THE IMPACT OF THE 1986 AND 1987 QUALIFIED PLAN REGULATION ON FIRMS' DECISION TO SWITCH FROM DEFINED BENEFIT TO DEFINED CONTRIBUTION FOR PLANS LARGER THAN 100 PARTICIPANTS

DISSERTATION

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements For the Degree of

DOCTOR OF PHILOSOPHY

By

Linda Jacobsen Bradley, B.S., M.S., CPA
Denton, Texas
December, 1993
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Prior research has documented the trend since 1974 away from defined-benefit plans toward defined-contribution plans as the primary vehicle for employees' retirement income security. No published research has examined the specific impact of the four major legislative acts passed during 1986 and 1987 on this trend. The purpose of this research was to examine the United States population of plans with over 100 participants to determine the extent of the reaction away from defined benefit plans resulting from the 1986 and 1987 legislation.

This research organized the Internal Revenue Service form 5500 records into a time-series panel-data format covering the years 1984 through 1989 for each unique Employer Identification Number. The LIMDEP statistical computer package was used to formulate a pooled time-series, intervention-type, random-effects model. A separate multinomial logit regression on the population of defined-
benefit plans existing in 1984 and 1985 predicted the probability of plan termination by 1990.

Prior research on the population of plans was achieved by performing cross-sectional regressions on selected years with explanatory variables including size of firm, one-digit SIC industry code, and union status. The present study is the first research of which the author is aware that examined the issue using a time-series approach tracking a specific firm through time. For the logit regression, additional variables unique to a plan (top heavy, integrated, maximum over/under funding, existence of a funding waiver request, change in retirement age) were examined.

Results indicated a decrease in defined-benefit (DB) coverage for 1986 and 1987 greater than expected, given the pre-existing downward trend. Size was positively correlated with the existence of a defined-benefit plan when addressing the entire population of firms reporting for any qualified plan. Surprisingly, size had minimal DB-plan-continuation prediction ability for firms with a pre-existing defined-benefit plan. Union existence and plan integration with Social Security appeared to exert a strong influence against DB plan termination.
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CHAPTER I

INTRODUCTION TO THE STUDY

Public Policy Issues


A critical public policy issue relates to the effect of legislation on firms' choices concerning type of qualified retirement plan(s) to sponsor and level of funding of these plan(s). For over fifty years, the federal government has sought to encourage the establishment of pension plans through tax incentives. At the same time, public policy has been directed toward ensuring that plans are financially sound and equitable. A major concern is that legislation
intended to make the system more equitable is unintentionally impeding pension growth.

Prior research suggests that the level of funding for existing defined-benefit plans is sensitive to tax incentives (Thomas, 1989). Other research posits that legislation from 1974 through 1985 may have changed the types of plans provided (Clark and McDermed, 1990). Because employers must balance the costs of maintaining a qualified plan against the benefits, the increasing costs resulting from frequent changes in governmental regulations may have altered the plan choice and plan funding decisions.

The fundamental question of interest in this research is: "What impact did the 1986 and 1987 legislations have on firms' decisions regarding qualified plan offerings?" The information obtained should be useful in the public policy debate concerning the issue of distinguishing functional from dysfunctional legislation as it relates to maintaining and expanding the private sector pension system.

Qualified plan terminations are significant due to their resulting impact on future retirement security. Retirement income derives from three sources: Social Security, individual savings, and employer-sponsored pensions. Despite the 1983 legislative "rescue" of the Social Security trust fund, the post-World War II baby boom and subsequent birth patterns coupled with increasing life expectancy of the elderly portend a serious Social Security
funding predicament commencing around the year 2010 and lasting for several decades (Boskin, 1986).

Americans are inadequate savers outside of their pension plans, as evidenced by the fact that the total increase in real (inflation adjusted) US pension assets in the 1980s exceeded the total real increase in the country’s wealth. The assets in pension plans in essence provided for all of the decade’s national savings (Thornburg, 1992). The average savings rate in the early 1970s was approximately 8%. By the late 1980s it was down to about 4% (Woolsey, 1990).

The current elderly appear to be as well off as the non-elderly in that the poverty rate of the elderly is lower than that of the non-elderly (Andrews and Hurd, 1992, p. 6). The current elderly have not been particularly vulnerable to inflation primarily because of Social Security (Schieber, 1992, p. 34). However, when the baby boom generation retires, their relative income position vis-a-vis other generations and their relative consumption position vis-a-vis their consumption when young and middle-aged may be much different than in the case of current retirees (Kotlikoff, 1992, p. 32).

Taxation of plan benefits and public policy with regard to retirement plans is an issue currently under discussion in the United States. The persistent and increasing federal budget deficits were the major driving force of public
policy in the last half of the decade of the 1980’s (Rappaport and Zeisler, 1992). In essence, Federal revenue needs have driven retirement income policy, leading to cutbacks in important tax benefits (Chernoff, 1989). Proposals were considered in early 1990 to tax short-term capital gains inside pension plans. Controlling the federal deficit will require either reduced spending, higher taxes, or the further limiting of tax preferences. The major tax preferences currently in force are pensions, other employee benefits, and home mortgage deductions. The taxation of pension benefits will inevitably be a target for deficit reduction in the years ahead.

Economists hold divergent opinions concerning whether pension funds fuel savings. Munnell and Yohn (1992, p. 133) argued that individuals tend to reduce their own savings in response to anticipated benefits, although somewhat less than dollar for dollar. The U.S. Treasury estimated that income tax receipts would have been $51 billion greater in 1992 without the special provisions for employer-sponsored pension plans (Smalhout, 1993, p. A18).

Tax preferences are more valuable to higher-income taxpayers, and there exists a concern that pension preferences are being hoarded by a select few for whom the advantages are most valuable (Lindeman and Utgoff, 1992, p. 184). Munnell contended that pension funds’ tax-exempt status was not buying benefits for the broad populace and
that dissaving at the federal level would decrease without it (Durgin, 1991, p.57).

Both chambers of Congress were concerned about the equity of qualified plan tax provisions when drafting the 1986 Tax Reform Act. The House Ways and Means Committee Report preceding the 1986 Tax Reform Act stated that "...A basic reason for extending significant tax incentives to qualified plans is the delivery of comparable benefits to rank-and-file employees who may not otherwise save for retirement (BNA, 1986, p. 216)." The Senate Finance Committee Report stated that "...The present-law nondiscrimination rules permit greater tax-favored contributions by or on behalf of highly compensated employees without comparable participation by rank-and-file employees (BNA, 1986, p. 503)."

Predicted Effects of the 1986 and 1987 Legislation

McGinn (1987) contended that the Tax Reform Act of 1986 was the beginning of a formal national retirement policy aimed at encouraging defined-benefit plans and discouraging defined-contribution plans. Paustian (1986) predicted that after the Tax Reform Act of 1986, defined-benefit pensions would continue to be the primary retirement vehicle used by corporations. Daniel Walker, Assistant Secretary of Labor, Pension, and Welfare Benefits Administration, predicted that due to the Tax Reform Act of 1986, more new defined-benefit than defined-contribution plans would be started, the
average benefit level would decrease, and overall coverage would broaden (Anonymous, Employee Benefit Plan Review, 1987).

The General Explanation of the Tax Reform Act of 1986, provided by the Joint Conference Committee on Taxation, (CCH, 1987, p. 732) stated that

Congress concluded that prior law unduly favored defined-contribution plans even though defined-benefit plans can provide better overall retirement income security. Congress believed the relationship between [DB and DC] limits should be adjusted more favorably toward defined-benefit plans because (1) those plans can provide a level of benefits that can be predicted by participants long before retirement, (2) the participants in defined-benefit plans can be better protected against investment loss, and (3) the plans can provide better protection against inflation...the change [resulting from the 1986 Tax Act]...was intended to increase the attractiveness of defined-benefit plans.

Assuming that encouraging defined-benefit plans was Congress’s primary intent in the Tax Reform Act of 1986, the unintended result may instead be the demise of a segment of defined-benefit plans. In addition, the 1987 full funding limitation can be construed as a direct contradiction of the position favoring defined-benefit plans.

Many benefits observers call for a national retirement income board to establish national retirement income policy so that legislation can adhere to some sort of a unifying framework. An integrated retirement policy is perceived as preferable to fragmented change tied to each annual tax bill (Rappaport, 1992). Steuerle (1992) noted that one failure
of the 1986 tax reform effort was that pension policy was never examined in a comprehensive way. He confirmed that tax policy since World War II has been used increasingly as a short-term economic tool. The overemphasis of this aspect of tax policy has prevented policymakers from dealing with longer-run issues.

**Purpose of the Study**

This research was exploratory and sought to determine the extent of the broad-based reaction to the 1986 and 1987 tax law changes. Information about the results of recent law changes could assist policymakers in evaluating new legislation.

Only plans with more than 100 participants were examined, using the Form 5500 annual information documents filed with the Internal Revenue Service and the Department of Labor for the years 1984 to 1990. Approximately the entire population of reporting employers was included on the machine-readable tapes purchased from the Pension Benefit Guaranty Corporation. Plans with under 100 participants generally filed forms 5500C, 5500R, and 5500EZ and were thus not on the 5500 tape series. The forms for these smaller plans were not examined, although it is likely that the impact of the legislation under investigation was much stronger for these under-100-participant plans. The few under-100-participant plans that filed 5500's (and were therefore included on the 5500 tapes) were deleted as an
inadequate representation of their underlying population. This practice is also in conformity with existing research.

