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Japanese Corporate Pension Plans and the Impact on Stock Prices

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Abstract

This study focuses on the stock market impact of Japanese corporate decisions to adopt pension plans. Implementing corporate pension plans in Japan is complicated because they are heavily regulated by the government and the traditional lump-sum-only severance benefit plans already exist, requiring interfacing newly adopted plans with existing ones. Using the GARCH estimation method, the market model applied in this article for the relatively long period 1975–1995 yields evidence that suggests that the stock market responds to some of the more specific characteristics of adopted plans. Alternative specifications of the pension "event" also suggest that relatively little of the market impact comes from public announcements about pension adoption occasioned by the release of a firm's financial statement.

Introduction

Since the publication of the American Accounting Association's *A Statement of Basic Accounting Theory* in 1966, major developments in the economic theory of accounting have emphasized the informational content of accounting and its impact on the financial market. An important strand of empirical research that it has spawned, the semi-strong efficient capital market hypothesis originated by Fama (1970), encompasses analyses of the informational content of corporate earnings, as well as that of depreciation and other accounting methods employed by firms. For example, Ball (1972) and Biddle and Lindahl (1982) analyze the tax consequences and stock price reactions to a firm's decision to adopt the LIFO (last-in first-out) inventory valuation

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method. These studies generally support the view that the financial market effectively utilizes accounting information, particularly as it relates to tax consequences.[1]

With respect to the stock market impact of corporate pensions, Feldstein and Seligman (1981), Daley (1984), and Bulow et al. (1987), among others, analyze the relationship between unfunded pension liabilities and share prices and find that unfunded vested pension liabilities adversely affect the market valuation of a firm. The findings are consistent with the underlying hypothesis, since an unfunded pension liability increases the firm's future obligations at the same time that the firm foregoes current corporate tax benefits associated with pension plans.[2] In addition, Alderson and Chen (1986), VanDerhei (1987), Moore and Pruitt (1990), and Alderson and VanDerhei (1992) examine whether and how the termination of overfunded plans impacts positively on share prices. Both the evidence and the argument regarding this latter linkage are more mixed. Interestingly, however, Mittelsteadt and Regier (1993) find evidence that when overfunded defined benefit plans are terminated, share prices tend to rise, causing a positive wealth transfer to shareholders, whereas defined-contribution plans that cannot be overfunded have no such effect.

While the preceding studies, using U.S. data, have analyzed the effect of either unfunded or overfunded pension liabilities of firms that already have plans in place, none have analyzed the effect of corporate decisions to adopt plans in the first place. This may not be surprising in view of the fact that corporate pension plans are widespread among American corporations, with some plans dating back to the 1920s.[3] In contrast, Japanese plans have been adopted more recently, albeit in a heavily regulated economic environment. The maintained hypothesis underlying this study is as follows:

> Hypothesis: *The adoption of pension plans by Japanese corporations (in the form of either the* tekikaku *or* kosei *variety, as explained in the following section) signals information about expectations of future earnings, which in turn impacts positively on their share prices.*

The primary incentive for a corporation to adopt a pension plan, relative to the alternative of relying solely on a traditional lump-sum payment plan, is the greater tax advantage associated with a newly adopted pension plan. This advantage, however, cannot be realized without sufficient corporate earnings from which the plan's future

[1] In this vein, Beatty (1995) also finds that employee stock ownership plans impact positively on stock prices through the tax advantage they offer, as well as their ability to serve as a deterrent against hostile takeovers. With respect to the Japanese financial market, Kohmura (1987) focuses on the depreciation method adopted by firms and its financial market impact and Ito (1989) focuses on the impact of dividend information, both finding a positive impact. Sakakibara et al. (1988) find evidence that suggests that the Tokyo Stock Market is "informationally efficient, at least with respect to unconsolidated earnings information" (1988, p. 90).

[2] See Tepper and Affleck (1974) and Tepper (1981), in particular.

[3] The 1926 revision of the Internal Revenue Code introduced provisions allowing pension premium contributions as a deductible corporate expense. Corporate pension plans became prevalent in the United States after the Second World War. See American Council of Life Insurance 1987, p. 33.

premium contributions will be deducted as an expense, and the adoption decisions have this informational content about future earnings expectations. But the cash-flow position of a firm is affected by pension decisions in a more complex manner, depending on (1) how the existing lump-sum payment obligations are transferred to the new plan, (2) the terms of the new plan stipulating the schedule of benefits and the periodic premium contributions required for the firm to maintain the plan, and (3) the administrative cost of carrying the plan. We trace briefly the evolution and the characteristics of alternative Japanese plans and the interactions between the plans. Our focus is on the stock market response to the corporate pension initiatives, as the transition is made from internally administered lump-sum severance plans to externally managed explicit pension plans.

JAPANESE CORPORATE PENSION PLANS AND THE INCENTIVES FOR THEIR ADOPTION

The Japanese pension system is fairly complex, so we briefly describe the major plans covering private sector employment.[4] The traditional practice of retirement compensation is based on one-time, lump-sum payments that are linked to the retiring employee's years of employment at the firm and to the salary level. Since similar payments at reduced rates are also made routinely to employees leaving the firm for nonretirement reasons, including a voluntary quit, the practice may be best understood as an implicit contract on all types of severance benefits. This long-standing practice was institutionalized by the 1952 revision of the Corporate Tax Laws. The *hikiate kin* (severance reserve, or *hikiate* for short) system was introduced, allowing participating firms to set up an internal reserve account on severance compensation. However, firms are under no legal obligation to actually set aside the reserve as either cash on hand or funds to be portfolio-managed as the firm's severance liabilities are accumulated over time, and most *hikiate* plans have in fact remained unfunded. Despite this, the law allows periodic "contributions" to the reserve account as the firm's legitimate expense. Hence, this tax provision provided a powerful incentive for Japanese corporations to set up the plan, but restrictions were soon imposed on the amount of tax deductions that can be claimed.[5]

Subsequent corporate tax legislation, passed in 1962, introduced a voluntary tax-qualified pension called *zeisei tekikaku nenkin* (*tekikaku* plan for short) under the aegis of the Ministry of Finance (MOF). This legislation grew out of increasing concerns about the rapidly rising unfunded indemnity of most *hikiate* plans. In contrast to the *hikiate* plan, the *tekikaku* plan entails the establishment of an explicit pension plan to be managed by an outside financial contractor, either a trust bank or a life insurance

[4] See Clark (1991), for example, for more details.

