Hitotsubashi Journal of Economics 42 (2001), pp.119-140. © Hitotsubashi University

IMPLICIT LABOUR CONTRACTS UNDER THREAT? THE SPECTRE OF SHAREHOLDER INTERVENTION

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Accepted June 2001

Abstract

Delayed rewards are often important to bond worker efforts and encourage investments in firm specific human capital. However, corporate control events, such as hostile takeovers, can be associated with reductions in the deferred compensation for long-term employees. If workers anticipate contractual breach, we show that firms with a higher risk of shareholder intervention have lower deferred compensation. Consequently, recent labour market developments and increased shareholder activism in Japan pose the potential for reduced stakeholder investments. However, econometric evidence using U.S. data provides scant support for the argument that any "breach" of implicit contracts is more likely to be driven by opportunistic reasons.

Key Words: Implicit Contracts, Corporate Governance, Specific Human Capital.
JEL classification: J41, G32, J31.

I. *Introduction*

This paper examines the relationship between the nature of implicit labour contracts and corporate ownership. In particular, we analyse the effects that ownership and governance

* The second-named author would like to acknowledge the financial support of the Center for Economic Institutions at Hitotsubashi University. Both authors benefitted from comments on an earlier version of the paper by Ronald Gilson, Bob Hutchens, George Jakubson, Mark Kennet, Rob Masson and Martin Wells. The usual attribution for errors applies.

structures have on the firm's ability to offer deferred compensation agreements with workers. Optimal labour contracts often involve implicit promises to pay deferred compensation (e.g., when worker efforts cannot be perfectly monitored or objectively measured). Since implicit contracts are not court-enforceable, they mainly stand on the strength of a firm's reputation and the workers' trust [see e.g., Bull(1987)]. When reputational forces are weak, shareholder wealth can be increased by an "opportunistic" revocation of promised employee rewards [see Lazear(1981)].

Shleifer and Summers (1988) argue that hostile takeovers and related exercises of shareholder "voice" are the primary vehicle through which opportunism occurs. Becker (1995) and Gokhale *et al.* (1995) find evidence that hostile takeovers result in wage losses for senior workers and Lichtenberg and Siegel (1990) find that white-collar employment falls dramatically after a takeover. In a similar vein, Pontiff *et al.* (1989), Mittelstaedt (1989), and Ippolito and James (1992) find that hostile takeovers or management buyouts are associated with reductions or reversions of excess pension assets. While valuable, this research does not have obvious efficiency implications. In particular, it is unclear whether the employment and wage reductions reflect opportunistic behaviour that undermines employee motivation and specific human capital development or whether they reflect an appropriate adjustment to changed economic circumstances.

In the next section, we present a simple model to illustrate how the threat of shareholder intervention, e.g., taking the form of a hostile takeover or a proxy fight initiated by dissident shareholders, affects the nature of observed labour contracts. In contrast to existing work that effectively treats shareholder intervention as a surprise to employees, we assume rational expectations on the part of all parties and allow for the firm's response to a takeover bid or a proxy fight to be endogenously determined. We contrast the implications of a world in which shareholder activism is expected to trigger opportunistic breaches of employment contracts with those of a world in which the motives are strictly to enhance efficiency. The assumption of rational expectations on the part of workers is not simply a convenient modeling device. Opportunistic behaviour does not involve any efficiency loss if such behaviour is truly unanticipated. Pure windfall losses or gains in employee compensation cannot affect choices of effort or specific human capital investment. However, employees will reduce effort and avoid investments in specific human capital if they expect the firm to behave opportunistically in the future.

In section III, we present two types of evidence on the empirical implications of the model. First, we discuss the implications of our theory for the structural changes and the labour market developments ongoing in Japan. Some sectors of the Japanese economy are becoming less regulated and increasingly open to inwards foreign direct investment. More generally, there are calls for a greater adherence to increasing shareholder wealth. Both developments bring with them changes in existing labour market practices and changes in corporate culture. However, there are both costs and benefits associated with these recent developments. Secondly, we present econometric evidence on a key implication of our model. Specifically, if workers and firms anticipate opportunism, there will be less deferred compensation in firms with lower costs of shareholder intervention. To proxy deferred compensation, we use two different measures of "at risk" pension benefits. The pension data for 203 large publicly-traded U.S. corporations are from Standard and Poor's *Compustat*. These data are merged with both firm- and industry-level data from *Compustat* and a number of other sources

that are intended to capture the most important determinants of deferred compensation for workers. Section IV concludes.

II. *Deferred Compensation and the Costs of Shareholder Intervention*

1. A Simple Model

We distinguish between non-opportunistic and opportunistic shareholder behaviour. It is assumed throughout that incumbent management always honours implicit contracts. The qualitative results are unchanged if both managers and shareholders are to some degree motivated by opportunism; the key issue is whether workers *expect* managers to be less inclined to opportunism. To address this question, we contrast the empirical implications for the case in which raiders bear no reputational or related costs of opportunism, and the case in which they, like management, bear prohibitively high costs of opportunistic behaviour.

We begin with the firm's labour contract. Each worker consumes in three different periods. In the first period, the worker is new to the firm and receives a wage of w dollars. In the second period, the worker receives $w+\Delta$ dollars if their performance is satisfactory and w dollars otherwise. In the third period, the worker retires and receives a pension of s times the final wage, i.e., either sw or $s(w+\Delta)$. Hence, the "performance-related" portion of pay is $(1+s)\Delta$ dollars. This "premium" could represent an explicit bonus or the gains associated with moving into higher-paying jobs further up the career ladder.

Since our purpose is to study the relationship between financial and labour contracts, we specify the benefits of deferred performance pay in reduced-form. In particular, we assume that firm revenues are $V(E[(1+s)\Delta])$ where the expectation operator E captures the fact that, if the raider is opportunistic, the worker only receives the premium if there is no raid. To ensure interior solutions we assume that $V' > 0$ and $V'' < 0$. However, there exists a critical level of deferred compensation beyond which $V' < 0$. The property that $V' > 0$ could reflect increased worker effort (as in Lazear, 1981), the ability of the firm to retain trained workers [e.g., Salop and Salop (1976)], and/or tax savings [e.g., Ippolito (1986)].[1] A firm for which considerations of effort, retention, or tax savings are of great importance will have a relatively high value of V' for any given level of deferred performance-related pay. Finally, we assume that, contingent on satisfactory performance, the worker always receives the high second-period wage and third-period retirement pension if the incumbent management team retains control. This assumption reduces the notational burden without affecting the results.[2]

For our purposes, the key element of the firm's financial contracts is the stance towards a hostile raider or activist shareholder. We assume that this party (henceforth, the "dissident" or "raider") can only achieve control of the firm by paying a premium of p dollars over the firm's current value. The premium p is chosen by the firm's founder in order to maximise

[1] Consider an incentive version of a model in the spirit of Lazear. For example, suppose a worker who exerts e units of effort increases the firm's receipts dollar-for-dollar at private cost $e^2/2\theta$. The worker chooses $e^*=\theta E[(1+s)\Delta]$ and the firm's value would be $V=e-e^2/2\theta$ so that $V'=\theta(1-E[(1+s)\Delta])$ and $V''=-\theta$.