Prior research either examined only Compustat firms or performed cross-sectional regressions on the population of pension plans without attempting a time series study. This research extended Compustat-sample research by including non-publicly traded firms and examining the reaction differences between these firms and those with a Cusip designation (e.g., publicly traded). This study inspected specific attributes of individual plans to determine their impact on the resultant plan-termination decisions.

This research used stronger statistical methodologies than prior population research by organizing the firms into time-series panel data, examining expanded and refined explanatory variables, and employing a percentage of defined-benefit-covered employees as a dependent variable rather than the 0,1 (no DB plan, DB plan) dichotomous variable. Use of the percentile as the dependent variable reflected the assumption that some firms maintained a defined-benefit plan for only a subset of their otherwise-eligible employees. The analysis of the effect of legislative changes was extended through 1989, whereas existing population research examined years ending with 1987.
Research Strategy

First, ordinary least squares and panel data regressions were examined to estimate the change in defined-benefit plan participation across the time period 1984-1989. Control variables reflected and extended prior research. Second, results using a post-86 dummy variable were compared to results using individual year dummies to estimate whether the observed change was a smooth time trend or an abrupt and contained event. Third, cross-tabulation analysis was used to highlight the differing behavior of major subpopulations within the general population of firms during this time period. Fourth, Multinomial LOGIT regressions were used to estimate the significance of selected distinguishing characteristics as contributing factors to the termination of defined-benefit plans.

This research approach yielded interesting results. It confirmed the documented pre-existing downward trend in the prevalence of defined-benefit plans relative to defined-contribution plans during the period 1984 to 1989. However, it showed a decrease in defined-benefit coverage for 1986 and 1987 greater than that expected, given the pre-existing downward trend.

As suggested by prior research, size was strongly positively correlated with the existence of a defined-benefit plan when addressing the entire population of firms reporting for a qualified plan. However, for the subset of
the general population made up of those firms already offering a defined-benefit plan, size appeared to have significantly less explanatory ability when addressing the decision to terminate or expand an existing defined-benefit plan.

The significance of the presence of a union was also confirmed and quantified in this study. The previous research incorporating union status into the model (Ippolito, 1990, Gustman and Steinmeier, 1992) also affirmed the importance of union influence. The present research was the first study to examine the subpopulation consisting of pre-existing defined-benefit plans, and results indicated that union existence also exerted a strong influence on the termination decision for firms already offering a defined-benefit plan.

The present research was the first study to incorporate the issues of publicly held firm ownership and the presence of the integration option in the defined-benefit plan agreement. An integrated plan takes a portion of the employee's social security benefits into account in calculating the plan benefits, thereby reducing the required contribution. The defined-benefit plans that integrate plan benefits with social security benefits appeared to be significantly more likely to be maintained than were plans that did not consider social security benefits in calculating the contributions required to attain the plan's
stated benefits. The issue of publicly held ownership evidently exerted a much weaker influence than did integration upon the defined-benefit plan termination decision.
CHAPTER II

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Explanation of Plan Types

The two principal types of vehicles for delivering cash pension benefits in the United States are the defined-benefit plan and the defined-contribution plan. Both types offer tax deductible contributions and tax deferred investment returns, with taxability passing to the participant at the future date of receipt of the funds.

Defined-Benefit Plans

A defined-benefit plan is one in which the benefits are established in advance by a formula, and employer contributions are treated as the variable factor (McGill, 1989, p. 105). Defined-benefit formulas are generally calculated on either a unit benefit or a flat benefit basis. A unit benefit formula provides for an explicit unit of benefit, usually a percentage of compensation (e.g., 1% of final pay), to be credited for each year of recognized service with the employer. A flat benefit plan provides, after a minimum period of service, a specified percentage of compensation at retirement that is unrelated to the years of service rendered.
In a defined-benefit plan, the fund is a single pool of assets used to pay benefits to all participants, with no allocation of assets to individual participants. The plan sponsor bears the investment risk, and contributions are determined based on the aggregate amount needed to provide plan benefits. Plan benefits are usually paid as lifetime annuities.

Defined-Contribution Plans

In a defined-contribution plan, the plan document defines the yearly contribution to be credited to an individual account for the participant. The ultimate benefit is based solely on the amounts contributed to the participant's account and any expense, investment return, and forfeitures allocated thereto. The size of the ultimate benefit is the variable factor.

Defined-contribution plans can be classified as money purchase pension plans, profit sharing plans (including IRC Section 401(k) plans), or stock bonus plans. The fixed yearly contribution is required to be made in a money purchase pension plan, whereas the year-to-year contribution is discretionary for a profit sharing plan. The total contribution for profit sharing plans is limited to 15% of eligible compensation. Although the total money purchase contribution could be fixed at up to 25% of compensation, many money purchase pension plans are combined with profit sharing or stock bonus plans. A typical combination is a
maximum 15% (of eligible compensation) discretionary profit sharing plan combined with an 8% (required contribution) money purchase pension plan. The total contributions for all combinations of defined-contribution plans cannot exceed 25% of eligible compensation.

**Defined-Benefit/Defined- Contribution Comparisons**

Generally, defined-benefit plans are the best choice for companies that want to encourage career employment and provide relatively high benefits to employees who retire from active service while minimizing benefits to those who leave with shorter service and at younger ages. Defined-benefit plans are more efficient in delivering benefit dollars per dollar of contribution because the assets are usually invested to produce a higher yield than in defined-contribution plans (Rappaport and Zeisler, 1992). A 1984 study found that retirement goals were satisfied more efficiently by defined-benefit than by defined-contribution plans in that they provided much greater benefit values (McGinn, 1987).

The House Ways and Means Committee Report preceding the 1986 Tax Reform Act (BNA, 1986, p.229) stated that "...The committee focused...also on the relative attractiveness of defined-contribution and defined-benefit plans...and concluded that defined-benefit pension plans provide better overall retirement income security." Apparently, the House of Representatives strongly favored defined-benefit plans.
The existence of a defined-benefit pension plan is likely to have an influence on employees' decisions about retirement and termination of employment. Defined-benefit plans often assist in the orderly transition between generations of employees. Firms in the process of restructuring offer early retirement "window" programs to help encourage early retirement during a limited period. At about mid-career, employees in companies with generous pension plans become much less likely to accept new employment than those without defined-benefit pension plans.

A primary disadvantage to the firm of maintaining a defined-benefit plan is that it involves a long-term commitment and subjects the employer to substantial financial risk. Defined-benefit plans are also difficult for the employees to understand and generally do not promote job satisfaction among younger employees. Recent law changes are making defined-benefit plans increasingly complex to administer, and the speed and magnitude of these legislative changes are creating a sense of continuing uncertainty and instability.

Conversely, a defined-contribution plan does not involve a long-term commitment and does not subject the employer to financial risk. Defined-contribution plans deliver higher benefits to employees terminating early, and thus make it more expensive to provide the same level of retirement benefits for those employees staying until
retirement. Winger (1991, p. 167) noted that although employees have a preference for participatory defined-contribution plans, care must be taken to separate what is a psychological preference of the modern employee for choice and autonomy in planning for the future and what is illusion in terms of hard economic facts which will have direct bearing on the employee's future income security.

For the participant, a defined-benefit plan is generally preferable if the employee stays with the firm until retirement and if the plan remains in force until the employee's retirement. If a participant terminates prior to early retirement, or the plan is prematurely terminated, a defined-contribution plan is generally preferable. Under a defined-contribution plan, it is difficult to provide adequate benefits to employees who join the firm relatively late in life. In a defined-benefit plan, contributions accrue slowly during a worker's early worklife and rise more than proportionately as retirement age approaches. This phenomenon is known as backloading, and is assumed to be a disincentive to job mobility.

A marked trend of firms switching from a defined-benefit plan as the primary plan to a defined-contribution primary plan has been documented (Chernoff, 1989, Bosworth and Burtless, 1992, Schieber, 1992, p. 35). A switch from a defined-benefit to a defined-contribution plan places all the risk (investment, inflation, inadequate funding)
inherent in planning for an employee's retirement solely upon the employee's shoulders.

Legislative History

Pre-ERISA

Industrial pensions appeared on the American scene during the last quarter of the nineteenth century, but only within the last fifty years have they assumed any significance in the old-age financial picture. In the beginning, private pension benefits were regarded as gratuities from a grateful employer in recognition of long and faithful service (McGill, 1989, p. 16). Another important consideration was the removal of superannuated employees from the payroll. Early pensions were funded on a pay-as-you-go basis.

As time went on, the granting of pensions gradually became a permanent part of employment policy. Management began to realize the desirability of making some advance provisions during the active service lives of employees for pensions to be paid after retirement (Steinberg and Danker, 1983, p. 4).

Tax-deferred status for pensions was first conferred by the Revenue Acts of 1921 and 1926. Contributions to a qualified pension plan (stock bonus, profit sharing, and defined-benefit trusts) were immediately deductible by an employer while the benefits were not taxable income to the employee until paid (Andrews, 1989, xxiii). These Internal
Revenue Code provisions gave considerable impetus to the formation of self-administered funded plans. As Scholes and Wolfson (1992, p. 4) noted, "...Any tax system designed to achieve a variety of social goals inevitably provides considerable private incentives to engage in tax planning."