[5] Subsequent regulation stipulated that the cumulative credits must not exceed 40 percent (tightened further to 20 percent since 1998) of lump-sum compensation that would be payable at the end of each year if all employees were to quit voluntarily in that year. To illustrate, suppose that a firm has the total severance indemnity of 1 billion yen in a given year—the payment that it would incur if all its employees were to quit in that year. The maximum *hikiate* credit that can be claimed as an expense to be deducted from its corporate income is limited to the difference between 400 million (= 40 percent of 1 billion) yen and the cumulative total deductions claimed in the past.

company.[6] The benefit levels are defined by each plan and, once established, the firm's periodic premium contributions as determined by the contractor, subject to the MOF regulation and reviewed every five years, are fully tax-deductible. By the end of 1995, 91,465 *tekikaku* plans covered 10.8 million employees.[7]

In the meantime, revisions of the Japanese social security system, developed in 1965, resulted in an alternative corporate pension called *kosei nenkin kikin* (employee pension funds, or *kosei* plan for short). The initiatives in this case were taken by the Ministry of Health and Welfare, which became increasingly concerned about the financial health of the national social security system that it administers. The new legislation shifts the administration (tax collection, management of collected funds, and benefit payouts for eligible employees) of a portion of the earnings-linked old-age public pension in the social security system to individual *kosei* plans that are set up by participating corporations. Hence, the *kosei* plan administers both this portion of social security benefits and the more substantial private pension portion. In return for the partial absorption of the public pension, the participating corporation receives a tax rebate. However, once set up, portfolio management of the plan is by an independent contractor subject to the same rules as the *tekikaku* plan, and the firm's premium contributions to the plan are also fully tax-deductible. But because of the legal restriction that the qualifying plan must enroll at least 500 employees, the *kosei* plan is limited to larger firms.[8] There were 1,878 *kosei* plans as of 1995, covering 12.1 million employees.

The primary corporate incentive for adopting either the *tekikaku* or *kosei* plan is the more favorable tax treatment that they both receive over the *hikiate* plan.[9] The adoption of either of these new plans may therefore contain useful information to the stock market: a firm expects to maintain at least sufficient earnings in the future, against which all premium contributions can be applied as an expense with resultant tax savings.

THREE FORMS OF TRANSFER FROM THE HIKIATE PLAN

Retiring employees typically have the option of receiving retirement benefits either in a lump sum, as pension income for a predetermined period, or in some combination of lump-sum payments and pension income. The period over which pension income is paid after retirement varies in *tekikaku* plans and is an option given to the employees, but it is paid by law for life in *kosei* plans. However, the transfer from the *hikiate* plan, which virtually all listed firms carried at least initially, to either *tekikaku* or *kosei* plans, can take one of three different routes.

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[6] Commercial banks and brokerage houses were prohibited until recently from managing private pension funds.

[7] The figures are from Raifu Dezain Kenkyusho (1999, p. 17).

[8] Before 1986, the minimum enrollment requirement was 1,000 employees per plan, which was reduced to 700 in 1986 and to 500 in 1989, where it has remained.

[9] We conducted a questionnaire survey of all manufacturing firms listed in the First Section of the Tokyo Stock Exchange during August and September 1995. The response we received indicated that more than 60 percent of 134 companies that returned the questionnaire listed tax and the related cost advantage as the primary reason for adopting pension. The format of the questionnaire we sent follows that of larger-scale surveys conducted earlier by Seimei Hoken Bunka Senta (Life Insurance Cultural Center) for 1992, which also indicated a similar pattern of response regarding the primary reasons for adopting the respective plans (Seimei Hoken Bunka Senta 1993). Our survey result is available from the authors upon request.

In *zenmen ikou* (*zenmen* transfer for short), the *hikiate* plan is completely dissolved and replaced by the newly adopted plan, which assumes the liabilities to pay for the accumulated benefits of the *hikiate* plan. The main advantage of this option for the firm is three-fold. First, with the dissolution of the *hikiate* plan, the firm is free of the considerable administrative and accounting details involved such as periodically updating the account, determining the amount of eligible tax credits, and paying benefits for both retirement and nonretirement severance whenever employees leave the firm. Second, a tax advantage comes from the higher deductibility of future premium contributions to the new plan as compared to what the *hikiate* plan alone would have allowed. Third, the firm is free of lump-sum settlements on accumulated nonretirement severance benefits whenever eligible employees leave the firm. The managed plan makes such settlements directly. Despite these merits, the majority of Japanese corporations have not chosen this route, mainly because it requires commensurately higher premium payments to cover the accumulated indemnity of the replaced *hikiate* plan.[10]

Alternatively, firms may elect *yokowari ichibu ikou* (meaning "horizontal partial transfer," or *ichibu* transfer for short), transferring some portions of the *hikiate* severance benefits to the new plan. Under this option, the *hikiate* plan is partially dissolved as the new plan is implemented, which then assumes fiduciary responsibilities for the transferred benefits. The tax advantage, therefore, is smaller than the *zenmen* transfer, because tax credits for the remaining *hikiate* plan are lower than with the new plan for an equivalent level of future benefits covered. However, many firms elect this option because they may feel that it offers a temporary cash-flow advantage over the *zenmen* option in that its premium payments are less. The risk for the firm, of course, is that it must finance the nontransferred portion of severance payments in a lump sum whenever eligible employees leave the firm, and the nonretirement severance is unpredictable.

The third option is *teinen ikou* ("transfer of retirement benefits," or *teinen* transfer for short), under which the existing *hikiate* plan is retained and the new plan is set up to provide for the payment of only the retirement benefits that include both pension and nonpension benefits. The limit on tax credits allowed in the *hikiate* plan is prorated by law to the nonretirement severance payments.[11] Therefore, corporations electing *teinen* transfer are able to claim the same amount of tax deductions for maintaining the *hikiate* plan as before the transfer, because the transfer does not affect the nonretirement severance indemnity that is used for computing the deductibility limit. Premium contributions to the new plan, in the meantime, are fully tax-deductible. Consequently, this redundancy in tax shelter generally gives the *teinen* option the largest tax advantage among the three options.[12] In addition, since the new plan using this option covers only the retirement benefits, the required premium payments are less than the

[10] However, a firm does not have to fund this indemnity with lump-sum premiums immediately upon transfer to the new plan. Under the current practice, a firm can do this with premium payments stretched over a period spanning from 6 to 30 years.

[11] See footnote 5.

[12] Murakami (1999, p. 8).