[2] The assumption is quite innocuous, since the opportunism of raiders can be interpreted in relative terms, i.e., relative to any opportunistic motives that incumbent management may harbour.

expected wealth.[3] The raider has a private valuation of controlling the firm of σ dollars, reflecting the added value that can be realised without opportunism. For example, one can think of a high value of σ as indicating that the firm's current management, or their policies, is no longer well suited to the firm's environment. If the raider intends to pay the same compensation as the firm's incumbent management (the case we refer to as the "non-opportunistic" raider), they value the target at $V-w-(1+s)(w+\Delta)+\sigma$ dollars. Since the incumbent managers also pay the worker all of $w+(1+s)(w+\Delta)$, the price the dissident must pay equals $V-w-(1+s)(w+\Delta)+p$ dollars.[4] Hence, the firm is taken over if $\sigma > p$ and managed by the incumbents otherwise.

If the raider is "opportunistic," the worker is paid the lowest possible wage w plus the lower pension of sw. In effect, the raider revokes the deferred compensation $(1+s)\Delta$ that was implicitly promised to the worker. Hence, the raider values the target at $V-w-(1+s)w$ and successfully acquires control of the firm if $\sigma > p-(1+s)\Delta$. If the raider is opportunistic, a higher Δ makes the firm a more attractive target and deferred worker compensation is an "exposed quasi-rent" in the terminology of Klein *et al.* (1978).

Finally, we assume that the founder chooses the cost barrier p and labour contract (Δ and w) knowing $V(.)$ and the fact that the raider will succeed in acquiring control whenever the private benefit σ is sufficiently large. The founder and the worker know whether the raider is opportunistic and so can compute the correct critical value of σ above which a raid will succeed. They do not, however, know the exact value of σ, only that σ is drawn from a cumulative distribution H with positive density h on the interval $[\underline{\sigma}, \bar{\sigma}]$. Hence, the worker's expected deferred compensation in the case in which the raider is opportunistic is $H(p-(1+s)\Delta)[1+s]\Delta]$.

2. The Non-Opportunistic Raider Case

The founder knows that a raid will occur only if $\sigma > p$, an event which occurs with probability $1-H(p)$. Since shareholders receive the premium p when a raid is successful, the value of the firm to the founder is

$$V-w-(1+s)(w+\Delta)+(1-H(p))p, \tag{1}$$

where $V=V(E[(1+s)\Delta])=V((1+s)\Delta)$, i.e., the worker knows that they will receive the premium Δ regardless of whether a raid takes place. The worker's participation constraint is

$$w+(1+s)(w+\Delta)=\underline{u}. \tag{2}$$

Substituting (2) into (1) yields the objective

$$V-\underline{u}+(1-H(p))p. \tag{3}$$

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[3] The optimal cost barrier to shareholder activism p is 'contracted' in the sense that the founder must take account of the effect that p has on the participation and future behaviour of workers and raiders. The founder can control p via the state of incorporation, adoption of certain corporate charter amendments, capital structure changes, and so on.

[4] The analysis is almost identical if p is partly a deadweight loss, i.e., a cost paid by the dissident that does not accrue to current shareholders (e.g., legal fees, opportunity cost of the dissident's time, etc.). The only difference would be that the optimal cost barrier is lower; none of the key comparative static results would be affected.

The parameters w and s represent redundant degrees of freedom when the worker participation constraint binds.[5] Given Δ, the worker's compensation in each period is determined by (2). The worker receives $w=(\underline{u}-(1+s)\Delta)/(2+s)$ in the first period, $w+\Delta=(\underline{u}+\Delta)/(2+s)$ in the second period, and $s(w+\Delta)$ as the third period pension.

The founder's problem simply involves the choice of p and Δ. From (3), the first-order condition for Δ requires $(1+s)V'=0$ or $V'=0$. The first-order condition for optimal p is

$$1-H(p)-ph(p)=0 \text{ or } p=(1-H(p)/h(p). \tag{4}$$

The results are straightforward. The probability of takeover is unrelated to the structure of worker compensation and the labour contract (characterised by Δ) is chosen to maximise expected revenues, V. The takeover premium is set to maximise the rents that can be "extracted" from the raider (i.e., rents that the founder receives as a shareholder or in the initial float price of his stock). The most important implications are that deferred compensation increases in V' and that there is no relationship between labour contracts and p. The key to these results is that workers do *not* anticipate opportunistic behaviour.

3. The Opportunistic Raider Case

Now assume that the raider pays only w to the worker in the second period plus sw in the third period. A raid is now successful if $\sigma>p-(1+s)\Delta\equiv\sigma^*$. Since the "confiscated" deferred compensation $(1+s)\Delta$ accrues to the raider, the founder's objective is

$$V[H(\sigma^*)(1+s)\Delta]-w-(1+s)(w+\Delta)+(1-H(\sigma^*))p. \tag{5}$$

Workers know that they will receive the amount $(1+s)\Delta$ only if there is no raid, hence their participation constraint is

$$(2+s)w+H(\sigma^*)(1+s)\Delta=\underline{u}. \tag{6}$$

Substituting (6) into (5) yields

$$V[H(\sigma^*)(1+s)\Delta]-\underline{u}+(1-\mathrm{H}(\sigma^*))(p-(1+s)\Delta). \tag{7}$$

The first-order condition for optimal Δ is $(1+s)$ times

$$V'[H(\sigma^*)-(1+s)\Delta h(\sigma^*)]-[1-H(\sigma^*)-h(\sigma^*)(p-(1+s)\Delta)]=0. \tag{8}$$

The first-order condition for optimal p is

$$V'[(1+s)\Delta h(\sigma^*)]+[1-H(\sigma^*)-h(\sigma^*)(p-(1+s)\Delta)]=0. \tag{9}$$

Using (9) to eliminate p from equation (8) yields $H(\sigma^*)V'=0$ or $V'=0$. Both the non-opportunistic and opportunistic raider cases have identical implications for the setting of worker compensation. Using $V'=0$, equation (9) can be rearranged as

$$p=(1+s)\Delta+(1-H(\sigma^*))/h(\sigma^*). \tag{10}$$

[5] We assume that the wage w has no binding floor and that there is perfect competition between workers for jobs at the firm. This ensures that the worker expects to receive the reservation utility level of $\underline{u}$. Garvey and Gaston (1997) develop the 'effic iency wage' case.

Hence, the cost barrier p is increased by the amount of deferred compensation the raider is expected to seize. While a high p is often portrayed as leading to management "entrenchment," in this model it serves the purpose of defining workers' property rights to their deferred compensation. When V' is greater, and hence optimal Δ is greater, then from (10) the optimal p is also greater. This premium equals the amount of deferred compensation "at risk" plus an extra amount $(1-H)/h$ that is aimed at extracting rents from the raider.