The Revenue Act of 1942 provided that pensions had to cover a broad cross-section of employees rather than solely executives, plans could not discriminate in the benefits paid to or contributions made for officers, shareholders, or other highly compensated employees, and that plans had to be in writing, be permanent, and be communicated to employees. Although coverage was broadened, management and administration was not regulated (Coleman, 1985).

During and shortly after World War II the number of pensions began to increase rapidly for three reasons. First, wage and price controls prevented employers from increasing worker compensation, but not from providing fringe benefits such as pensions. Second, normal and excess profits taxes were extremely high, leading employers to look for tax deductions such as those provided by pension plan contributions. Third, unions held that pensions were a mandatory subject of collective bargaining.

The Steel Industry Fact Finding Board in 1949 recognized the human depreciation concept as a philosophical basis for funding and vesting (McGill, 1989, pp. 18-19). The human depreciation concept asserts that the cost of
maintaining a human machine both during and after an employee's working life should be a cost of production.

The Welfare and Pension Plans Disclosure Act of 1958 attempted to curb existing abuses, such as exorbitant fees and commissions, kickbacks, and excessively high administration costs. This was Congress's first attempt to regulate plan management and administration.

ERISA

When Studebaker stopped producing automobiles and closed its plants in 1963, over 4,000 workers with vested pension rights lost some or all of their pensions (Coleman, 1985). This influenced the first broad pension reform bill, introduced by Senator Jacob Javits in 1967. After seven years of congressional hearings and legislative action, the Employee Retirement and Income Security Act (ERISA) became law on September 2 (Labor Day), 1974.

Included in ERISA were participation and vesting standards, fiduciary and funding requirements, strengthened reporting and disclosure rules, and insurance against benefit losses arising from private defined-benefit pension plan terminations. In essence, the law is designed to increase the probability that a promised pension is actually received by pension plan participants upon retirement.

ERISA created the Pension Benefit Guaranty Corporation (PBGC), a federal insurance program under which workers would be paid their benefits even if the funding levels in
the plan were insufficient to pay benefits and the firm was unable to make up the difference. The price of the insurance was initially set at $1.00 per participant per year (Ippolito, 1989, p. 3). McGill (1970) warned of the moral hazard problem involved with federal guarantee programs and suggested stricter funding standards, lower benefit guarantees, and tougher standards to qualify for insurance coverage. One explanation for ERISA's apparent naiveté is that, under pressure from corporations and their unions, a deliberate attempt was made to effect transfers to workers and shareholders in troubled firms by creating a generous insurance contract that was not priced in relation to risk and exposure (Yoder, 1992, p. 36A).

**Post-ERISA**

Revenue Reconciliation Act of 1990 (RRA). A public policy concern is that because Congress has dealt with pension issues on a piecemeal basis, the result is unmanageable complexity for plan providers and a mind-set of being "under siege" from government regulations.

**Highlights of Legislation from 1975 to 1985**

TEFRA '82 substantially reduced the maximum limits on benefit and contribution accruals. The maximum defined-benefit dollar limit was reduced from $136,425 to $90,000, payable at age sixty-two. The defined-contribution limit was reduced from $45,475 to $30,000. The aggregate limit for participants covered under both a defined-benefit and a defined-contribution plan was also reduced. TEFRA introduced restraints on specific targeted plans it classified as top-heavy. A top-heavy plan disproportionately benefitted the officers and highly compensated employees of the sponsoring firm. Top heavy rules subjected these plans to special minimum benefit and minimum vesting rules. Top heavy plans were defined as those for which the present value of accrued benefits (for a defined-benefit plan) or the account balance (for a defined-contribution plan) allocated to top-heavy participants exceeded 60% of the present value of the plan's total accrued benefits or account balances.

TEFRA also reduced the allowable integration spread, restricted loans from participants, and instituted minimum
distribution requirements. An integrated plan was one that provided a proportionately higher benefit to highly compensated participants, on the premise that it was an extension of the Social Security program. Leased employees were treated as employees of the employer and cost of living increases could no longer be taken into account until 1986 in determining the maximum deductible contribution.

A significant contribution of TEFRA was that it placed partnerships and self-employed businesses on an equal footing with corporations by making contributions and benefit limits the same for all pension plans (Andrews, 1989, p. 115). This eliminated incentives for professional practices to incorporate their businesses solely to maximize pension contributions.

DEFRA '84 extended the freeze on cost of living increases to 1988 and amended key provisions of TEFRA. The minimum distribution rules were slightly eased, and the definition of top heavy key employee was modified to exclude officers who earned less than 150% of the defined-contribution limit.

REA '84 extended the pension rights traditionally awarded to women. The minimum participation age was lowered from age twenty-five to age twenty-one, years of service after age eighteen were required to be counted for vesting, and break-in-service rules generally allowed an employee to return to employment after a less than five year break
without starting over in accruing pension benefits. Employees were required to obtain their spouse's permission in order to waive joint-and-survivor defined-benefit annuity benefits, and Qualified Domestic Relations Orders enabled divorced spouses to obtain payment of benefits.

**Highlights of 1986 and 1987 Legislation**

SEPPAA '86 raised the PBGC premium from $2.60 per participant to $8.50 per participant. This greatly increased the relative administrative costs of defined-benefit plans, because only defined-benefit plans have been required to purchase federal Pension Benefit Guaranty Corporation insurance.

SEPPAA resulted from Allis-Chalmers and Wheeling-Pittsburg Steel Corporation terminating defined-benefit plans in 1985 with unfunded liabilities of over $400 million (Ippolito, 1989, p.215.). Before SEPPAA, employers could terminate their plans at will, regardless of the financial position of the firm or the plan. After SEPPAA, two types of voluntary terminations were recognized. Plans could terminate voluntarily through a standard termination if their assets could meet their benefit commitments. Other voluntary terminations were permitted only as distress terminations contingent upon a determination acknowledgement from the PBGC. Distress terminations required the plan administrator to show, using specific criteria, that the firm was financially unable to continue the plan. The
conditions of employer liability were changed to require the employer to continue payments to the PBGC even after plan termination (Andrews, 1989, pp. 118-119).

The Tax Reform Act of 1986 lowered income tax rates, broadened the base of taxation, and made sweeping changes in qualified plan provisions. The minimum coverage tests (IRC Section 410(b)) revised non-discrimination testing requirements, adding the ratio and average benefits tests. The new IRC Section 414(q) definition of highly compensated employees added to the complexity of non-discrimination testing. IRC Section 401(a)(26) required each plan/benefit structure to cover the lesser of fifty employees or 40% of all employees of the employer. A salary limitation of $200,000 was applied to each year's compensation for use in benefit calculations, causing both defined-contribution and defined-benefit plans to "reverse discriminate" in the case of covered employees earning more than $200,000.

In the case of 401(k)'s, TRA 1986 placed a $7000 cap on elective deferrals and instituted an average deferral percentage test for non-discrimination. Hardship withdrawals were limited to the amount of the employee's elective deferrals.

TRA 86 restricted loans from plans to participants under IRC Section 72(p), revised the integration rules for both defined-benefit and defined-contribution plans (IRC Section 401(1)), and reduced the allowable range of present
value calculations (IRC Section 417(e)). The fundamental changes required by TRA 86 resulted in the legal amendment of most plans in order to sustain compliance with ERISA.

The ADEA in 1986 reduced age discrimination in retirement planning. Pension accruals could no longer be frozen beyond normal retirement age, employees hired after age sixty could no longer be excluded from participation, and mandatory retirement was prohibited by Department of Labor Regulations except for certain higher level executives and college professors.

The Omnibus Budget Reconciliation Act’s Revenue Act of 1987 significantly impacted defined-benefit plans. The new full funding limitation (IRC Section 412(c)(7)) stipulated that the end-of-the-year Accrued Benefit Obligation (ABO) must be calculated at specified rates. OBRA’s ABO is calculated essentially the same as Statement 87 from the Financial Accounting Standards Board.

The full funding limitation determines the amount of deductible contributions that an employer may make to a qualified defined-benefit plan. Under the Revenue Act of 1987, deductible contributions to a defined-benefit plan could not exceed 150% of current liabilities. This was intended to prevent employers from making excessive contributions to fund liabilities that were not yet owed (CCH, 1987, p. 52). The making of such contributions was
viewed as effectively providing a tax-free savings account to offset employers' future liabilities under prior law.

Prior to 1987, employers were allowed to take anticipated wage increases (largely inflation) into account in making contributions. Because typical defined-benefit plans promise a benefit based upon the employee's future salary, each year the firm accrues a marginal cost that depends on future wage growth as well as current salaries (Lindeman and Utgoff, 1992, p. 187). The overfunding limit of 150% of legal vested liabilities (with no allowance for future wage growth) prevented overfunded firms from making new tax-deductible contributions. Rapid swings in interest rates could also push firms over the full funding limits and thus prohibit firms from making new contributions into the fund (Clarke and McDermed, 1990, pp. 78-79). OBRA's full funding limitation may make a future switch to a defined-contribution plan inevitable because a currently existing defined-benefit plan would have higher minimum contributions in the future resulting from this severe limitation on the current maximum contribution (Smalhout, 1993, p. A18).