TABLE 1
Three Forms of Transfer From *Kikiate* to *Tekikaku* or *Kosei* Pension Plans

	Zenmen Transfer	*Ichibu* Transfer	*Teinen* Transfer
Benefits transferred:	All severance (retirement plus non-retirement) benefits.	Portions of severance (retirement plus non-retirement) benefits.	Retirement benefits only.
Status of the *hikiate* plan after transfer:	Dissolved.	Partially dissolved.	No change—the *hikiate* plan remains in place.
Corporate income tax advantage:	All premium contributions are tax-deductible.	Premium payments for the transferred portion of severance benefits and the eligible *hikiate* credits for the remaining portion of the *hikiate* plan are tax-deductible. The least tax-advantageous among the three options.	Premium contributions to the plan plus eligible *hikiate* credits are tax-deductible. The most tax-advantageous among the three options.
Preretirement funding burden to the firm:	Premiums for all severance benefits (both retirement and non-retirement) paid on a regular basis. Premium payment requirements are the largest among the three options.	Premium payments for the transferred portion of benefits plus lump-sum payments for the remaining portion whenever severance occurs.	Premium payments for retirement benefits on the regular basis plus lump-sum payments for all non-retirement severance.
Funding requirements for the firm when employees retire:	None. (All payments are met by the externally managed plan.)	Must fund the non-transferred portion of retirement benefits.	Lump-sum retirement payments for the remaining *hikiate* plan.

zenmen option.[13] However, all nonretirement accumulated severance benefits must be paid in a lump sum as before. Table 1 summarizes the three forms of transfer available among the *tekikaku* and *kosei* plans with respect to the tax merit and the cash burden on the firm.

[13] On average, premium payments under the *teinen* option are approximately 80 percent of the premiums paid under the *zenmen* option for a typical employee covered by each plan. See Dai-ichi Seimei Hoken Sogo Kaisha (1986, p. 104).

THE TIMING OF PENSION PLAN ADOPTION

Planning for the *tekikaku* plan typically begins in earnest at least a year in advance of its formal adoption. The chief financial contractor, either a life insurance or trust bank agency, is chosen during this planning period and draws up a detailed schedule of the terms of the pension plan in accordance with the mandate given by the contracting firm. This is the phase in which information regarding the firm's intentions begins to be transmitted to the market. Upon final approval by the firm's management, typically between 30 and 60 days prior to the plan's implementation, the plan's contractor applies for a permit to execute the plan from the National Tax Office of the MOF on behalf of the contracting firm. This permit is granted routinely. However, the public announcement of the firm's decision to implement the new pension plan does not occur until the release of the firm's financial statement, which typically takes place three months following the end of the fiscal year. The announcement of the pension plan is made in a footnote to its financial statement.

The *kosei* plan takes a somewhat longer preparatory period, typically two to three years in advance of its actual implementation, because of the more cumbersome procedural requirements. The Ministry of Health and Welfare requires submission of detailed documents pertaining to the plan for preliminary examination by its pension office, followed by a formal hearing on the proposed plan. The official justification is that a detailed scrutiny is warranted because the *kosei* plan is by law entrusted with the responsibility to absorb and carry a portion of the social security retirement benefits. Based on the outcome of the hearing, an informal permit called *naininka* is granted, which allows the firm to proceed with the formal permit application, to which the consent of the firm's labor union representatives must be affixed. Once the informal permit is granted, the rest of the process takes approximately three months until the financial terms of the plan are worked out with the chosen contractor, whereupon the plan is implemented. Public notice of the adoption is given in the government publication *Kanpo*, approximately one month after the plan's formal adoption. The firm's financial statement, released typically three months after the end of the fiscal year, also contains a footnote announcement in the same manner as the *tekikaku* plan.

THE EMPIRICAL ISSUES

Given the extensive governmental regulation bearing on the establishment and the management of Japanese corporate pension plans[14] and the complexity of the pension system as a whole, does a firm's pension adoption still contain useful information to which the stock market responds? And given the long planning process involved in the Japanese corporate decision regarding pension adoption, how long prior to, as well as subsequent to, the plan's adoption does the market respond, if ever? By adopting either the *tekikaku* or *kosei* plan, a firm must also decide on the particular form of transfer from the *hikiate* plan in place to one of the alternative new plans. Of the three types of transfer available, the *ichibu* transfer is the least advantageous in terms of tax

[14] Until the recent deregulation, for instance, the government stipulated that for the purpose of assessing the future indemnity of the plan, it must set the expected rate of return on premium contributions at 5.5 percent per annum. Another regulation, known as the 5-3-3-2 rule, stipulated that at least 50 percent of the plan's assets must be in government or other low-risk bonds, no more than 30 percent in stocks, no more than 30 percent in foreign investments, and no more than 20 percent in real estate investments.

benefits, and the *teinen* offers the largest tax savings for the same level of total benefits covered. Does the market response go so far as to differentiate among these transfer options of the adoption decision?

Consistent with the maintained hypothesis as stated in the introductory section, we can summarize the empirical issues to be investigated by the following null hypotheses:

> **Hypothesis 1 (null):** *The timing of pension adoption decisions has no effect on the stock market.*
>
> **Hypothesis 2 (null):** *The stock market is indifferent among the three forms of the plan's transfer options.*

THE ESTIMATION METHOD

We estimate the stock market impact of pension decisions using monthly prediction errors from the market model. The model assumes that the individual share price reflects all available information, including the market-wide information that affects the entire stock market. Hence, we must separate the impact of firm-specific information such as pension adoption from the market-wide informational impact in arriving at our estimate of abnormal returns. We estimate these returns for each company on a monthly basis, beginning at the 35th month ($t = -35$) prior to the event month through the eleventh month following the event ($t = +11$). The choice of this relatively long "window" is motivated by the time frame of the Japanese corporate pension decision process.

For the specification of the event month, we use the following three alternatives:

1. Event A is the month in which the new pension plan is formerly adopted (implemented).
2. Event C is the month in which the plan's chief financial contractor draws up the plan with detailed terms of the plan, following the mandate given by the firm's top management. This occurs typically one month prior to the plan's formal adoption among the *tekikaku* plans, and three months prior to adoption among the *kosei* plans.
3. Event P is the month in which the financial statement of the firm is released, containing public announcement about the adoption of a new pension plan. This occurs typically three months after the end of the fiscal year.[15] Hence, as an event month, this lags behind the adoption month (event A) by 3 to 14 months.