III. *Empirical Implications*

A. Summary of Implications: The model developed in the previous section presumes that the value of the firm and implicit contracts increase in the ability to bond workers. Such bonding can be achieved by implicitly promised wage growth or bonus payments, generosity of pension benefits, promotion probabilities and the likelihood of layoff in the event of negative demand shocks. We next assumed that the firm's shareholders, by an appropriate choice of governance structure, can erect "cost barriers" to hostile takeovers and thereby protect stakeholder investments. However, the basic empirical implications that follow from the theoretical discussion depend upon whether the firm and its stakeholders anticipate opportunistic re-negotiation, breach or even reneging of implicit agreements. Specifically,

(i) If corporate control changes *are not* expected to result in contractual breach, the cost barrier, or takeover premium paid by a successful hostile bidder for the firm, is unrelated to the structure of worker compensation and measures correlated with the importance of the value of implicit contracting;

(ii) If corporate control changes *are* expected to result in contractual breach, the cost barrier increases in the importance of the value of implicit contracting and bonding of workers. This is the "classic" case in which corporate governance features serve to protect the implicit or non-contractible investments of stakeholders.

We now present some "case study" as well as econometric evidence that bears on these implications. First, we discuss recent labour market developments in Japan and the implications of the structural changes in human resource management and organisational behaviour. Following that, we provide some econometric evidence on the relationship between deferred compensation benefits promised to workers and the barriers to shareholder intervention exhibited by U.S. firms. In particular, controlling for the effects of various firm- and industry-specific characteristics, we investigate whether firms with higher barriers to shareholder intervention exhibit higher or lower deferred compensation for their workers.

B. The Japanese Case: Corporations in every country face the need to change due to the very nature of changing dynamic comparative advantages. The need for change becomes more apparent in the face of dramatic changes in the economic environment. There is always resistance to change, of course. Mooted changes in organisational direction involve winners and losers. For example, if Japanese firms abandon lifetime employment practices and renegotiate implicit contracts, then this will undoubtedly adversely affect incumbent employees. On the other hand, the effect of demographics and greater external labour market

opportunities for experienced workers may work to offset some of these losses. Some of the changes in organisational design may be inevitable as the Japanese labour market and corporate environment globalise. Blomström *et al.*, (2000) and Ito and Fukao (2001) note that deregulation has opened up much of the industrial and service sectors to foreign multinationals. Inward foreign direct investment into the Japanese economy is small, but is likely to increase as deregulation opens up industrial and service sectors. This will serve to accelerate change to the existing corporate culture. Perhaps more significantly, from a long-term perspective is that such changes in labour market institutions may alter the incentives of workers to invest in firm-specific human capital.

Genda and Rebick (2000) argue that Japan has been undergoing structural shifts in its labour markets, both external and internal, and that these changes have been amplified by demographic factors. However, they also note that the shifts are not particularly notable, when compared with European, and particularly, U.K. developments. In a similar fashion, Kato (2000) argues that Japanese firms have been 'fine-tuning' rather than dismantling their existing employment practices. He also argues, however, that some of the recent changes have the potential to result in reduced commitment by union officials to rank-and-file workers. This may eventually lead to the 'breakdown of the system'.

Gilson and Roe (1999) describe the lifetime employment system common in large Japanese firms as having a 'bright side' and a 'dark side'. The latter involves the lack of exposure to the external labour market and worker immobility; the Japanese firms' lack of 'macro'-flexibility may leave them unable to respond to rapid technological change. Dealing with redundant workers and managers when the economy is shrinking was always going to be an issue that at least some Japanese firms would have to face. On the other hand, at the micro level the very nature of implicit, rather than explicit, contracting is that trusted managers can effect adjustments in the terms of those contracts in response to environmental changes. The 'bright side' encourages productivity and commitment, because employees fear the potentially high costs associated with job loss. The model in section II presumes the importance of a bright side along with associated mechanisms that bond workers to firms and encourage higher productivity and specific investments.

What are the costs of overhauling a human resources management system that has apparently served Japan so well? The firm is often described as a nexus of contracts. Taking the broadest possible definition of a contract, i.e., which encompasses social, economic and legal elements, provides a particularly useful way in which to frame one's thinking about the relationship between the firm's various stakeholders. During the 1980's there was considerable debate in the United States about suspected breaches of implicit contracts during the height of the 'merger wave'. One aspect of hostile takeovers that attracted considerable attention was the fact that some of the takeovers were frequently financed by 'stripping' excess assets from employee pension funds and renegotiating the wages of long-term employees. Corporate restructuring through takeovers is in large measure value enhancing, of course. However, it was argued that by some observers that part of the gains to shareholders were re-distributive transfers from employees and other stakeholders of the corporation [e.g., Shleifer and Summers (1988)]. The present day concerns in Japan are even more apparent with some of the shareholder activism being instigated, either directly or indirectly, by foreign investors, as mentioned above.

Of course, the main problem with reneging on implicit contracts is that such opportunism

undermines the value of the firm and may create inefficiencies. *"The breach of trust accompanying such deals might spread enough fear of further breach through the economy as to either vastly complicate or even prevent profitable trade"* [Shleifer and Summers (1988, p.53)]. Seen in this light, it is not surprising that Japanese firms have been reluctant to embrace drastic changes to lifetime employment and related human resources management practices.[6]

One way in which to assess the predictions of the model we developed in section II is to look at recent changes in employment practices brought about by the 'long slump' and then exacerbated by the Asian economic crisis. Hashimoto and Raisian (1985) find that employee earnings grow significantly more rapidly in large Japanese firms than in their U.S. counterparts.[7] Brunello and Ariga (1997) argue that such differences compared to Western firms is driven by Japanese firms commitment to long-term, implicit employment contracts, substantial investment in firm specific skills and cooperative industrial relations. Such rapid earnings growth is commonly associated with the presence of a high value of firm-specific human capital investments and the importance of an end-weighted reward structure for workers, increased payments later in a worker's career. Rapid earnings growth also suggests low earnings early on in the career and thus a relatively high value of shared worker firm investments and steep age-earnings profiles. Both of these considerations would lead us to expect high barriers to hostile takeovers in Japan, a prediction that is strongly supported by the presence of stable cross-shareholdings that characterise the Japanese keiretsu.

Of greater interest, are the recent changes in corporate governance prompted by the slowdown in economic growth. For the post-war period up to the late 1980's, Kester (1991, p. 50) describes how organisational inertia and resistance to structural change in Japan was in large part driven by the reluctance on the part of managers and owners to breach implicit contracts with labour. In turn, institutional features such as reciprocal shareholding arrangements significantly reduce the temptation to tender shares owned in a target company (see Hoshi, 1998). Kester (1991) discusses how an active market for corporate control only began to emerge in Japan from the late 1980's. This latter phenomenon is consistent with the recent changes in labour practices, documented above, that have reduced the gains to seniority and promotion in Japan.