The required PBGC insurance premium was increased in 1987 from $8.50 per participant per year to $16.00. A variable premium was added equal to $6.00 per $1,000 of unfunded vested benefits per participant. The total maximum premium was set at $50.00 per participant per year.
Applicable Prior Research

Spot Market/Deferred Wage Theory

The structure of the labor market is crucial to research in pension reporting. The labor market may be characterized by either a lifetime contract between firm and employees for deferring compensation or by a spot market whereby employees receive wages equal to their marginal productivity for each period (Pesando and Clarke, 1983). Pension promises are part of employee compensation, accepted by employees instead of additional cash wages or fringe benefits.

In the spot market model, the rational worker will grant no wage concession in return for a non-vested pension benefit. An essential feature of this model is that there is nothing which binds the worker to the firm for other than the immediate period, and nothing which binds the firm to the worker. The spot labor market clears on the basis of employee productivity and labor costs at each moment in time, and the worker’s remuneration in each period equals the value of his/her marginal product in that period (Gustman and Mitchell, 1992, p. 49).

Conversely, the implicit contract model provides for a long-term or lifetime contract, in which competitive forces ensure that the worker’s total compensation and value of his marginal product are equated over the worker’s lifetime. Implicit contracts have been asserted to bind workers to the
firm, thus reducing the cost of turnover (Lazear, 1979, p. 1272) and to provide incentives for employees to develop firm-specific human capital (Williamson, 1985, p. 243).

Empirical support for the validity of the implicit contract characterization was provided in Kotlikoff and Wise's (1989, p. 42) examination of Bureau of Labor statistics data on wages and benefits. They concluded that sharp changes in average pension accrual did not occur at the ages of vesting, early retirement, and normal retirement. This was interpreted as strong evidence that neither wages nor marginal products appeared to adjust at these critical ages to meet the spot market equilibrium condition implied by a legal view of pension contracts.

Ippolito (1985, pp. 1039-1040) reported that implicit pension savings rates (the value the employees assign to each year's pension promises) were approximately constant over the tenure of the pension-covered employees. This constancy is congruent with the implicit contract view's characterization of benefits as being earned over employees' careers rather than in discrete units (Stone, 1991).

Studies examining the economic effects of pensions tend to support the conclusion that defined-benefit pensions are part of an implicit contract used to modify worker behavior. If the labor market is in fact characterized by the long-term contract model, the prevalent trend of switching from a defined-benefit to a defined-contribution plan as the
primary plan could signify a fundamental shift in the implied labor market contract. To the extent that this switch is driven by changes in the tax laws, governmental legislation and its attendant regulations have interfered with choices that would otherwise be made in a "free market".

Population Research (Form 5500)

Clarke and McDermed (1990) examined the Internal Revenue Service/Department of Labor 5500 forms for the years 1977 to 1983, limiting the study to firms' primary plans containing more than 100 participants. The authors concluded that the price of writing implicit employment contracts that included a defined-benefit pension plan rose during the seven year period examined, resulting in fewer such contracts being adopted. They determined that regulations reduced the benefits to firms from offering defined-benefit plans while simultaneously increasing the administrative and reporting costs of these plans.

Clarke and McDermed's model included three cross-sectional probit regressions (1977, 1980, 1983) with 0 as the dependent variable if a firm had no defined-benefit plan and 1 as the dependent variable if a firm had at least one defined-benefit plan. Thus, if a firm had any defined-benefit plan, it was assumed to be the primary plan, regardless of the percentage of participants covered.
Clarke and McDermed's explanatory variables included employment size of sponsoring firms (number of employees), industry of plan sponsor (two digit SIC industry code), and the year of the oldest plan. Size of firm and age of primary plan were both statistically significant at the 1% level. The industry codes showed varying levels of statistical significance.

The probability of having a defined-benefit plan as explained by these variables decreased from an average of 72.1% in 1977 to 65.1% in 1983, with the smallest firms (less than 500 participants) showing a larger probability decrease (61.4% to 53%) than did the largest firms (84.9% to 82.4% for over 1000 participants). Likelihood ratio tests performed on a set of equations with only one post-ERISA dichotomous variable indicated that the equations across the years were significantly different from each other. They concluded that 80% of the decline in defined-benefit coverage was due to increasing government regulation. Retail trade showed a larger probability decrease than did manufacturing, and over 40% of the firms with defined-benefit pensions were in the manufacturing sector.

Gustman and Steinmeier (1992) examined the 5500 filings for the years 1977, 1981, and 1985. They also used the classification scheme of a dependent variable of 1 if a firm had any defined-benefit plan and 0 if a firm had only defined-contribution plans. Their probit model included as
independent variables size (number of employees), industry (two digit code) and union status, with union status represented as 1 if the firm had any plan for collective bargaining participants and 0 if the plan did not. They determined union status from the 1977 Employee Benefit Surveys filed. Any change in union status post-1977 could not be determined. The inclusion of union status was the unique contribution of their research.

Gustman and Steinmeier discovered that once the plans were classified by union status, the drops in percentages of defined-benefit coverage were less noticeable. For employees of firms with no collective bargaining agreement in existence in 1977, the drop in defined-benefit plan coverage from 1977 to 1985 was 82.9% to 76.8%, whereas for all firms combined it went from 89.8% to 79.5% between 1979 and 1985. However, the "union status not available" group declined from 86.8% to 71.1%. Better information on union status was needed. They concluded that the movement of workers into non-union jobs explained at least one-half of the decline in defined-benefit plan coverage, with less than one-half being the result of the increase in government regulation and other demographic and economic factors.

Ippolito (1990), Director of Research for the Pension Benefit Guaranty Corporation, extended the research of both Clarke and McDermid and Gustman and Steinmeier, using cross-sectional regressions for the years 1979 and 1987. He found
that when using the 5500 forms for all firms combined, virtually the entire reduction in defined-benefit market share over the period 1979 to 1987 was attributable to employment shifts. Because information about a collective bargaining agreement was requested on the 1987 form 5500, his research accurately represented union status.

However, Ippolito's aggregate results commingled two contrary trends relating to plan size. For plans with more than 100 but fewer than 1,000 participants, there was a clear shift in preferences away from defined-benefit plans. For plans with more than 1,000 participants, there was no evidence of a shift in preferences away from defined-benefit plans and a small drift toward defined-benefit plans was discerned. Thus, the small change in preferences in favor of defined-benefit plans among large firms offset the larger shift in preferences away from defined-benefit plans among smaller firms, resulting in aggregate results that evinced no net change in preferences for defined-benefit plans.

**COMPSTAT—Sample Research**

Thomas (1988) examined the link between tax status and corporate defined-benefit plan funding policy for a sample of 677 firms during the 1980-1984 period. Tax status was measured by classifying firms into three categories: those paying taxes, those offsetting current tax losses due against prior years' tax payments (carryback firms), and those with current year losses to be carried forward to
future years (carryforward firms). Results suggested that tax status declines were associated with pension contribution reductions (from time series regressions), reductions in contributions were also related to previous excess contributions, and tax status was related to fund levels, choice of actuarial variables, and the use of defined-benefit plans (from cross sectional regressions). In short, tax status appeared to be an important determinant of pension funding.

Thomas (1989) examined 1,137 defined-benefit plan terminations that each had reversions of plan funds to employers in excess of one million dollars between May 1980 and March 1986. For these firms, terminations of overfunded plans were motivated by cash needs, rather than tax, accounting, or wealth transfer considerations. Results were consistent with the financial slack hypothesis, because terminations were generally preceded by large declines in funds from operations.

Stone (1991) examined fifty-six firms obtained from a PBGC list of defined-benefit plan asset reversions to employers between 1981 and 1985, each in excess of one million dollars. Any existing defined-benefit plan was required to be terminated in order for the firm to receive the plan assets in a reversion. Some of the firms replaced the terminated defined-benefit plan with another defined-benefit plan while some replaced with a defined-contribution
plan. Stone studied the link between financial stress and the defined-benefit plan continuation versus replacement (with a defined-contribution plan) decision and found that firms switching to defined-contribution plans after asset recaptures were more financially stressed than were firms continuing defined-benefit plans after recapture.

Stone reasoned that the long-term implicit contract features of a defined-benefit plan decreased in value to the firm and to its employees as the probability of the firm's bankruptcy increased. The identification of economic reasons why employees of financially stressed firms would support switching to a defined-contribution plan was viewed as contradicting the position frequently taken in public debates that switching is always abusive.

Stone's results indicated that firms switching to defined-contribution plans in 1984-1985 were smaller, more highly leveraged, less solvent, and less profitable than were the firms continuing defined-benefit plans. The difference was statistically significant for only the size variable. This was consistent with Kotlikoff and Smith's (1983, p. 164) discovery that firms sponsoring defined-contribution plans were smaller and Pesando and Clarke's (1983, p. 736) statement that employees would be less willing to enter into implicit contracts with smaller firms.

Stone examined the effect of two confounding factors, employee age and unionization. Her employee age variable
was the proportion of vested benefits divided by total benefits, although she recognized that this was an imperfect proxy for employee age. She used as her union control variable the proportion of union employees divided by total employees, obtained from the firms’ 10-K. Surprisingly, neither the union nor employee age control variables were significant when measured alone.