We calculate an abnormal return (i.e., prediction error) on firm i's equity share (E_{it}) for month t as the difference between the observed return and the return predicted by the market model:

$$E_{it} = R_{it} - (A_i + B_i R_{mt}), \tag{1}$$

where t is the month index for the test (prediction) period, $-35, \ldots, 0, \ldots, +11$, with $t = 0$ for the event month; R_{it} is the natural logarithm of the rate of return of the

[15] The fiscal year ends March 31 for the majority of Japanese corporations. However, some also use June 30, September 30, or December 31 as the end date of their fiscal year.

common stock of firm i at the end of month t; R_{mt} is the the natural logarithm of the average rate of return of common stocks evaluated from the Nihon Shoken Keizai Kenkyusho (Japan Securities Resource Institute, JSRI) index of stock prices; and A_i, B_i are the firm's estimated parameters of the market model obtained from the preceding four-year estimation period, t = −83, . . . , −36.

The average abnormal return for the test month t is given by

$$AE_t = (\sum_{i=1}^{N} E_{it})/N, \tag{2}$$

where N is the number of firms in the sample. The cumulative average abnormal returns, CA_T, are then the sum of AE_t over the test period:

$$CA_T = \sum_{t=-35}^{T} AE_t \tag{3}$$

where $T = -35, \ldots, 0, \ldots, +11$.

As is now well recognized in the literature, stock returns generally exhibit time-varying volatility, and hence the ordinary least-squares (OLS) estimates of the market model are inefficient. For this reason, Bera et al. (1988), for instance, use the market model relying on the Autoregressive Conditional Heteroskedasticity (ARCH) process. For this study, we apply the Generalized Autoregressive Conditional Heteroskedastic (GARCH) estimation method originally developed by Bollerslev (1986, 1987), using the GARCH (1,1) version as follows:

$$\begin{aligned} E_{it} &= R_{it} - (A_i + B_i R_{mt}) \\ E_{it}/\psi_{it-1} &\sim \tau(0, \sigma_{it}^2, \nu) \\ \sigma_{it}^2 &= a_{i0} + a_{i1} E_{it-1}^2 + b_{i1} \sigma_{it-1}^2, \end{aligned} \tag{4}$$

where ψ_{it-1} is the set of all information through time $t-1$ on firm i (i = 1, . . . , N); τ is the student t-distribution with zero mean, variance σ_{it}^2 and ν degrees of freedom; and A_i, B_i, a_{i0}, a_{i1}, and b_{i1} are the maximum-likelihood estimates of the true parameters.[16] The algorithms we use for estimation are the Version2 of Eviews.

We first test the statistical significance of AE_t and CA_T. We then estimate the regression of CA_T on the available pension information, including the types of transfer adopted, controlling for the firm's earnings variable.

THE DATA USED

The period chosen for this study spans more than 20 years, from January 1975 through March 1995. The choice of this period was motivated by (1) the availability of company data on the status of pension plans adopted, (2) the critical period in Japanese corporate history when explicit pension plans in the form of either the *tekikaku* or *kosei* plan began to be adopted in earnest, and (3) a length sufficient to include the develop-

[16] Corhay and Rad (1996) also use the same process in the market model estimation.

TABLE 2
Distribution of Pension Plans by Industry

Industry	*Tekikaku* Plan	*Kosei* Plan	Total
Agriculture, forestry, fisheries, and mining	5	1	6
Construction	17	6	23
Foods	16	6	22
Textiles	2	2	4
Pulp and papers	8	0	8
Chemicals	33	6	39
Oil, coal, rubber, glass, clay, and stones	21	1	22
Ferrous metals	17	1	18
Nonferrous metals	4	2	6
Metal products	7	1	8
Machinery	29	2	31
Electric tools	26	18	44
Transportation equipment	14	2	16
Precision instruments	6	1	7
Other manufactures	7	5	12
Commerce	16	6	22
Real estate	6	0	6
Transportation and communications	23	1	24
Utilities (electricity and gas)	1	0	1
Services	9	0	9
Total	267	61	328

ment and the subsequent collapse of the major speculative bubble in the Japanese stock market. In particular, we are motivated regarding (3) by this question: Are the efficiency implications of the market model with respect to corporate pensions borne out generally despite the market upheaval associated with the bubble phenomenon?

We examined the financial statements of all 1,152 companies listed in the First Sections of the Tokyo, Osaka, and Nagoya Stock Exchanges, excluding banks, finance, and insurance businesses. Of these companies, 1,087 had corporate pension plans, but we could not ascertain the date of adoption for 393 companies, which we thus excluded from our sample. Among the remaining 694 companies, we found that 408 adopted either *tekikaku* or *kosei* plans during the period covered. But this list contains 80 companies that were not listed on the exchanges at the time of the plan's adoption. Excluding these companies, our final list contained 328 companies, 267 carrying the *tekikaku* plan, and 61 the *kosei* plan. Tables 2 and 3 present the distribution of these companies by industry and the adoption year, respectively.

The data used for this study are from the JSRI, generally recognized to be the best source on stock prices, dividend payments, issuance of new shares, new listings, delisting, and other changes in listed companies.

TABLE 3
Distribution of Pension Plans by Adoption Year

	Tekikaku Plan				*Kosei* Plan			
Year	*Zenmen*	*Ichibu*	*Teinen*	Total	*Zenmen*	*Ichibu*	*Teinen*	Total
1975	3	5	0	8	0	2	0	2
1976	0	2	0	2	1	4	1	6
1977	2	2	3	7	2	2	0	4
1978	4	5	2	11	0	3	5	8
1979	2	4	9	15	0	2	2	4
1980	6	11	17	34	0	4	1	5
1981	0	6	15	21	1	2	0	3
1982	1	8	10	19	0	4	0	4
1983	1	9	8	18	0	5	0	5
1984	1	5	11	17	0	1	0	1
1985	1	8	9	18	0	3	0	3
1986	0	9	9	18	1	1	0	2
1987	0	7	12	19	1	2	0	3
1988	2	4	4	10	1	1	0	2
1989	1	6	6	13	0	3	1	4
1990	1	11	4	16	0	2	0	2
1991	2	4	2	8	0	1	0	1
1992	3	1	1	5	0	1	0	1
1993	0	2	2	4	0	0	0	0
1994	0	3	0	3	0	1	0	1
1995	0	0	1	1	0	0	0	0
Total	30	112	125	267	7	44	10	61

THE EMPIRICAL RESULTS

Table 4 presents the estimated AE_t and CA_T assessed at monthly intervals for the 328 firms with pension plans. We obtained positive and statistically significant (at least at the 5 percent level) average abnormal returns in a substantial number of cases,[17] suggesting that the market does react favorably to information regarding the pension adoption over the relatively long period. The cumulative abnormal returns are statistically significant every month at the 1 percent level from $t = -25$ forward (to $t = +11$) in the adoption event, and from $t = -24$ forward in both the contract and public announcement events. The positive and statistically significant cumulative effect

[17] The z-statistic (with standard normal distribution) used for testing the null hypothesis takes into account the increase in variance due to prediction outside the estimation period, following Theil (1971, pp. 122-123). For the derivation of the z-statistic for cumulative prediction errors in the market model, see Patell (1976, p. 257).