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[6] Simple versions of implicit contract models imply that wages are equalised across states of nature. Wages can be viewed as part indemnity during poor states and as part insurance premium during good states. Such insurance arrangements are ex ante optimal for risk-averse workers and their less risk-averse employers. There are two points worth noting. First, the feasibility of such implicit contracts relies on the independently and identically distributed nature of productivity and demand shocks through time (or across sectors of a conglomerate firm). A firm hit by a permanent shift in the underlying distribution of the states of nature it faces may be forced to renegotiate long-term contracts or to abandon implicit contracts in favor of more market-based employment agreements. Secondly, there is a dual moral hazard problem associated with enforcing implicit contracts ex post (see Davidson, 1990). Workers have an incentive to breach contracts when external labour market conditions improve and firms have an incentive to renege on implicit contracts when the labour market is slack. Incentive compatibility constraints adjust to reflect these costs of enforcing implicit contracts. For example, if demographic changes in Japan serve to raise the reservation wage of experienced, skilled workers, then this will force contract wages closer to market-determined wages. This requires that the firm offset these wage increases by collecting the insurance premium from its less experienced workers. If this proves to be infeasible, the only alternative may be to abandon implicit contracting (as well as some of the institutions that support it, such as lifetime employment).

[7] Brunello and Ariga (1997) find that within-rank (between-rank) earnings growth is higher (lower) in Japan than in the United Kingdom. They argue that this underscores the importance of seniority in Japan, as opposed to the importance of job matching in the United Kingdom.

TABLE 1. VARIABLE LABELS AND DESCRIPTIVE STATISTICS

Variable	*Description*	*Source*	*Mean*	*s.d.*
BOE_NV	Nonvested pension benefits per employee ($'000)	c,l	0.88	0.81
BOE_V	Vested pension benefits per employee ($'000)	c	9.59	7.74
GBOE_V	Adjusted vested pension benefits per employee ($'000)	c,a,l	41.95	38.85
FUNDRAT	Pension funding ratio: Vested benefits/Pension assets (%)	c,l	85.71	24.05
SEOS2	Selling expenses/Sales2 (*100)	c	17.74	10.69
ROE1	Return on equity (%)	c	15.58	4.91
DSE2	Debt-equity ratio (%)	c	40.69	40.01
SALE1	Total sales ($m)	c,l	3420.20	7794.10
EMPGROW	Annual employment growth: 1981-1985 (%)	c	−0.73	8.54
IGPOTA2	Inventories+Plant+Equipment/Total assets2 (*100)	c	62.46	12.42
WHCOLL	White collar employees (%)	b	36.28	15.92
ENGSCI	Engineers and scientists (%)	b	2.24	1.80
EDUCATAV	Average education of workers (%)	b	13.56	0.80
UNION	Union membership (%)	k	36.80	17.36
F5	Share ownership by top 5 families or individuals (%)	d	10.43	13.05
I5	Share ownership by top 5 institutions (%)	d	19.30	10.10

Sources: c=Compustat; a=adjusted see text; l=logged in empirical work; b=CPS; k=Kokkelenberg-Sockell (1985); d=Demsetz-Lehn (1985).

Using annual Wage Census data for 1976 to 1989, Ariga *et al.* (1992) show that the average age of workers increased in all industries, across all firm sizes and job classes. They argue that this reflects delayed promotions or a more stringent selection policy during the course of the period. Slower growth also resulted in an increasing share of higher rank positions (see also Brunello *et al.*, 1995). The authors conclude that a growth slowdown presents large Japanese firms with a serious dilemma. If a firm tries to maintain its hierarchical structure, then the promotion policy must bear the burden of adjustment. However, since promotions are the key incentive scheme at large Japanese firms, these adjustments may have unwanted incentive consequences. Ariga *et al.* (1992, p.466) observe that movements to "pay according to (observable) performance may induce serious under investment" in on the job training by workers.

C. An Econometric Study for the United States: We now examine whether implicit contracts are systematically affected by the threat of opportunistic behaviour in the sense that firms promising greater amounts of deferred compensation place higher barriers in front of potential activist shareholders. The empirical work is motivated by the recent finding that institutional or outside shareholders are willing to tender their shares to hostile raiders at substantially lower premiums than insiders or family shareholders.

1. Data Description

The data on deferred compensation and the financial characteristics of firms used in our analysis are from Standard and Poor's *Compustat*. Industry-level variables are primarily from the *Current Population Survey*. Data were drawn from other sources as well. The sources of all the variables and their descriptive statistics are listed in table 1.

Unless otherwise stated, all data are for 1981. The choice of 1981 as our benchmark for this study was influenced by the availability of the share ownership data used in the

well-known study by Demsetz and Lehn (1985). With the exception of the pensions data, the *Compustat* data are averaged across three-year sub-periods in order to minimise the possibility of measurement error. The variable label suffixes denote: *1* = 1977-78-79 and *2* = 1980-81-82. The regressors denoted with a *2*-suffix are contemporaneous. Those variables with a *1*-suffix indicate that they are lagged. For example, the return on equity, ROE1, is lagged to capture the long-term impact of profitability on promised rewards. The size variable (LnS1) is lagged to avoid the spurious correlation that may arise due to the fact that more profitable firms grow larger and the fact that more profitable firms have higher promised rewards. The small and negative mean value for EMPGROW reflects the relative over-sampling of manufacturing industries.

2. Measuring Deferred Compensation

Our model characterises employment contracts by Δ or the extent to which compensation is deferred. Using the notation from section II, a firm's true pension liabilities are $s(w+\Delta)$, which strictly increase in Δ. In principle, reported pension liabilities should therefore reliably characterise the degree to which compensation is deferred. One part of Δ is simply the firm's existing pension liabilities that are not vested, which we label LBOE_NV.

Fully vested pensions based on current earnings are effectively the property right of the worker and therefore do not correspond to Δ since they cannot be revoked, either for shirking or for reasons of firm opportunism. As stressed by Ippolito (1986), even workers who are fully vested have a great deal of their future pension benefits at risk because only benefits based on current earnings are ever vested.[8] Indeed, our theoretical model assumes that all benefits are vested, since workers receive a pension of sw even after an opportunistic raid. The portion $s\Delta$ reflects expected earnings growth that is lost in the event of an opportunistic takeover. We capture these benefits by the variable LGBOE_V. This variable measures the amount of promised benefits that would be lost if the worker were to separate from the firm or if the pension plan were terminated, under the assumption that employees would continue to work until retirement. The Appendix describes in detail how we use expected industry wage growth to adjust vested pension liabilities.[9]

3. Measuring the Cost of Shareholder Intervention

There are many possible determinants of p, the cost barrier facing a raider or activist

[8] The Employee Retirement Income Security Act (ERISA) of 1974 was based on a suspicion that employers would be opportunistic with respect to their workers' pension benefits. Public outrage at the possible opportunistic dismissal of non-vested workers lead to the passage of the Act (see Cornwell *et al.*, 1991). However, even fully vested workers have something to lose if they are dismissed before retirement because most benefit formulas are based on years of service as well as the highest salary (typically this is the salary in the immediate year, or average salary in the last few years, preceding retirement). Being prematurely dismissed means those older workers would lose on both counts. While ERISA provides some insurance against such losses, the insurance is capped at a relatively modest level (e.g., $21,477 in 1987, see Francis and Reiter, 1987).