Case Study Research

Winger (1991) found that the tax disincentives for defined-benefit plans in the 1982 TEFRA, 1984 DEFRA, and the 1984 REA caused seven of the firms in her case study of nine major Midwest corporations in the Minneapolis-St Paul area to change their corporate focus from defined-benefit plan to defined-contribution plan. By using the entire population for the data, the herein reported research provides a more broad-based indication of the reaction to legislation. In addition, the legislation through 1987 is able to be examined.

Research Hypotheses

Panel-Data Time-Series Models

A set of time series equations was used first to assist in determining the relative impact of the 1986 and 1987 legislation. The dependent variable was the percentage of participants covered by a defined-benefit plan. Thus, if a firm had one or more defined-contribution plans, but no defined-benefit plan, the dependent variable was 0. If a
firm had a defined-benefit plan that covered all the employer's participants, the dependent variable was 1.0. A firm that had a defined-benefit plan covering 150 participants and a defined-contribution plan covering 600 participants would have a dependent variable of 0.25. The numerator of the dependent variable was the number of the participants in the largest defined-benefit plan of the firm. The denominator was the greater of the number of participants in the largest defined-contribution plan or the number of participants in the largest defined-benefit plan. I originally planned to use the sum of the defined-benefit participants in all plans as the numerator, but upon examination of the data there appeared to be no way to separate replacement defined-benefit plans from original plans and I did not want to double-count the participants. I therefore used the number of defined-benefit participants in the largest defined-benefit plan. It was assumed that it is common for participants in a defined-benefit plan to also be participants in one or more defined-contribution plans.

All prior research has found size of firm to be a significant explanatory variable in determining plan existence and plan type. Therefore, the first hypothesis examined firm size both to confirm existing research and to "partial out" the effects of size so that the effect of a post-86 variable would not be compounded with size. The first hypothesis was therefore as follows:
HA-1. The percentage of participants covered by a defined benefit plan is positively related to the SIZE variable (Log of total employees).

Null form: The coefficient of SIZE is less than or equal to 0.

Because this was a time series study, and each firm was in effect its own control, any change in size was expected to be significant. As Stone (1991) observed, firms experiencing a contraction in employment would likely have employees who were less likely to prefer a defined-benefit plan.

HA-2. Industry Code is related to the percentage of participants covered by a defined-benefit plan.

Null form: The coefficients for INDUSTRY CODES are all simultaneously equal to 0.

One of the central reasons a firm expends limited resources to provide employee benefits was the perception that competing employers in the industry were doing so. Thus, it was viewed as necessary for any given firm to meet their competition's commitment to retirement benefits in order to attract and retain skilled workers. In addition, industry-wide economic circumstances may result in different optimum benefit offerings. It is expected that firms in a given industry will have similar reactions to events occurring during a given period of time. As with size, all relevant research has found industry to be a significant factor in determining plan benefits; therefore, this information was included to confirm existing research and
"partial out" the impact of industry from any post-86 changes.

HA-3. The percentage of participants covered by a defined benefit plan is positively related to the degree of union participation in the firm, measured by the number of union participants divided by the total participants.

Null form: The coefficient on PCUNION is less than or equal to zero.

Both Ippolito (1990) and Gustman and Steinmeier (1992) confirmed that union presence was a significant predictor of whether or not a firm will have a primary defined-benefit plan. Therefore, the union variable was introduced to confirm existing research and "partial out" the effects of union status. The confounding impact of unionization was especially troublesome because the economy was viewed as experiencing a movement of jobs out of the manufacturing sector, which traditionally has been a main provider of defined-benefit plans, into the service sector, which has not historically preferred defined-benefit plans. Thus, it was important to differentiate between the portion of the decrease due to shifts in unionization and the portion due to other factors, including tax law changes.

HA-4. The percentage of participants covered by a defined-benefit plan is positively related to the state of having ownership publicly held (CUSIP=1) versus closely held (CUSIP=0).

Null form: The coefficient on CUSIP is less than or equal to 0.
Managers of closely-held firms have been found to follow a different strategy from that of publicly-held firms (Trostel and Nichols, 1982). It was expected that publicly-held firms were more likely to have a higher percentage of participants covered by a defined-benefit plan than were closely-held firms.

HA-5. The percentage of participants covered by a defined benefit plan is positively related to an industry-specific economic indicator.

Null form: The coefficient of INDSTRNG will be less than or equal to 0.

The performance of the economy was expected to exert a strong influence on firms' choice of retirement plan offerings. A growing economy would generally foster defined-benefit plan growth and a shrinking economy would likely inhibit defined-benefit plan growth.

**Pre-existing Trend Models**

Before a change in trend was discernable, confirmation of any existing trend was needed. It was important that any discovery of a post-86 decrease in defined-benefit coverage first account for the pre-existing trend.

HA-6. The percentage of participants covered by a defined benefit plan is related to the time dummies for 1984-1990.

Null form: The coefficients on the six time dummies for 1984-1990 are all simultaneously equal to 0.

A trend away from defined-benefit plans has purportedly existed since before the 1974 passage of ERISA. After controlling for the effects of size, industry, union status,
and public ownership, it was still expected that time would have a strong influence over the six year period. A general decline in the percentage of firm participants in a defined-benefit plan was likely to have existed over the entire seven year period.

HA-7. The coefficients on the 1984-1986 time dummies are greater than the coefficients on the 1987-1990 time dummies.

Null Form The coefficients on the 1984-1986 time dummies are less than or equal to the coefficients on the 1987-1990 time dummies.

The post-86 time dummies were expected to show a different trend from that existing in the pre-86 period. This would lend support to the general hypothesis that the 1986 and 1987 legislation impacted firms' decisions regarding the defined-benefit to defined-contribution switch.

**Multinomial LOGIT Models**

Some firms, when faced with the integration-inhibiting provisions of the Tax Reform Act of 1986, would likely terminate their defined-benefit plan(s) rather than include the required amount of non-highly compensated participants. Firms strongly committed to defined-benefit plans might expand their defined-benefit plan coverage to include the requisite non-highly compensated participants. These two movements could confound each other in the time-series panel-data models. To further examine the effect of the 1986 and 1987 legislation, a second regression was proposed.
The sample for the Multinominal LOGIT model will be the firms that had an existing plan in 1985 (Table 14) or 1984 (Table 16) and had a defined-benefit plan sometime during 1984-1989. There were three dependent variables signifying three states: (1) kept the defined-benefit plan essentially intact until the end of the six year period, (2) terminated the pre-existing defined-benefit plan, but replaced it with a defined-contribution plan, or (3) terminated the defined-benefit plan and did not institute another plan.

The first three independent measures were the same as the first three for the prior regression: size, industry code, and union status. Thus, the first hypothesis, consistent with existing research relative to equation B, was as follows:

HB-1a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the SIZE variable (Log of total employees).

HB-1b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the SIZE variable.

Null form: The coefficient of SIZE is less than or equal to 0.

It was anticipated that firms within the same industry will have the same degree of preference for defined-benefit plans. Therefore, firms within the industry should have the same degree of preference for replacing with a defined-
contribution plan upon a defined-benefit plan termination. The LOGIT regression was able to utilize an expanded set (eight) of SIC codes because LIMDEP personal computing processing capability did not pose limitations on this non-panel data set.

HB-2a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the INDCODE variable.

HB-2b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the INDCODE variable.

Null form: The coefficient of INDCODE is less than or equal to 0.

Unions have a strong preference for defined-benefit plans. Some commentators infer there is something of a collusion between a firm’s management and their union to promise unfunded benefits with the Pension Benefit Guaranty Corporation being the intended ultimate payor (Yoder, 1992, Ippolito, 1989). It was expected that the presence of unions would decrease the probability of plan termination, and, given the existence of a plan termination, would influence the replacement of a terminated defined-benefit plan with a defined-contribution plan.

HB-3a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the PCUNION variable.

HB-3b. Given that a defined-benefit plan existed before 1989 and that it was terminated by
1989, the continued existence of a defined-contribution plan in 1989 is positively related to the PCUNION variable.

Null form: The coefficient of PCUNION is less than or equal to 0.

Additional variables were posited as predisposing a firm to deleterious effects from the 1986 and 1987 legislation. The question of interest was "How did these firms react to tax-induced stressors, given the degree of change required?" Essentially, this regression attempted to determine whether the firms expanded their offerings to the non-highly compensated, as was the intent of the legislation, or removed the defined-benefit retirement option completely.

The fourth independent measure was a 0,1 dummy variable indicating a plan's top-heavy status in 1985. A top-heavy plan was one for which the present value of accrued benefits for highly compensated employees exceeded 60% of the present value of the plan's total accrued benefits. It could be that a top-heavy plan would suffer more from the 1986 TRA's equity and fairness emphasis. On the other hand, a top-heavy plan had a greater percentage of benefits going to the highly compensated, so there might be more emphasis placed on maintaining the plan.

HB-4a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the TOPHEAVY variable.
HB-4b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the TOPHEAVY variable.

Null form: The coefficient of TOPHEAVY is equal to 0.