TABLE 4
Average Abnormal Returns (AE) and Their Cumulatives (CA): Alternative Event Months

	Event A		Event C		Event P	
Month	AE	CA	AE	CA	AE	CA
−35	−0.466[a]	−0.466[a]	−0.174	−0.174	−0.079	−0.079
−34	0.653[a]	0.187	−0.166[c]	−0.339[b]	0.386[c]	0.307
−33	−0.166	0.021	0.654[a]	0.315	−0.202	0.105
−32	0.180	0.202	−0.333[c]	−0.018	0.175	0.283
−31	−0.290	−0.089	0.248	0.231	0.142	0.422
−30	0.418	0.329	0.024	0.255	0.225	0.647
−29	0.645[c]	0.974	0.567[b]	0.822	0.168	0.815
−28	0.229	1.203	0.280	1.102	0.549[b]	1.364[b]
−27	0.524	1.726	0.199	1.301	−0.068	1.296[b]
−26	0.227	1.953[b]	0.615[b]	1.916	−0.132	1.164
−25	0.815[a]	2.768[a]	0.185	2.101[c]	0.505	1.669[b]
−24	0.444	3.212[a]	0.894[a]	2.995[a]	0.760[a]	2.429[a]
−23	0.076	3.288[a]	0.408	3.403[a]	−0.068	2.361[a]
−22	0.560[c]	3.848[a]	0.206	3.608[a]	0.292[c]	2.653[a]
−21	0.281	4.130[a]	0.642[b]	4.250[a]	0.009	2.662[a]
−20	0.344	4.473[a]	0.406	4.656[a]	0.172	2.834[a]
−19	0.191	4.664[a]	0.429[c]	5.084[a]	0.100	2.935[a]
−18	0.409[c]	5.073[a]	0.121	5.206[a]	−0.060	2.874[a]
−17	−0.178	4.895[a]	0.356	5.562[a]	0.754[a]	3.628[a]
−16	0.280	5.175[a]	−0.203	5.359[a]	0.792[a]	4.420[a]
−15	0.281	5.456[a]	0.399[c]	5.759[a]	0.222	4.642[a]
−14	0.207	5.663[a]	0.336	6.095[a]	−0.302	4.340[a]
−13	0.315	5.978[a]	0.310	6.406[a]	0.807[a]	5.148[a]
−12	0.051	6.029[a]	0.260	6.665[a]	0.255[b]	5.403[a]
−11	0.184	6.213[a]	−0.192	6.473[a]	0.301	5.704[a]
−10	0.356	6.569[a]	0.310	6.783[a]	0.633[a]	6.337[a]
−9	0.388	6.957[a]	0.533[c]	7.317[a]	−0.013	6.324[a]
−8	0.572[b]	7.529[a]	0.396	7.713[a]	0.237	6.561[a]
−7	0.777[a]	8.306[a]	0.423[c]	8.136[a]	0.145	6.706[a]
−6	−0.028	8.278[a]	0.605[b]	8.741[a]	−0.152	6.554[a]
−5	0.768[a]	9.046[a]	0.140	8.881[a]	0.048	6.602[a]
−4	0.230	9.276[a]	0.654[a]	9.535[a]	0.734[a]	7.336[a]
−3	0.372	9.648[a]	0.302	9.837[a]	0.054	7.390[a]
−2	0.265	9.914[a]	0.437[b]	10.274[a]	−0.160	7.230[a]
−1	0.720[a]	10.634[a]	0.132	10.406[a]	0.448[c]	7.678[a]
0	−0.210	10.424[a]	0.863[a]	11.268[a]	0.219	7.896[a]

TABLE 4 Continued

	Event A		Event C		Event P	
Month	AE	CA	AE	CA	AE	CA
+1	0.329	10.752[a]	−0.154	11.114[a]	−0.341[c]	7.555[a]
+2	0.333	11.085[a]	0.203	11.317[a]	0.212	7.767[a]
+3	0.015	11.100[a]	0.303	11.620[a]	0.010	7.777[a]
+4	0.402[c]	11.503[a]	0.175	11.796[a]	−0.343[c]	7.433[a]
+5	0.131	11.634[a]	0.475[b]	12.270[a]	−0.149	7.284[a]
+6	−0.139	11.495[a]	0.064	12.334[a]	−0.036	7.248[a]
+7	−0.073	11.422[a]	−0.064	12.270[a]	0.218	7.466[a]
+8	−0.139	11.283[a]	0.088	12.358[a]	0.443[c]	7.909[a]
+9	0.058	11.341[a]	−0.236	12.121[a]	0.452[b]	8.361[a]
+10	0.617[a]	11.958[a]	0.046	12.167[a]	−0.101	8.260[a]
+11	−0.151	11.807[a]	0.468[b]	12.636[a]	0.402[a]	8.662[a]

Notes: The superscripts following the estimated values indicate statistical significance at 1 percent ([a]), 5 percent ([b]), and 10 percent ([c]), respectively, using the two-tailed critical *z*-value. (See footnote 17 for more detail.) Events A, C, and P designate the plan's adoption month, the contract completion month, and the month of financial statement release, respectively.

that remains several months beyond the event month suggests that the information's impact is substantial.