[9] The vested pension benefits reported by the firms in *Compustat* are based on "employees' service rendered to date." These benefits are most likely to be for defined benefit plans. Lazear (1986, p.331) notes that the majority of workers in the United States are covered by defined benefit rather than defined contribution pension plans. Also, the former plans tend to be far less common in small firms (and thus, less common in our sample of firms).

shareholder. For example, amendments in the corporate charter such as supermajority rules, poison pills, staggered boards of directors, and so forth increase the cost of takeovers (Dann and DeAngelo, 1988). We focus on the structure of ownership of the firm. Stulz *et al.* (1990) find that takeover premiums are significantly lower for firms that are predominantly held by institutional shareholders and are higher when insiders hold more shares. We use the percentage of the firm's shares held by the five largest institutional shareholders (I5) and the five largest individual shareholders (F5) as measures of p. These data are from *Corporate Data Exchange* Stock Ownership Directories for 1981.[10]

While the evidence on the premia paid in successful takeovers suggests that p increases in F5 and falls in I5, the following considerations should be kept in mind. First, while the takeover premium increases in F5 so does the temptation for insiders to behave opportunistically. Inside shareholders have claims on more of the firm's cash-flow rights as well as its shares [Stulz (1988); Morck *et al.* 1988)]. In other words, F5 may proxy for both a lower probability of takeover as well as a greater incentive for management to expropriate workers.

Further, it is not always true that large institutional shareholders are willing to tender their shares for a lower premium or otherwise go against the wishes of existing management. Despite their larger shares of the total premium paid in a takeover, some large institutional shareholders are subject to commercial and other pressures exerted by incumbent management that could effectively increase rather than reduce p [see Brickley *et al.* (1994)]. As suggested by Lakonishok *et al.* (1992), public pension funds and other major institutional investors can often be motivated by political and other goals, rather than the returns of their beneficiaries. This observation is important, since many large institutional investors are in fact pension funds [Drucker (1991)]. Shareholder opportunism in this case would entail the fund manager diverting assets from the target firm's pension fund to their own pension fund shareholders!

Given the possible ambiguities associated with our ownership variables as indicators of p, we use the following supplementary measures. First, higher leverage, DSE2, commits cash flows to bondholders and reduces the attractiveness of the firm as a takeover target [Palepu (1986), Garvey and Gaston (1997); Gaston (1997)]. IGPOTA2 is the ratio of inventory plus gross plant and equipment to total assets and measures "tangible" or collateralisable assets. Titman and Wessels (1988) maintain that managerial consumption of perquisites is negatively related to collateralisable assets. Since these considerations imply a lower risk of takeover, IGPOTA2 should be positively related to p. To the extent that takeovers or proxy fights are intended to discipline under-performing firms, those firms with a higher return on their equity, ROE1, have a decreased vulnerability to takeover. If potential raiders or dissidents face an increasing cost of capital, then larger firms are more difficult to takeover. Firm size is captured by LnS1, the log of sales.[11]

[10] Further description of the ownership data can be found in Demsetz and Lehn (1985). Our sample size is smaller due to the non-reporting of pension benefits by some companies in *Compustat*. Unlike Demsetz and Lehn, our sample does not include firms in regulated industries or media firms. Means and standard deviations are almost identical, however. In our sample of 203 firms, the means (standard deviations) are: 19.30 (10.10) for I5, and 10.43 (13.05) for F5. In the Demsetz-Lehn sample of 511 firms: 18.39 (11.52) for I5, and 9.08 (13.03) for F 5.

[11] Different measures of firm size such as logged and unlogged sales, total assets and total number of employees are all very highly correlated (e.g., $\rho = 0.95$ between LnS1 and log total assets). The reported results that follow are robust to alternative size measures.

4. The Determinants of Deferred Compensation

Previous empirical work suggests that the most important determinants of an individual's deferred compensation are their union status (UNION) and the occupational mix of the industry in which they work [see Lazear (1986)]. Clearly, the determinants of deferred compensation, described in section II, are related to the occupational mix. Our focus, however, is not on how deferred compensation varies across individuals, but on how it differs across firms.

We also use firm-level information to control for other determinants of deferred compensation. For example, EMPGROW captures the expected growth of the firm's work force. It is based on realised values of employment levels from 1981 to 1985. Firms with growing workforces will tend to have more young workers who have reported pensions of sw even though they expect to stay with the firm and thus have true pensions of $s(w+\Delta)$. In some specifications that we estimate, we account for the fact that full pensions may not be paid if the firm has not laid aside sufficient funds to cover them by including a measure of the degree to which true pension liabilities are under-funded, LFUNDRAT. This measure is particularly relevant in the current context because of the evidence that hostile takeovers, or even the threat thereof, often trigger a reduction in the assets a firm leaves to back its pension plan [Mittelstaedt (1989); Pontiff *et al.* (1989)].

5. Main Results

The results for both measures of pensions per worker for our baseline specification are displayed in table 2. The fit of the equations is reasonable for pension equations of this type. Of the statistically significant coefficients, firm size seems to be important for pensions and higher union density is positively related to pensions, particularly, non-vested pensions. The large positive sign for firm size and the importance attached to size in the empirical literature on hostile takeovers is consistent with the view that large firms are less vulnerable to shareholder activism or opportunistic intervention and that they can therefore promise higher deferred compensation to their workers. However, it is also consistent with the view adopted by Brown and Medoff (1989) that large firms employ higher quality workers and therefore that all types of compensation, including pensions, are higher in larger firms. The negative coefficient for EMPGROW suggests that it is in fact a reasonable control for the tenure of the firm's workforce, since firms with better growth prospects and fewer senior employees have lower reported pensions.

Table 2 indicates that I5 has a positive relationship with deferred compensation. (Results from specifications including F5 are discussed in the next section.) In the last section, we noted that, if shareholders are expected to behave opportunistically with respect to deferred compensation, the correlation between deferred compensation and institutional ownership should be negative. If there is no such opportunism problem, the theory predicts no relationship.