The fifth independent measure was a 0,1 dummy variable indicating plans which were integrated as of the first plan year. Integrated plans provided a proportionately higher benefit to highly compensated participants than to non-highly compensated participants due to inclusion of projected social security benefits into the plan’s benefit formula. The Tax Reform Act of 1986 severely restricted the integration options. As with top-heavy plans, there could be pressure to terminate the plan due to necessary changes, or there could be pressure to keep the plan because it disproportionally benefitted the decision-makers.

HB-5a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the INTEGRAT variable.

HB-5b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the INTEGRAT variable.

Null form: The coefficient of INTEGRAT is equal to 0.

The sixth independent measure was the presence of a funding waiver request at any time during 1984-1990. If a firm was having difficulty meeting the required minimum funding payments, management might apply for a funding
waiver due to difficult financial circumstances. Controlling for firms having filed a funding waiver controlled for firms canceling the defined-benefit plan due to business reverses instead of the legislation.

HB-6a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the FUNDDEF variable.

HB-6b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the FUNDDEF variable.

Null form: The coefficient of FUNDDEF is equal to 0.

The seventh independent measure was the maximum amount of overfunding per participant a plan experienced during the 1984 through 1990 period. The full funding limitation of the Revenue Reconciliation Act of 1987 was expected to exert a strong influence on the plans that had historically been overfunded. The overfunded status could have been due to a desire to maximize the tax deduction, create a slush fund, or to fund for projected benefit obligations. On the one hand, overfunding could pre-dispose a firm to termination since the level of permissible overfunding was curtailed and the ability to transfer plan assets to the firm severely penalized. On the other hand, a firm overfunding its defined-benefit plan could be viewed as a firm committed to a defined-benefit plan. Either way, the 1986 and 1987 legislation altered the options available for overfunding.
In addition, the presence of an overfunded plan has been viewed as a takeover target. Management might choose to terminate the plan to eliminate this attraction. However, the Tax Reform Act of 1986 penalty for asset reversions to sponsoring firms and the further restrictions in the Revenue Act of 1987 on reversions curtailed significantly the risk of overfunded plans attracting takeover activity.

HB-7a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the MXNTOVPP variable.

HB-7b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXNTOVPP variable.

Null form: The coefficient of MXNTOVPP is equal to 0.

The eighth independent measure was the maximum amount of underfunding per participant. A firm could underfund as a motivator for employees, e.g., employees might perceive a need to be more productive in order for the firm to continue to be in existence to fund their retirement because the requisite funds were not residing in the plan. A firm in financial trouble might be more likely to terminate its defined-benefit plan because it would not wish to have the liabilities shown on the balance sheet. In addition, the employees would be less likely to be willing to forgo
current compensation for future pension promises if the future of the firm was uncertain.

HB-8a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the MXNTUNPP variable.

HB-8b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXUNFDPP variable.

Null form: The coefficient of MXUNFDPP is equal to 0.

The ninth independent measure was the change in retirement age. Both the 1986 and the 1987 legislation narrowed the parameters of allowable retirement age, leaving the firms much less room to manipulate the current year's deduction. After the Tax Reform Act of 1986, early retirement could not be set at younger than age fifty-five. It is assumed that plans funding for a much earlier retirement would be more likely to terminate the defined-benefit plan and less likely to replace with another defined-benefit plan.

HB-9a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the CHGRTAGE variable.

HB-9b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the CHGRTAGE variable.

Null form: The coefficient of CHGRTAGE is equal to 0.
Most pre-1986 plans had to be amended to comply with the Tax Reform Act of 1986. For the defined-benefit plans covering only a subset of the participants, it might be in those participants' best interests to terminate the plan (with the plan assets transferred to the participants IRA's or frozen to benefit the named participants) and to set up a new plan (defined-benefit or defined-contribution) to cover a much broader group of participants. Therefore, it is expected that firms that cover only a subset of their otherwise eligible participants in a defined-benefit plan would be strongly impacted by the Tax Reform Act of 1986.
CHAPTER III

RESEARCH METHODOLOGY

In order to measure the impact of specific legislation at a given point in time, it was necessary to track individual firms through time to determine their reaction to specific changes. Existing research has attempted to quantify the impact of continuously constricting pension legislation by performing isolated cross-sectional regressions at different points in time. There was a tendency for newer (smaller) firms to have only defined-contribution plans and for older, more established firms to have defined-benefit plans. A trend also existed for service firms to have defined-contribution plans and manufacturing firms to have defined-benefit plans.

Jobs have been shifting from manufacturing to service industries and from larger to smaller firms. These shifts in the economy have a tremendous effect on plan choice. Any research endeavoring to determine shifts in preferences due to legislation requires a time-series panel data approach. Because the research question is in essence a panel-data question, a panel-data method was used for this study.
The statistical package LIMDEP by William H. Greene was used to formulate panel-data time-series and LOGIT regressions using various explanatory variables. Kennedy (1992, p. 234) rated LIMDEP as the best computer package for estimation in the context of qualitative and limited dependent variables.

In order to tie this study to existing research it was necessary to use explanatory variables that do not vary over time (industry code, for example) for the panel-data time-series models. This required the use of the random effects model rather than the fixed effects model. The fixed effects model cannot handle explanatory variables with zero variance across time for any cross-sectional member. Further, the population of firms was sufficiently large to exceed the capacity of the LIMDEP personal computer system so that random subsamples had to be drawn for the regressions. The random effects model is more appropriate when inference is to be made from a random subsample of a population (Kennedy, p. 222).

The results from fixed effects model regressions are also presented in Tables 4A, 6A and 8A. In the case where neither the fixed nor the random effects model was appropriate, the instrumental variables model would have to be considered. However, no instrumental variable was found to replace the effects of industry status. In order to test the appropriateness of the random effects model for this
study, a Hausman test for correlation between the error term and the exogenous variables was calculated for a model deleting the time-invariant SIC codes and the CUSIP variable (Tables 4A, 6A and 8A). This reduced model produced a Hausman of 159.297 (p=0.000) for the one-way stratification model for the random sample of the entire population illustrated in Table 4 and 4A. This indicated that the random effects model was appropriate.

For the population of firms that had 0<PCDBPART<1 for 1984 (Tables 8 and 8A), the Hausman produced a 7.77514 (p=.100171) for the one-way stratification. For the population of firms that had PCDBPART=1 (Tables 6 and 6A) for 1984, the Hausman was 13.01616 (p=.011197) for the one-way stratification. The fixed effects models resulted in a significantly higher R squared and adjusted R squared.

Tables 4, 4A, 6, 6A, 8 and 8A present the random effects and the fixed effects models.

An appropriate test for homoskedasticity is the Lagrange multiplier test, also known as the Breusch-Pagan test. It is based on the idea that if the hypothesis of homoskedasticity is true, the ordinary least squares estimates of the regression coefficients should not differ significantly from the maximum likelihood estimates that allow for possible heteroskedasticity. As the Lagrange multipliers given in Table 4,6, and 8 show, the random effects models pass the test for heteroskedasticity.
Kmenta (1986, p. 491) identified the Lagrange Multiplier test as asymptotically equivalent to the Likelihood Ratio Test and the Wald test. He cautioned that these tests are intended to be used in large samples. This study utilizes random samples of over 3000 firms, for up to six years' data, resulting in over 15,000 observations per regression. Thus, it was assumed that the Lagrange Multiplier Test was appropriate for this study.

It was originally hoped that the entire population could be regressed over the six-year period. However, the personal computer version of LIMDEP would not accommodate a sample the size of the population (up to 30,000 firms for six years) and the mainframe version of LIMDEP was not available. Therefore, repeated random samples were run to determine the effect of sampling error. The unreported results were consistent with the random samples presented herein.

It was also hoped that 1990 could be included in the regressions. However, in the multinomial Logit data format used in this study, missing observations connote information. The 1990 data available from the Department of Labor was not complete, and the missing observations due to an incomplete data tape would be interpreted by the system as missing observations due to no-longer-existing plans. Therefore, the 1990 observations were not included.
The original intention was also to include numerous interactive terms in the time-series equation so that differential reactions to the 1986 and 1987 legislation could be measured. However, these interactive terms had to be dropped due to two difficulties. First, the personal computer LIMDEP package has a limited number of available data cells. Doubling the number of variables required halving the number of sample observations. It was determined that the larger sample would yield more information than would the interactive terms. Second, the interactive terms had a variance that was not independent of the underlying main effect terms, causing a correlation between the error and the regressors that the random effects model could not handle.

It was also hoped that the effects of administration costs could be included in this study. The popular press often claims that defined-benefit plans are being terminated due to the increasing administrative costs resulting from continuous required amendments to meet legislative changes. An average of administrative costs per year was to be substituted for administrative costs, since the decision to terminate and administrative costs are confounded due to administrative costs being unusually large in the year of termination. However, it was discovered that many firms do not pay their own administrative costs but instead pay them out of the corporation's funds in order to get a tax
deduction for both the administration fees and the qualified plan contribution. The existence of the data for any given firm was thus too inconsistent to make any conclusion from the analysis of administrative costs.