Figure 1 presents the plot of cumulative average abnormal returns. The top three in the top graph correspond to the three series of cumulative returns reported in Table 4. This result, however, does not control for the effect of corporate earnings that have been shown to affect stock prices.[18] Accordingly, we conduct a pair-match analysis for a comparative purpose: for each corporation that has either the *tekikaku* or the *kosei* plan, we choose another corporation carrying only the *hikiate* plan that most closely matches the control firm's earnings in the same industry.[19] The bottom three series in the top graph show deviations in the cumulative returns between the control firm and its paired match. They point to the presence of statistically significant cumulative returns, after controlling for the effect of earnings.[20]

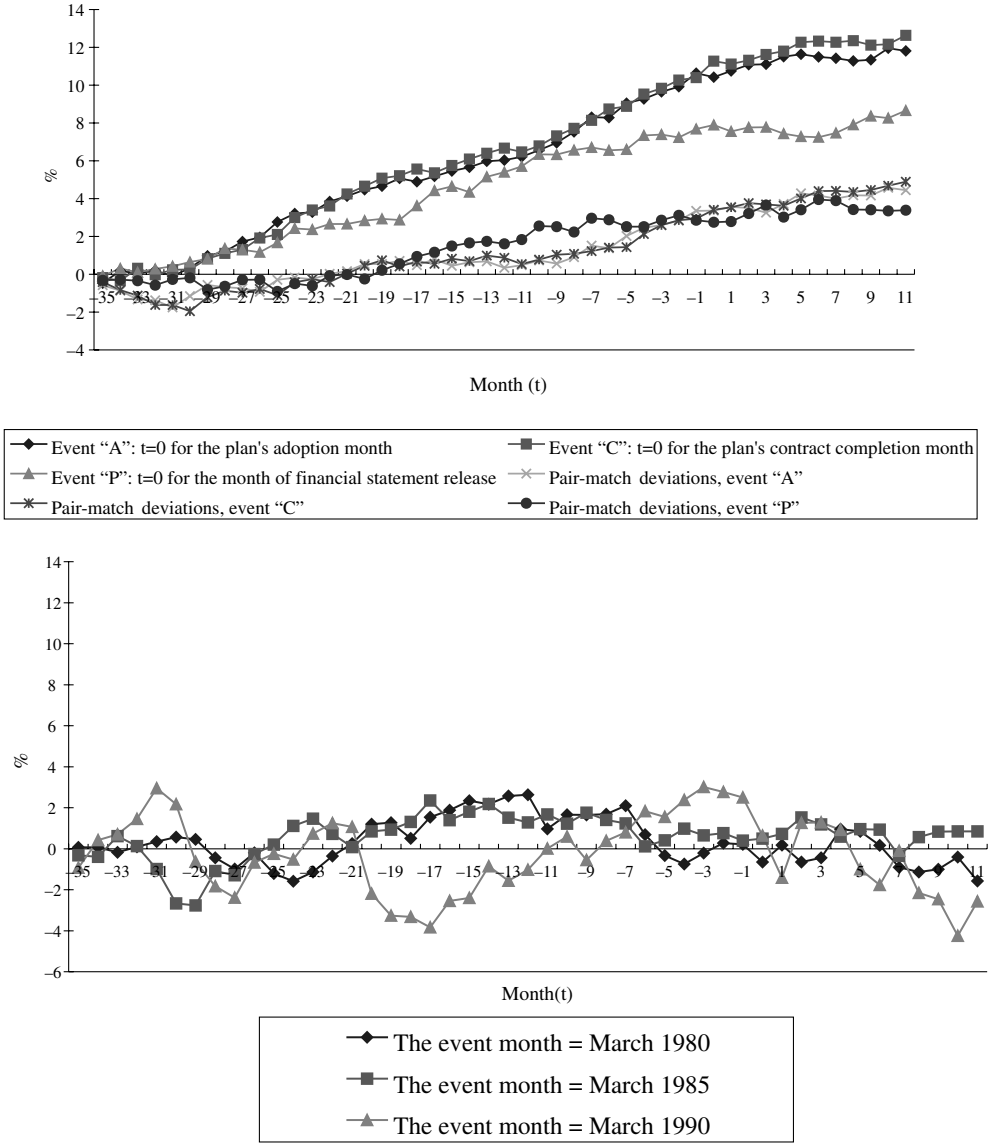
We report in Table 5 the result of regression analysis that focuses on explaining the cumulative abnormal returns for different sub-periods surrounding the event month,

[18] See, for example, Ball and Brown (1968) and Strong and Walker (1993) for the United States, and Sato et al. (1979) and Kunimura (1979) for Japanese studies. Kunimura's study, in particular, presents evidence in support of Fama's semi-strong form hypothesis (1970) on the relationship between earnings forecast and the stock price.

[19] We define the earnings variable as the change in the annual rate of return on capital preceding the adoption month.

[20] Following a suggestion made by one of the referees, we selected a random sample of firms that carry only the *hikiate* plan, in order to see if any baseline tendency exists for abnormal returns to accumulate over time. Using 50 firms and three different benchmark "event" months, we detected no evidence of a systematic trend bias. This is seen in the bottom graph of Figure 1.

FIGURE 1
Cumulative Average Abnormal Returns



controlling for corporate earnings.[21] The regression is a pair-match analysis, where the paired match is selected by applying the same earnings criteria as in the preceding paragraph. Hence, we enter 656 (= 2 × 328) firms into the regression analysis. Finally, to correct for possible cross-sectional correlations in the stock returns that may bias the regression estimate, we apply White's method (1980) for heteroskedasticity correction.

[21] For the importance of controlling for the earnings variable in the regression specification, see Salamon and Kopel (1993).

TABLE 5

Regression Analysis of Cumulative Abnormal Returns, Pension-Plan (D = 1) vs. Pair-Matched *Hikiate*-Only (D = 0) Corporations: Alternative Event Months

Dependent Variable	Constant	Pension Dummy (D)	Corporate Earnings	D times *Zenmen*	D times *Ichibu*	D times *Teinen*	Adjusted R^2	F-Value	Sample Size
EVENT A: THE PLAN'S ADOPTION MONTH									
CA (−35, 0)	5.976[a]	2.807[c]	3.309[a]				0.078	28.62[a]	656
	(4.117)	(1.288)	(4.563)						
	5.984[a]		3.281[a]	6.103	1.094	3.897[c]	0.077	14.63[a]	656
	(4.117)		(4.521)	(1.185)	(0.419)	(1.286)			
CA (−23, 0)	3.565[a]	2.959[b]	2.201[a]				0.070	25.71[a]	656
	(2.861)	(1.679)	(3.134)						
	3.569[a]		2.157[a]	7.417[b]	0.451	4.661[b]	0.073	13.97[a]	656
	(2.861)		(3.108)	(1.670)	(0.217)	(2.051)			
CA (−11, 0)	1.708[b]	2.419[b]	1.211[a]				0.062	22.47[a]	656
	(2.054)	(2.106)	(5.594)						
	1.704[b]		1.197[a]	5.304[b]	−0.249	4.728[a]	0.073	13.95[a]	656
	(2.047)		(5.515)	(1.905)	(−0.187)	(3.153)			
EVENT C: THE PLAN'S CONTRACT COMPLETION MONTH									
CA (−35, 0)	6.733[a]	2.825	3.449[a]				0.082	30.24[a]	656
	(4.591)	(1.277)	(4.436)						
	6.737[a]		3.438[a]	9.875[b]	1.248	2.720	0.083	15.85[a]	656
	(4.587)		(4.406)	(1.896)	(0.473)	(0.886)			
CA (−23, 0)	4.305[a]	3.250[b]	2.301[a]				0.074	27.27[a]	656
	(3.367)	(1.811)	(3.084)						