Taken literally, the result for I5 has the following interpretation. Large institutional shareholders actually insulate rather than expose the firm to shareholder intervention, so that the barrier to shareholder intervention, p, actually rises in I5. Since the positive relationship

TABLE 2. DETERMINANTS OF DEFERRED COMPENSATION

	LBOE_NV	LGBOE_V
SEOS2	−0.006	0.007
	(0.007)	(0.007)
ROE1	0.018	0.0004
	(0.013)	(0.014)
DSE2	0.001	−0.001
	(0.002)	(0.002)
IGPOTA2	−0.0003	−0.0004
	(0.006)	(0.006)
EMPGROW	−0.014	−0.010
	(0.007)	(0.008)
LnS1	0.214	0.263
	(0.057)	(0.061)
UNION	0.023	0.006
	(0.005)	(0.005)
I5	0.016	0.016
	(0.006)	(0.006)
WHCOLL	0.007	−0.006
	(0.009)	(0.010)
ENGSCI	0.048	0.069
	(0.045)	(0.047)
EDUCATAV	0.054	0.358
	(0.185)	(0.197)
Intercept	2.387	2.946
	(2.117)	(2.247)
R^2	0.270	0.239
Adjusted R^2	0.228	0.195
F	6.42	5.45

Notes: Standard errors in parentheses. N = 203.

between deferred compensation and I5 is most pronounced at high levels of institutional ownership (see the discussion in the next subsection), large blocks of shares held by institutions may reflect a commitment to the corporation or its Board, or concerns with control similar to those of any large block-holder. That is, beyond some critical level of ownership, the identity of the shareholder may simply cease to be important.

There are several reasons for this literal interpretation of our model to be treated with caution. As noted above, there is solid evidence that measures of institutional ownership are negatively related to p. Predicting takeover probabilities or the cost of shareholder intervention is notoriously difficult [see Palepu (1986)]. For example, our I5 measure may not appropriately distinguish between inside and outside ownership of the firm. Brickley *et al.* (1994) find that banks and insurance companies often vote their shares on the side of incumbent management, while investors such as mutual funds and college endowments are more likely to have the traits that are normally associated with the "true" institutional investors that are willing to tender their shares for less.

The relationship between our measures of deferred compensation and the other variables that were included to measure the barrier to shareholder intervention, such as DSE2, IGPOTA 2, and ROE1, is statistically insignificant. In addition, the positive finding for both firm size

TABLE 3. SENSITIVITY OF THE DEFERRED COMPENSATION ESTIMATES TO THE CHOICE OF REGRESSORS, FIRM SIZE, AND UNIONISATION

	No industry variables		*No Compustat variables*		*Large firms**		*Most unionised***	
	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V
SEOS2	−0.013	0.012			−0.010	−0.002	−0.028	−0.024
	(0.006)	(0.007)			(0.009)	(0.010)	(0.010)	(0.010)
ROE1	0.021	0.008			0.016	−0.005	0.035	−0.004
	(0.014)	(0.015)			(0.021)	(0.023)	(0.018)	(0.016)
DSE2	0.001	−0.001			−0.0002	−0.006	0.001	−0.002
	(0.002)	(0.002)			(0.003)	(0.004)	(0.002)	(0.002)
IGPOTA2	0.004	0.001			−0.018	−0.006	−0.004	−0.000
	(0.006)	(0.006)			(0.008)	(0.009)	(0.007)	(0.006)
EMPGROW	−0.015	−0.006			0.0001	0.001	−0.010	0.002
	(0.008)	(0.008)			(0.012)	(0.013)	(0.008)	(0.007)
LnS1	0.257	0.328			0.236	0.300	0.218	0.132
	(0.058)	(0.061)			(0.112)	(0.124)	(0.064)	(0.056)
I5	0.018	0.013	0.009	0.009	0.034	0.021	0.018	0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.012)	(0.006)	(0.006)
UNION			0.026	0.005	0.025	0.003	0.038	0.026
			(0.005)	(0.005)	(0.009)	(0.009)	(0.010)	(0.009)
WHCOLL			0.002	−0.017	0.004	0.001	0.030	0.035
			(0.009)	(0.010)	(0.016)	(0.018)	(0.015)	(0.014)
ENGSCI			0.038	0.054	0.008	0.026	0.120	0.106
			(0.045)	(0.049)	(0.068)	(0.076)	(0.064)	(0.057)
EDUCATAV			0.171	0.603	0.200	0.395	−0.334	−0.069
			(0.181)	(0.193)	(0.301)	(0.334)	(0.275)	(0.243)
Intercept	3.755	7.207	2.810	2.240	1.331	2.777	6.230	8.062
	(0.701)	(0.733)	(2.081)	(2.230)	(3.410)	(3.781)	(3.034)	(2.679)
n	203	203	203	203	94	94	108	108
R^2	0.167	0.157	0.192	0.142	0.341	0.247	0.330	0.341
Adjusted R^2	0.137	0.126	0.171	0.120	0.252	0.146	0.253	0.266
F	5.57	5.17	9.36	6.53	3.85	2.44	4.29	4.52

Notes: Standard errors in parentheses. *Large firms are those with greater than average log sales.
**Unionised firms are those with greater than average union membership.

and institutional shareholding may be open to interpretation. Hence, the most sensible interpretation of our results is that there is only weak evidence in favor of the prediction that firms protect higher levels of deferred compensation with higher barriers to shareholder intervention. This conclusion is consistent with that of Neumark and Sharpe (1996), who find little evidence to support the hypothesis that hostile takeovers are driven by motives of opportunistic rent appropriation.

6. Alternative Models and Specification Checks

Next we demonstrate that our results are not sensitive to the choice of regressors and empirical specification. Econometric results depend on assumptions about the specification and often leave room for doubt about whether slightly different assumptions would produce entirely different results. Table 3 investigates the sensitivity of the key results to the choice of

regressors. First, omission of the industry-level variables leaves the coefficient on I5 unchanged. Deletion of the *Compustat* or financial and accounting information leads to smaller, but still positive, coefficients on I5. Specifically, this is due to the omission of the firm size variable. Demsetz and Lehn (1985) noted that larger firms have smaller institutional ownership than smaller firms. Omitting firm size therefore biases the coefficient on I5 downwards. This is confirmed in the next two columns of table 3 that present estimates for the full specification for large firms only (i.e., firms with above average sales). The coefficient on I5 increases significantly. Hence, if we control for firm size [and there are compelling reasons to do so, see Oi and Idson (1999), e.g.], then institutional share ownership is positively related to deferred compensation. Finally, if we restrict our attention to only those firms in the most unionised industries we note that the coefficient on I5 is smaller for vested benefits. This is driven by the increased influence of unions in these firms and the positive correlation between union strength and institutional share ownership.

As another test of the sensitivity of our results we entertained several alternative measures of deferred compensation. In the first two columns of table 4, pension levels rather than pensions per employee are used as the dependent variables. Apart from the dramatic jump in the magnitude of the firm size coefficient, the results are virtually identical to those found in the first two columns of table 2. An alternative measure of deferred compensation is expected wage growth [Lazear (1981)]. Unfortunately, we do not have firm-level wage data. However, we calculated average wage growth from the Bureau of Labor Statistics publication, *Employment and Wages*, for each 4-digit industry for the 11-year period from 1981 to 1991. Our 203 firms are in 104 different 4-digit industries. We assigned each firm in our sample the average wage growth for the industry. The regression results are presented in the fourth column of table 4. We were reassured by the fact that the signs on all variables, with the exception of that for union density, are the same as for the pension equations. The sign reversal for union density reflects the concentration of union workers in industries that experienced low wage growth throughout the 1980's [see Gaston and Trefler (1995)].

