. Private pension fund is a dummy that takes value 1 if shareholder *i* is a private pension fund and value zero otherwise. Private pension funds with average large positions is a dummy that takes value 1 if shareholder *i* is a private pension fund which ranks at least 10th for the average size of its positions in Swedish listed companies and value zero otherwise. Foreign is a dummy that takes value 1 if shareholder *i* is foreign and value zero otherwise. Regressions (1) to (3) are estimated using a Probit model and marginal effects calculated at the mean of the independent variables are reported. A constant is included in all regressions. Standard errors corrected for clustering at the firm level between parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)
CF rights	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Public pension fund * CF rights	0.008*** (0.001)	0.008*** (0.001)	0.008*** (0.001)
Private pension fund * CF rights	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Top 10 private pension funds * CF rights		0.002** (0.001)	0.002** (0.001)
Top 10 independent private pension funds * CF rights		-0.002** (0.001)	-0.002** (0.001)
Foreign * CF rights			0.000 (0.000)
Log of market capitalization	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Voting rights of the largest shareholder	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Observations	45775	45775	45775

Appendix

Table A.1.
Swedish Stock Market Information

This table reports summary statistics of the main characteristics of the companies listed on the Stockholm stock exchange for the period 1999 to 2005.

	1999	2000	2001	2002	2003	2004	2005
Trading volume (SEK billion)	2 608.9	4 455.9	3 994.4	2 701.8	2 453.2	3 390.7	3 763.5
Number of shares traded, (million)	14,690	27,901	47,044	63,988	82,305	83,037	72,064
Average transaction size (SEK thousand)	309	324	376	274	262	324	320
Number of transactions (thousand)	8,426	13,764	10,628	9,869	9,365	10,477	11,757
Average daily volume (SEK million)	10,353	17,753	15,978	10,807	9,852	13,402	14,876
Average number of transactions per day	33,436	54,835	42,512	39,477	37,610	41,410	46,470
Year-end market capitalization (SEK billion)	3 182.2	3 130.7	2 480.8	1 562.6	2 066.9	2 492.3	3 314.8
Stock turnover rate, %	94	107	134	122	124	134	124
Change in index, %	66	-12	-17	-37	30	18	33
Number of trading days	252	251	250	250	249	253	253
Number of new companies, net	54	46	24	10	5	10	9
Number of delisted companies, net	30	35	30	18	20	15	14
Number of listed companies at year-end	300	311	305	297	282	277	272
USD exchange rate with SEK	8.53	9.54	10.67	8.83	7.19	6.61	7.96

Source: OMX, Stockholmborsen, WDI, and IFS

Table A.2. **Swedish National Pension System**

This table lists all public and private pension funds that participate in the Swedish national pension scheme and have equity participations in the listed companies included in our sample.

Public Pension Funds: Första AP-fonden (First AP-fund, AP1), Andra AP-fonden (Second AP-fund, AP2), Tredje AP-fonden (Third AP-fund, AP3), Fjärde AP-fonden (Fourth AP-fund, AP4), Sjätte AP-fonden (Sixth AP-fund, AP6), Sjunde AP-fonden (Seventh AP-fund, AP7).

Private Pension Funds: About 600 pension funds in total. S denotes Swedish fund; F denotes Foreign fund. The following asset managers manage pension funds that own shares in the companies included in our sample: AIG fonder (F), AMF Pension fonder (S), Axa fonder (F), Aktia fonder (F), Aktie-Ansvar fonder (S), Alfred Berg fonder (F), Aragon Fondkommission AB (F), Banco fonder (S), DnB/Carlson fonder (S), Carnegie fonder (S), Carnegie fonder (Luxemburg) (F), Catella fonder (S), Cicero fonder (S), Credit Suisse fonder (F), Didner & Gerge aktiefond (S), DnB NOR fonder (F), Öhman Fondkommission AB (S), Öhman fonder (S), East Capital fonder (S), Enter fonder (S), Erik Penser Fondkommission (S), Evli fonder (Finland) (F), Fidelity fonder (F), FIM fonder (Finland) (F), Firstnordic fonder (S), Folksam fonder (S), Folksam LO fonder (S), Fondita fonder (F), Gustavus Capital fonder (S), HQ Fonder (F), Hagströmer & Qviberg Fondkommission (S), CDC Ixis fonder (F), Insight Investments fonder (F), Kaupthing fonder (S), Lannebo fonder (S), Länsförsäkringar fonder (S), Merrill Lynch fonder (USA) (F), JP Morgan Chase fonder (F), Morgan Grenfell fonder (F), Nordea fonder (S), Odin fonder (Norge) (F), Pictet fonder (USA) (F), Robur fonder (S), SEB fonder (S), SHB/SPP fonder (S), Sampo fonder (F), Seligson & Co fonder (F), Simplicity fonder (S), Skagen fonder (Norge) (F), Skandia fonder (S), Spiltan & Pelaro fonder (S), Storebrand fonder (F), Västernorrlandsfonden (S).

Source: PPM and Financial Supervisory Authority of Sweden.