**Description of the Data**

The data was extracted off tapes purchased from the Pension Benefit Guaranty Corporation, who obtained them from the Department of Labor. Each year was provided separately, with the firms' information on each plan offered as a separate observation. Thus, if a firm had fifteen plans, it appeared as fifteen complete observations. The firms were arranged in numerical ascending order of the employer identification number. Because each state has the same first two digits for the identification number, the states were grouped together. The data was recorded as a continuous string of numbers or letters, with no spaces or markers identifying the position of either the fields or the firms.

COBOL programs were utilized to extract the fields of information needed from the over 2,000 fields for each plan recorded on the tapes. Equivalent information from different years resided in different fields on the tapes, often in different formats. Thus, different programs were needed for different years. In addition, COBOL programs were used to condense the multiple observations for a firm into one line of data per year. A COBOL program provided
the linkage from year to year to convert the data matrix into panel data format, whereby each year for a given firm existed as a separate line in the data table. Lastly, a COBOL program was utilized as a random number generator to produce random samples of a given year's employer identification numbers. These COBOL programs were provided in the appendix.

It was necessary to collapse the multiple observations for a given firm into one line of data before the regressions could be attempted. It was common for a given person to be in more than one defined-contribution plan (for instance, a profit sharing plan maintained separately from an ESOP). Thus, it appeared unwise to add the defined-contribution participants to arrive at a defined-contribution participant total. I considered the total participants in the largest defined-contribution plan to be the defined-contribution participants.

It appears uncommon for a given person to be simultaneously a participant in more than one active defined-benefit plan. However, it was unwise to add the defined-benefits participants together because some of the defined-benefit plans were frozen and new defined-benefit plans added, with any given participant included in both. Therefore, I similarly used the total participants in the largest defined-benefit plan as the defined-benefit
participiants. These two values were ultimately used in the calculation of a ratio.

In order to collapse the multiple plans into one line of data, the largest defined-benefit and the largest defined-contribution plan(s) were isolated as described above. The total number of participants (TOTPART) was determined to be the largest of the number of participants of the two plans. The number of defined-benefit participants (DBPART) was divided by TOTPART to obtain the percentage of defined-benefit coverage (PCDBPART) inside the LIMDEP program. PCDBPART became the dependent variable for the panel data time-series regressions. The value for total employees (TOTEES) was determined to be the largest number of employees reported for any plan of a given firm. Each 5500 requested the total employee information.

The determination of largest plan was made independently from year-to-year. If a firm froze certain plans and instituted replacement plans, the program selected only the plan with the largest number of participants for that year.

The first step in either regression was to choose the year for the underlying random sample generation. Thus, if a random sample from the 1985 year was obtained, and a firm did not file a 1985 5500 (DB or DC), that firm could not be in the random sample and would not be in the resulting data set, even though it may have had a plan in some other year.
during the six year period under study. After the random sample was obtained from a given year, another COBOL program searched through the six years to find the information from that employer identification number’s data for each year.

For the panel-data, time-series study, a problem occurred when firms dropped out of and back into reporting status. Many firms had more than one employer identification number due to operating separate lines of business, consolidations, or spin-offs. They have been legally allowed to use any of a group of employer identification numbers assigned to them.

Hsiao (1992, p.197) suggested treating randomly missing data in a time-series observation in the same manner as rotating samples are often handled. However, I omitted the firms that dropped out-and-back-in for two reasons. One, because the penalty for non-reporting is quite punitive ($25 per day per plan), I found it unlikely that many firms intentionally missed reporting for a given year. Two, there were a number of firms with only one yearly observation. I found it equally unlikely that a firm would go to the expense of implementing a plan and then keep it open for only one year. It usually takes more than one reporting period to terminate a plan, in any case. Therefore, I reasoned that the firms with a gap in their reporting were probably the same firms that showed only one year’s report, but I have no way to match them up. I thus dropped both the
firms with one year's data and the firms with out-and-back-in reporting. Charles Boynton, the chair of my committee, found in his work with the Office of Tax Analysis of the United States Department of the Treasury that firms often intentionally report shifting employer identification numbers, perhaps in the belief it makes tax audits more difficult.

Because I wanted the population studied by the LOGIT regression to mirror the population examined by random samples in the panel data regressions, I also dropped the firms from the LOGIT regression if they reported for only one year or dropped out and back in again. Both regressions included firms that started plans after 1984 (if they filed a 5500 in the year of the underlying random sample) and also included firms that dropped out and stayed out. LIMDEP required a special algorithm to create a variable to instruct the system concerning the number of observations each firm possessed. With this variable, LIMDEP was able to handle the unbalanced matrix.

The data for the LOGIT regression was obtained by first obtaining the entire set of employer identification numbers for the specified year (in this study, 1985), and deleting the firms that either dropped out and back in or had only one observation. Then, the program searched that firm's panel data observation for 1984 for defined-benefit participants. If it found one in 1984, 1984 became the
first year of defined-benefit participation. If it did not find a defined-benefit participant in 1984, the program searched 1985-1989 for a defined-benefit participant. The first year the program discovered a defined-benefit participant is the first year of defined-benefit coverage. Most of the data for the LOGIT regression came from the first year of defined-benefit coverage; there was only one line of data per firm. This matrix configuration enabled the examination of the entire population in spite of the PC version’s size limitations.

The values for defined-benefit participants, total employees, total participants, top-heavy indicator, integrated indicator, union percentage, and first retirement age were determined as of the first year of defined-benefit participation. These values did not change over time for the LOGIT regression. The values that did change due to new information were retirement age, maximum overfunding, and maximum underfunding. If a firm did not have defined-benefit participants during any of the six years under study, it was dropped from the LOGIT data set.

Description of the Variables

The dependent variable for the panel-data time-series regression was the percentage of defined-benefit participants divided by total participants (PCDBPART). It ranged in value from 0 (no defined-benefit plan) to 1 (a
defined-benefit plan as large as any existing defined-contribution plan).

The first independent variable was SIZE, measured as the natural log of the total number of employees. The panel data regression used a different SIZE for each year, while the LOGIT regression used the SIZE for the first year of defined-benefit participation.

The second explanatory measure was dummy variables indicating one-digit SIC industry codes. These codes could not be used in a fixed effects model specification because the variance would be absorbed into the unique intercepts. Due to the significance of industry to this study, the random effects model was used. The panel data model used four codes for five industry groupings (manufacturing was the reference) while the LOGIT group used eight with manufacturing as the reference. Both models used whatever the first year's code was for the entire period; any changes in SIC code were not recorded. In my estimation, the five codes used in the panel data model captured the significance of industry, and doubling the codes would require reducing the sample size.

The third measure represented union concentration. Prior population research coded this variable as a 0,1 dummy variable with a 0 indicating no collectively bargained plans and a 1 indicating at least one plan subject to collective bargaining. This research used the ratio of collectively
bargained plan participants divided by the number of total participants in all plans. Therefore, this research used a percentage-of-union-participants measure rather than the 0,1 convention found in prior research.

The fourth measure was a 0,1 dummy variable indicating whether or not an employer had a CUSIP designation. This information became available on the form 5500's during years subsequent to the previous research. The CUSIP designation was assumed to be a surrogate for publicly held versus closely held. A publicly held firm should have had a CUSIP number while a closely held firm should not. This information indicated existing differences between the reaction to the legislation of closely held versus publicly held employers. My interest in the CUSIP variable (having no year-to-year variance) was another reason the random effects model was selected.

The influence of the general economy was a likely factor in employers' decisions regarding what type of retirement plan to offer. In order to measure the general health of an industry, the natural log of the total number of employees for all firms inside the given firm's two-digit industry code was used.

A (0,1) dummy variable was used to indicate pre- and post-86. The final variables were five time dummies for the six years 1984 through 1989. These variables' coefficients
indicated the extent of the trends in decreasing defined-benefit coverage during the six year period.
CHAPTER IV

RESEARCH FINDINGS

The findings of this research confirmed prior studies' conclusion that a pre-existing downward trend in the prevalence of defined-benefit plans existed during the 1984 to 1989 period under study. Research results suggested that the 1986 and 1987 legislative environment appeared to have had a short-term accelerating impact on this downward trend. This study confirmed the significance of industry classification and the presence of unionized participants, and made a unique contribution by discerning the influence of integrated status, widely dispersed ownership (CUSIP), and the insignificance of SIZE on the termination decision for the subset of firms already sponsoring a defined-benefit plan. These findings were possible due to the tracing of individual firms through the six year period via a panel-data time-series approach.

Overview of Results Tables

Table 4 (4A), Table 5 (6A), and Table 8 (8A) summarize the findings of three different samples using three different regression algorithms. Table 4 represents the findings from a random sample of 3622 firms drawn from the
population of 1984 5500 filers. The data from six years was collected for these firms, for a total of 18652 individual observations. Three different regressions were then performed on this panel data set: OLS, one way random effects, and two way random effects. For Table 4A, three different regressions were performed on this panel data set using the fixed effects model.

Tables 6 (6A) and 8 (8A) resulted from reducing the population of all firms filing 5500's into the subpopulation of firms having at least one defined-benefit participant in 1984. Table 6 (6A) reports the results obtained by regressing a random sample of 3012 firms drawn from the population of firms that had a 1984 defined-benefit plan as large or larger than any then-existing defined-contribution plan (PCDBPART=1). The same three regressions as above were performed. Table 8 (8A) reports on the regressions performed on the 1662 firms making up the population of firms reporting for 1984 with defined-benefit participants greater than zero but less than the maximum number of defined-contribution plan participants (0<PCDBPART<1).