In the column labeled 'Unadjusted Pensions' we show estimates of the effects of our adjustment to vested pension benefits (see the Appendix). A logical concern to have about our earlier results is whether the adjustment that we apply to vested pensions is affecting our results in a peculiar manner. In a regression of unadjusted vested pension benefits on the same set of regressors, the only parameters that show some sign of sensitivity are the coefficients on SEOS 2, the measure of marketing and advertising expenditures, and that on UNION. Since the adjustment process essentially adjusts upwards the pensions in rapidly growing industries with younger workforces, the larger negative coefficient on SEOS2 indicates that firms in growing industries tend to expend more marketing their products. Similarly, the larger positive coefficient on UNION indicates that unions tend to figure more prominently in low-growth industries. Both observations seem reasonable.

In the last two columns of table 4, we investigate the effects of aggregating our two deferred compensation measures. The second to last column indicates that, while there exist some understandable differences in the determinants of vested and non-vested pensions, the three most important determinants are still firm size, union density, and institutional share ownership.

The last column of table 4 introduces the pension under-funding ratio as an additional regressor. While pension under-funding remains somewhat of a paradox in the pension

TABLE 4. THE DETERMINANTS OF ALTERNATIVE MEASURES OF DEFERRED COMPENSATION

	Pension levels		*Wage growth*	*Unadjusted pensions*	*Total pension benefits**	
	LB_NV	LGB_V	WGROW10	LBOE_V	LGBOETOT	LGBOETOT
I5	0.018	0.018	0.003	0.016	0.016	0.013
	(0.007)	(0.006)	(0.009)	(0.006)	(0.006)	(0.006)
SEOS2	0.013	0.026	0.070	−0.018	0.007	0.010
	(0.007)	(0.007)	(0.010)	(0.006)	(0.007)	(0.006)
ROE1	0.008	−0.010	0.026	−0.014	0.001	0.009
	(0.014)	(0.014)	(0.020)	(0.013)	(0.014)	(0.013)
DSE2	−0.003	−0.006	−0.002	−0.001	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
IGPOTA2	−0.007	−0.007	0.001	−0.001	−0.0003	0.004
	(0.006)	(0.006)	(0.008)	(0.005)	(0.006)	(0.005)
EMPGROW	−0.018	−0.014	0.016	−0.014	−0.010	−0.005
	(0.008)	(0.008)	(0.011)	(0.007)	(0.008)	(0.007)
LnS1	1.099	1.147	0.137	0.223	0.261	0.232
	(0.061)	(0.060)	(0.087)	(0.026)	(0.060)	(0.055)
UNION	0.021	0.005	−0.018	0.016	0.007	0.003
	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)	(0.005)
WHCOLL	0.010	−0.003	0.002	−0.006	−0.006	−0.008
	(0.010)	(0.010)	(0.014)	(0.009)	(0.010)	(0.009)
ENGSCI	0.053	0.075	0.148	0.043	0.069	0.051
	(0.048)	(0.047)	(0.068)	(0.044)	(0.047)	(0.043)
EDUCATAV	−0.134	0.171	0.433	0.183	0.354	0.547
	(0.198)	(0.196)	(0.282)	(0.181)	(0.194)	(0.181)
LFUNDRAT	.	.	.	.	.	1.273
						(0.213)
Intercept	1.902	2.461	−2.017	4.498	−3.907	−6.209
	(2.263)	(2.239)	(3.217)	(2.067)	(2.213)	(2.071)
R^2	0.692	0.727	0.567	0.348	0.243	0.362
Adjusted R^2	0.674	0.712	0.542	0.311	0.199	0.322
F	38.96	46.33	22.69	9.28	5.56	9.00

Notes: $n=203$. Standard errors in parentheses. *LGBOETOT=*log*(BOE_NV+GBOE_V).

economics literature, some commentators have argued that firms whose workers can engage in a collective 'hold-up' must purposely under-fund their pension plans [e.g., Ippolito (1986)]. This makes the workers, specifically the union workers, bondholders in the corporation and aligns their interests with the continued existence of the firm. The positive coefficient on the funding variable, LFUNDRAT, gives some credence to this view. The model in section II suggests an alternative explanation for the positive correlation between under-funding and pension benefits per worker. Under-funding may be associated with the absence of financial slack that might otherwise tempt an opportunistic raider [Palepu (1986)]. That is, cash flow constraints may lower the probability of takeover. Under this interpretation, the finding for pension under-funding provides very strong support for our model.

Finally, we turn to a closer examination of the relationship between the two ownership measures, F5 and I5, and deferred compensation. Table A1 reports the coefficients on the ownership variables from regressions using F5, the measure of family or inside shareholder concentration, in lieu of I5; using both F5 and I5; using ownership splines [as suggested by

Morck *et al.* (1988)] for I5 and F5; and using a dummy variable, FAMILY, designed to measure control in a dichotomous fashion (with family control defined as F5 > I5 > 5%). It is immediately apparent that family ownership of firms is not important for explaining the variation in deferred compensation in our sample. Institutional control is always statistically significant, however. Any evidence of systematic non-linearities in the relationship between institutional ownership and deferred compensation, however, has at best marginal statistical significance.

IV. *Discussion*

Recent economic developments and the changes that are being mooted for corporate governance, in countries such as Japan, remind some observers of similar developments in the United States in the 1980's. That period was one of radical change for many large corporations. One of the most notable developments of the period was the increased activism of shareholders. In the early eighties this was manifested by the 'wave' of hostile takeovers. In the later eighties, with the cooling of the high-yield bond market and the emergence of regulatory barriers to takeovers, it was active institutional investors who increased the pressure on top managers to maximise share values (Jensen, 1991). Recent calls for changes in the traditional preservation of and reliance upon stable supplier and stakeholder relationships, as well as greater accountability by Japanese firms to their shareholders have the hallmark of a similar sea-change in corporate culture.

A less-publicised but parallel development during the 1980's was the reduction in white-collar employment and the perceived erosion of the career structure that characterises internal labour markets of large corporations.[12] These corporate control events and labour market developments were not independent. Many commentators believe that increased shareholder demands are the primary force leading firms to cut back on layers of middle management. Considerable controversy still exists, however, about the primary effects of shareholder activism. On one hand, it may force companies to abandon outmoded management and compensation practices [Jensen (1993)]. On the other, such activism may result in opportunistic actions that undermine the trust necessary for the development of firm-specific human capital and organisational effectiveness [Shleifer and Summers (1988); Garvey and Gaston (1997)]. More than ten years later, a similar debate is being waged in Japan.