TABLE 5 Continued

Dependent Variable	Constant	Pension Dummy (D)	Corporate Earnings	D times *Zenmen*	D times *Ichibu*	D times *Teinen*	Adjusted R^2	F-Value	Sample Size
	4.308[a]		2.260[a]	10.336[b]	1.024	3.903[b]	0.079	15.02[a]	656
	(3.366)		(3.060)	(2.254)	(0.483)	(1.715)			
CA (−11, 0)	2.218[a]	1.961[b]	1.634[a]				0.066	24.10[a]	656
	(2.575)	(1.682)	(4.916)						
	2.212[a]		1.579[a]	8.093[a]	−0.642	3.337[b]	0.081	15.34[a]	656
	(2.567)		(4.780)	(2.872)	(−0.486)	(2.169)			
			EVENT P: THE STATEMENT RELEASE MONTH						
CA (−35, 0)	4.213[a]	2.238	2.915[a]				0.061	22.16[a]	656
	(2.710)	(1.035)	(4.983)						
	4.223[a]		2.884[a]	1.458	1.064	3.822[c]	0.059	11.25[a]	656
	(2.712)		(4.927)	(0.317)	(0.399)	(1.345)			
CA (−23, 0)	2.058[b]	2.813[b]	1.908[a]				0.064	23.32[a]	656
	(1.753)	(1.763)	(4.038)						
	2.060[b]		1.882[a]	4.565[c]	1.323	4.070[b]	0.063	12.06[a]	656
	(1.752)		(4.010)	(1.395)	(0.677)	(1.981)			
CA (−11, 0)	1.543[b]	0.737	0.969[a]				0.042	15.30[a]	656
	(2.110)	(0.707)	(5.248)						
	1.544[b]		0.975[a]	−0.310	0.295	1.528	0.040	7.86[a]	656
	(2.109)		(5.259)	(−0.159)	(0.226)	(1.098)			

Notes: CA (p,q) is the sum of abnormal returns over the period (month *p* to *q*). The superscripts following the estimated values indicate statistical significance at 1 percent ([a]), 5 percent ([b]), and 10 percent ([c]), respectively. The *t*-values are in parentheses.

The dependent variable $CA\ (m, 0)$ is the sum of abnormal returns cumulative over the period, $t = m$ through the event month. We report results from several sub-periods to convey a sense of the time frame when the pension information appears to make an impact on the market. It is clear that the earnings variable plays a dominant role in explaining the abnormal returns, as it is highly significant in all cases. Controlling for this variable, however, we find that the dummy variable for pension enters positively in each regression, with statistical significance at the 5 percent level in the $(-23, 0)$ and $(-11, 0)$ period except for event month P.

It is of considerable interest, therefore, to examine if the choice among the transfer options that firms elect makes a difference. Accordingly, we report the result of another regression that differentiates among the three forms of transfer. As it turns out, both the *teinen* and *zenmen* transfers register a statistically significant result at least at the 5 percent level in the $(-23, 0)$, as well as $(-11, 0)$ period associated with the adoption (A) and contract (C) event months. However, pension adoption with the *ichibu* transfer fails in the significance test in all cases, indicating that pension adoption with this option does not produce a statistically meaningful impact. This is consistent with the hypothesis that the more limited nature of tax savings under the *ichibu* transfer fails to induce a favorable market response. Moreover, the public announcement (P) event occasioned by the release of the financial statement is in effect a nonevent in terms of market response in the more immediate $(-11, 0)$ period preceding the announcement, regardless of the transfer options chosen. Evidently, the lateness of this event, lagging behind the adoption event by up to 14 months, renders this period devoid of informational impact on the stock market. This is consistent with the notion that pension information effectively leaks to the market through more private channels such as the choice of financial contractors and the implementation of the plans.

CONCLUSIONS

The Japanese corporate pension system may appear to be both complex and obtuse, reflecting the heavy dose of governmental regulations as well as the difficulties involved in integrating different plans that have evolved from separate origins. The more traditional *hikiate* plan with lump-sum severance pay is either replaced or interfaced with the newly adopted explicit pension plans in different ways. However, we have presented evidence that suggests that the decision to adopt an explicit pension plan induces the stock market response that is also sensitive to the particular forms of transfer options adopted. Moreover, our evidence suggests that this response predates the release of a firm's financial statement by a substantial period, limiting the impact of this particular event in the more immediate months preceding the public announcement. The two null hypotheses, therefore, stand to be rejected.

A number of additional implications of our findings remain for further inquiry. The extensive U.S. pension economics literature has emphasized tax incentives and the tax consequences of corporate pension and has also addressed the stock market impact of the funding status (in terms of being either unfunded or overfunded) of the existing plans. Our findings on Japanese corporate pension plans are consistent with the efficiency implications of new pension adoptions based on tax incentives. But in contrast to American corporations, Japanese pension plans may be best characterized as "underfunded," with virtually no case of an overfunded pension. Also in contrast to the U.S. plans, Japanese corporate pensions have no insurance

coverage, save instances of a limited insurance coverage in some *kosei* plans. But the *kosei* insurance coverage is voluntary, unlike the American pension plans that must carry insurance under the Employee Retirement Income Security Act (ERISA) of 1974. To what extent, if any, does the difference in insurance coverage and the public policy regarding pension insurance explain the gap in the funding status of pension between the two countries?