This paper examined the labour and financial contracts of the large majority of corporations that were not the subject of major control events. We presented a simple model of how the threat of shareholder intervention, which could take the form of a hostile takeover or some action by dissident shareholders, affected the firm's implicit labour contracts. In contrast to existing work that effectively treats such intervention as unanticipated, our model assumed rational expectations by all parties and allowed for the firm's response to a takeover bid or a proxy fight to be endogenously determined. When shareholder intervention is expected to involve opportunistic contractual breaches, the key prediction was that firms in which the costs

[12] Based on his consulting experiences and field interviews Emshoff (1993, p.13) notes: "*Increasingly, people are recognizing that the restructure actions that have been underway for the past five to ten years are not just belt-tightening reactions to a downturn in the economy. We will not rehire the people into the positions they left when things get better. Those jobs are gone for good.*"

of shareholder intervention are lower have implicit contracts that offer less deferred compensation.

In a sample of 203 large publicly-held U.S. corporations, we examined whether implicit contracts are systematically affected by the threat of opportunistic behaviour in the sense that firms promising greater amounts of deferred compensation place higher barriers in front of potential activist shareholders. The empirical work was motivated by the recent finding that institutional or outside shareholders are willing to tender their shares to hostile raiders at substantially lower premiums than insiders or family shareholders.

After controlling for the effects of firm- and industry-specific variables such as firm size, occupational mix, and union density, we found little support for the idea that firms with higher deferred compensation for their employees had more formidable barriers to hostile takeovers. In particular, we found that firms whose share registries are dominated by large institutional shareholders have higher deferred compensation for their workers. If contracting parties do anticipate opportunistic behaviour, one implication of our results is that the finding in the recent literature that larger institutional shareholdings constitute a lower cost barrier to intervening in firms may be questionable. Large institutional shareholders may be equally, if not more, concerned about their reputations than family or inside shareholders.

Such a finding has considerable relevance for the current debate in Japan. Some commentators, mainly Anglo-American, have pointed to the considerable inertia in the Japanese economy. While structural change is occurring, from a Western perspective, it seems to be occurring at a snail's pace. From a Japanese perspective, change is likely to come with some, not insignificant, cost. Consequently, the slow pace of change is explicable. Among this paper's contributions is to underscore the fact that there is a dark side and a bright side, to use Gilson and Roe's (1999) terminology, to current employment practices and governance structures. In the current environment, the costs associated with insulating stakeholders seem altogether too apparent. However, it also seems too easy to forget that until the early 1990's, the Japanese system of governance was lauded, in part for the protection it afforded stakeholders and the incentives it gave them to make valuable firm-specific investments.

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APPENDIX

The measure of non-vested pensions that we use is the *Compustat* data item "Pension Benefits−Present Value Nonvested" and the unadjusted measure of vested pensions is "Pension Benefits−Present Value Vested." *Compustat* contains a large number of other variables that measure pension characteristics, however, the majority of these data items have only been available since 1985, when the Financial Accounting Standards Board established comprehensive financial accounting standards for employers offering pension benefits to their employees (see *Statement of Financial Accounting Standards no. 87*).

The imputation of 'at risk' pension benefits is based on the procedure described by Ippolito (1986, pp.45-46). The present value of reported pensions at age a is equal to

$$PV_a = baW_a e^{-i(R-a)}, \tag{A1}$$

where b is a constant reflecting the generosity of the pension plan, W_a is the individual's wage at age a (hence, s in our model equals ba for a senior worker), and R is the anticipated retirement age. The nominal interest rate is i. Equation (A1) simply states that the firm's legal pension liabilities (i.e., those recorded in *Compustat*) are the benefits to the worker based on current wage and current years of service, discounted from the anticipated retirement age to the current age.

A firm that intends to honour its pension promises has 'true' or economic pension liabilities equal to

$$PV_a = baW_R e^{-i(R-a)}, \tag{A2}$$

Note that (A2) is based on W_R, not W_a, and accounts for anticipated wage growth until retirement as part of the firm's economic pension liability. Supposing that wages grow at the rate g reflecting productivity growth, inflation, and the slope of the age-earnings profile, (A2) can be rewritten as

$$PV_a = baW_a e^{(g-i)(R-a)}. \tag{A3}$$

Hence, the unprotected part of vested pensions is equal to (A3) less (A1) or

$$PV_a = (baW_a e^{-i(R-a)})(e^{g(R-a)} - 1). \tag{A4}$$

Equation (A4) suggests scaling *Compustat* pensions by $S = (e^{g(R-a)} - 1)$. While neither g nor a are available at the firm level, they are available at the industry level. From the 1981 *Current Population Survey*, we calculate the average age of each industry's workforce at the 3 -digit SIC industry level. We also calculate average wage growth from *Employment and Wages* for each 4-digit industry for the 11-year period from 1981 to 1991. Setting $R = 65$, we then calculate the expressions $g(R-a)$ and S. Recorded vested pension liabilities are then scaled by S. The average value of S is 5.6 (min.=0.2; max.=21.1). Values of S equal to zero indicate that recorded liabilities equal economic liabilities; higher values of S indicate larger differences between implicit contractual liabilities and those actually recorded.

TABLE A1. EFFECTS OF FAMILY AND INSTITUTIONAL OWNERSHIP ON DEFERRED COMPENSATION

	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V	LBOE_NV	LGBOE_V
F5	0.001	−0.002			0.004	0.003						
	(0.005)	(0.005)			(0.005)	(0.005)						
I5			0.016	0.016	0.017	0.016						
			(0.006)	(0.006)	(0.006)	(0.007)						
F0_5						0.074	0.106					
						(0.101)	(0.106)					
F5_25						−0.008	−0.014					
						(0.030)	(0.032)					
F25						−0.009	−0.018					
						(0.013)	(0.014)					
I0_5								−0.090	−0.077			
								(0.043)	(0.046)			
I5_25								0.017	0.014			
								(0.013)	(0.014)			
I25								0.022	0.021			
								(0.011)	(0.011)			
FAMILY										0.001	0.001	
										(0.001)	(0.001)	
R^2	0.243	0.215	0.270	0.239	0.271	0.239	0.252	0.231	0.284	0.245	0.247	0.218
Adj. R^2	0.199	0.170	0.228	0.195	0.225	0.191	0.201	0.178	0.235	0.194	0.204	0.173
F-test*	0.01	0.14	7.12	6.09	3.74	3.04	0.77	1.34	3.62	2.55	1.11	0.72

Notes: $n=203$. Standard errors in parentheses. Estimates of intercept and other coefficients not reported (see table 2).

Splines: F0_5, F5_25, F25=family ownership 0-5%, 5-25%, 25-100%, respectively.

Likewise for institutional control splines, I0_5, I5_25, I25. FAMILY=1, if F5 > I5 > 5%.

* R^2 for regressions without ownership variables: LBOE_NV (.243); LGBOE_V (.215); $n-k=192$.