We have also shown that the market responds positively to the choice of either the *zenmen* or *teinen* option, which have a greater tax advantage than the *ichibu* transfer. Indeed, the *ichibu* option fails consistently in our statistical test, suggesting that the market assesses its adoption in effect as a nonevent. But one major difference that exists in economic characteristics between the *zenmen* on the one hand and the *teinen* (and *ichibu* to a lesser extent) on the other is that the latter contains an important risk element that is absent in the former. That risk, of course, stems from the uncertainty in the timing of nonretirement severance of employees and the typically large cash settlements of accumulated severance benefits that come with it. In the *zenmen* option, the managed plan handles all such payments, sparing the firm from a sudden and unanticipated cash drain. The firm's regular premium payments under the *zenmen* option, therefore, contain this implicit insurance premium. However, only a small number of Japanese corporations have elected the *zenmen* option (see Table 3), suggesting that the insurance premium paid in this form is perhaps too high. An explicit insurance market has never been developed in Japan addressing this particular risk assessment on the corporate cash-flow position. This issue, therefore, remains to be explored further.

REFERENCES

Alderson, M. J., and K. C. Chen, 1986, Excess Asset Reversions and Shareholder Wealth, *Journal of Finance*, 41: 225-241.

Alderson, M. J., and J. L. VanDerhei, 1992, Additional Evidence on the Reaction of Shareholders to the Reversion of Surplus Pension Assets, *Journal of Risk and Insurance*, 59: 262-274.

American Accounting Association, 1966, *A Statement of Basic Accounting Theory*. American Accounting Association.

American Council of Life Insurance, 1987, *Pension Facts*. American Council of Life Insurance.

Ball, R., 1972, Changes in Accounting Techniques and Stock Prices, *Journal of Accounting Research*, 10(supplement): 1-38.

Ball, R., and P. Brown, 1968, An Empirical Evaluation of Accounting Income Numbers, *Journal of Accounting Research*, 6: 159-178.

Beatty, A., 1995, The Cash Flow and Informational Effects of Employee Stock Ownership Plans, *Journal of Financial Economics*, 38: 211-240.

Bera, A., E. Bubnys, and H. Park, 1988, Conditional Heteroskedasticity in the Market Model and Efficient Estimates of Betas, *Financial Review*, 23: 201-214.

Biddle, G. C., and F. W. Lindahl, 1982, Stock Price Reactions to LIFO Adoptions, *Journal of Accounting Research*, 20: 551-588.

Bollerslev, T., 1986, Generalized Autoregressive Conditional Heteroskedasticity, *Journal of Econometrics*, 31: 307-327.

Bollerslev, T., 1987, A Conditionally Heteroskedastic Time Series Model for Security Prices and Rates of Return Data, *Review of Economics and Statistics,* 59: 542-547.

Bulow, J. I., R. Morck, and L. Summers, 1987, How Does the Market Value Unfunded Pension Liabilities? in: Z. Bodie, J. B. Shoven, and D. A. Wise, eds., *Issues in Pension Economics* (Chicago, Ill.: University of Chicago Press).

Clark, R. L., 1991, *Retirement Systems in Japan* (Homewood, Ill.: Irwin).

Corhay, A., and A. T. Rad, 1996, Conditional Heteroskedasticity Adjusted Market Model and an Event Study, *Quarterly Review of Economics and Finance,* 36: 529-538.

Daley, L. A., 1984, The Valuation of Reported Pension Measures for Firm Sponsoring Defined Benefit Plans, *Accounting Review,* 59: 177-198.

Dai-ichi Seimei Hoken Sogo Kaisha, 1986, *Kigyo Nenkin Gaido* [Guide to Corporate Pension] (Tokyo: Toyo Keizai Shimpo).

Fama, E. F., 1970, Efficient Capital Markets: A Review of Theory and Empirical Work, *Journal of Finance,* 25: 387-417.

Feldstein, M., and S. Seligman, 1981, Pension Funding, Share Prices and National Saving, *Journal of Finance,* 36: 801-824.

Ito, M., 1989, Haitou Jyohou no Iminaiyou [The Informational Content of Dividend Payments], *Shouken Keizai*, 167: 138-155.

Kohmura, M., 1987, *Gendai Kigyou Kaikei to Shouken Shijyo* [Contemporary Corporate Accounting and the Securities Market] (Tokyo: Doubunkan).

Kunimura, M., 1979, Kaikei Jyohou to Kabuka [Accounting Information and Stock Prices], *Kaikei*, 115: 491-503.

Mittlesteadt, H. F., and P. R. Regier, 1993, The Market Response to Pension Plan Terminations, *Accounting Review,* 68: 1-27.

Moore, N. H., and S. W. Pruitt, 1990, A Comment on Excess Asset Reversions and Shareholder Wealth, *Journal of Finance,* 45: 1709-1714.

Murakami, K., 1999, Kigyo Nenkin no Kadai to Tenbou [Problems and Prospect of Corporate Pension], *Sanseiken Forum*: 7-11.

Patell, J. M., 1976, Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Tests, *Journal of Accounting Research,* 14: 246-276.

Raifu Dezain Kenkyusho, 1999, *Kigyo Nenkin Hakusho* [White Paper on Corporate Pension].

Sakakibara, S., H. Yamaji, H. Sakurai, K. Shiroshita, and S. Fukuda, 1988, *The Japanese Stock Market* (New York: Praeger Publishers).

Salamon, G. L., and R. Kopel, 1993, Accounting Method Related Misspecification in Cross-Sectional Capital Market Research Designs, *Journal of Accounting and Public Policy,* 12: 217-238.

Sato, H., et al., 1979, Kaikei Houkoku to Kabushiki Shijyou [Accounting Report and the Stock Market], *Kigyou Kaikei,* 31: 60-79.

Seimei Hoken Bunka Senta [Life Insurance Cultural Center], 1993, *Kigyou no Fukuri Kosei Seido ni Kansuru Chousa* [Survey on the Corporate Welfare System].

Strong, N., and W. Walker, 1993, The Explanatory Power of Earnings for Stock Return, *Accounting Review,* 68: 385-399.

Tepper, I., 1981, Taxation and Corporate Pension Policy, *Journal of Finance,* 36: 1-13.

Tepper, I., and A. R. P. Affleck, 1974, Pension Plan Liabilities and Corporate Financial Strategies, *Journal of Finance,* 29: 1549-1564.

Theil, H., 1971, *Principles of Econometrics* (New York: John Wiley & Sons).

VanDerhei, J. L., 1987, The Effect of Voluntary Termination of Overfunded Pension Plans on Shareholder Wealth, *Journal of Risk and Insurance,* 54: 131-156.

White, H., 1980, A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity, *Econometrica,* 48: 817-838.