Tables 5, 7, and 9 provide the relevant descriptive statistics for Tables 4, 6, and 8.

Table 10 compares the results of OLS regressions using alternative forms of time dummies using the same random sample of the entire population as Table 3. Tables 4-10 suggest a change in 1986 and 1987 in the percent of pension
plan participants covered by a defined-benefit plan.  

Tables 11, 12, and 13 are summary statistics of the population of 1985 filers, stratified in various ways. The intent of these tables was to illustrate some characteristics of the 1985 defined-benefit-reporting population.

Tables 14 and 16 report the marginal effects of two LOGIT regressions on the population to determine what attributes of a given plan were correlated with the firm's decision to terminate or continue the defined-benefit plan. Further evidence of an impact from the 1986 and 1987 legislation was demonstrated if the decision appeared to have been influenced by characteristics adversely impacted by the legislation.

**Summary of Results**

Table 4 illustrates the comparative strength of the panel data stratification relative to the simple pooled OLS format. The negative coefficient for the post-86 variable confirmed that the three years after 1986 had a lower percentage of defined-benefit participation than did the three years prior to and including 1986. I also performed separate OLS regressions using a post 1985, a post 1987, and a post 1988 variable in place of the post 1986 variable. The post 1986 variable had the strongest t-value of the four, using the same sample and other explanatory variables.

The essence of the results of the two-way
stratification in Table 4 was that even after holding firm and year effect constant and controlling for firm size, industry, unionization, and dispersion of ownership, there remained a seven-percentage-point drop in the percentage of defined-benefit participants relative to total participants in the post-86 era relative to the pre-86 period. Industry strength appeared to be significant in the OLS results, but was found through the stratification process to be insignificant.

Table 6 reports on the sample of firms that maintained a defined-benefit plan covering all eligible participants in 1984. The impact of the post-86 period after a two-way stratification revealed a 5.57% decline with a higher p value (.05 versus .001). It was predictable that the firms most committed to defined-benefit plans (illustrated by their 1984 coverage of 100% of eligible participants) would be less affected by the equity-enhancing provisions of the 1986 Act.

Table 8 reports the regressions for the sample of firms having 1984 defined-benefit participation, but at a level less than that for defined-contribution participation. Again, the stratification process exposed industry strength as a poor indicator of changes in the level of PCDBPART. One interesting result of this analysis was that the size coefficient was again small, negative, and insignificant for all three regressions. A priori, I expected that large
firms would be more likely to keep their defined-benefit plan (with the expanded required coverage) than would small firms. However, it appeared that large firms were equally as likely to terminate a defined-benefit plan as were smaller firms.

Table 10 is an analysis of comparative OLS regressions run on the random sample of the entire population. The purpose of Table 10 was to illustrate that the years 1986 and 1987 were very different from the two before and the two after. Thus, the decreases in defined-benefit coverage appear not to be attributable solely to the pre-existing trend. The OLS regression isolating each year separately had no more explanatory power than did a regression combining the effects of 84 and 85 or combining the effects of 88 and 89 or both. Therefore, the difference between 1984 and 1985 (relative to 1986) was insignificant compared to the difference between 1985 and 1987 (relative to 1986). In addition, the difference between 1988 and 1989 (relative to 1986) was insignificant when compared to the difference between 1987 and 1988.

Table 11 presents the 1985 defined-benefit plan population in cross-tabular format. It highlights the impact of union participation, integration, and number of plan participants. When the percentage of union participation dropped to zero, the percentage of firms
keeping their defined-benefit plan until 1989 greatly decreased.

However, the percentages for the firms with partial union coverage did not differ greatly from the firms with total union coverage. Therefore, the convention used in prior research (0 for no union coverage, 1 for any union coverage) appeared to adequately account for union influence.

As the total number of participants decreased, the likelihood of continuing defined-benefit coverage also appeared to decline. However, the regressions indicated that plan size could be confounded with integration. For all categories, an integrated plan was more likely to be maintained than was a non-integrated plan.

Table 12 stratifies the population of 1985 reporting plans into levels based on the total number of participants in the firm’s largest plan. The vast majority of firms in this population were under 1000-participant plans. Therefore, this study’s underlying population was skewed toward the smaller plan. As the number of participants rose, the mean of union participation rose, the percentage coverage in a defined-benefit plan fell, the percentage of integration provisions rose, and the percentage of firms keeping their defined-benefit plan rose.

Table 13 stratifies the population of 1985 filers into three groups: those keeping a defined-benefit plan, those
replacing with a defined-contribution plan, and those
terminating qualified plans altogether. As expected, the
mean union participation level was much higher for the firms
keeping their defined-benefit plan.

Size, however, was dispersed fairly evenly throughout
the three groups. The average integration level was higher
for the firms keeping their plan than for the ones switching
to a defined-contribution plan or terminating plan coverage.
The average maximum net overfunding per participant was
higher and the average maximum net underfunding per
participant was lower for the firms keeping their defined-
benefit plan. The percentage of total employees covered by
a plan was higher for the two groups keeping a qualified
plan than for the group discontinuing plan coverage. Table
13 concludes with the information that of the defined-
benefit participants included in this analysis, 68.03% did
not have their defined-benefit plan terminated, 15.60% had
their defined-benefit plan terminated and replaced with a
defined-contribution plan, and 16.37% had coverage
terminated with no replacement by 1989.

Table 14 (16) presents the marginal effects from a
LOGIT regression run on the population of 1985 (1984)
defined-benefit filers. The dependent variable for this
regression was 0 if the defined-benefit plan was maintained
until 1989, 1 if it was replaced by a defined-contribution
plan by 1989, and 2 if it was terminated without any other
qualified plan by 1989. Again, size was not as significant as expected when predicting the firms terminating qualified plan coverage altogether. Union, as expected, exerted a strong influence on the decision. Integrated plans were more likely to be maintained, and all industry codes except tax-exempt/other were less likely to keep the defined-benefit plan than was manufacturing, the reference.

Formal Hypothesis Results

Panel-Data Time-Series Models

HA-1. The percentage of participants covered by a defined benefit plan is positively related to the SIZE variable (Log of total employees).

Null form: The coefficient of SIZE is less than or equal to 0.

At the .001 significance level, I can reject the null hypothesis of SIZE being less than or equal to zero as found in Table 4 with Model 1. When addressing the entire population of qualified plan reporters, the correlation between SIZE and the percentage of participants covered by a defined-benefit plan probably did not happen by chance. This finding was strongly supported by previous research (Clark and McDermot, 1990, Gustman and Steinmeier, 1992).

However, once the population was stratified into the subset containing only firms having a defined-benefit pension plan in 1984, the significance of SIZE evaporated. For a random sample of 3012 firms taken from the population of firms that had a defined-benefit plan with number of
participants greater than or equal to the largest defined-contribution plan in 1984 (Table 6), I must fail to reject the null hypothesis. Any correlation between SIZE and the percentage of defined-benefit participation for this subset of the population probably happened by chance.

Similarly, Table 8 reports a regression performed on the 1662 firms that made up the population (as adjusted) of firms having a defined-benefit plan with the number of defined-benefit participants less than the number of defined-contribution participants in 1984. In other words, firms having a defined-benefit plan that did not cover all participants. For this subset of the population, I must fail to reject the null hypothesis. Any correlation between size and the percentage of defined-benefit participation for this subset of the population probably happened by chance.

In summary, once I know that a firm has a defined-benefit plan in existence in 1984, SIZE tells me nothing about whether or not it will increase or decrease relative participation in defined-benefit plan(s) by 1989. If the information concerning any pre-existing defined-benefit plan was unavailable, SIZE was significant in predicting a positive percentage defined-benefit participation.

HA-2. Industry Code is related to the percentage of participants covered by a defined-benefit plan.

Null form: The coefficients for INDUSTRY CODES are all simultaneously equal to 0.
A joint test of the four regression coefficients (Pindyck and Rubenfeld, p.117) was performed to determine whether or not the industry codes taken together were significant. The SSE from Table 4 was 3835.99. The SSE from this OLS regression without the four industry codes was 3909.93. An F test with 4 and 18647 degrees of freedom yielded 70.41. At the 1% significance level I can reject the null hypothesis of no significance. Thus, the correlation between industry codes and percentage of defined-benefit participation probably did not happen by chance.

An equivalent test was performed on the regressions reported in Table 6 (firms where defined-benefit participation in 1984 was 100%) and Table 8 (firms where defined-benefit participation in 1984 was positive but less than 100%). In both cases, I may reject the null hypothesis of no significance. The correlation between industry and defined-benefit participation appeared not to have happened by chance.

HA-3. The percentage of participants covered by a defined benefit plan is positively related to the degree of union participation in the firm, measured by the number of union participants divided by the total participants.

Null form: The coefficient on PCUNION is less than or equal to zero.

No matter which population or sub-population was examined, or which regression method was used, the existence
of union participants appeared to be the strongest positive influence on the percentage of defined-benefit participation. For a random sample of the entire population of 1984 qualified-plan filers (defined-benefit plus defined-contribution), Table 4 reports a t-value ranging from 30.559 (OLS) to 12.303 (two way random effects). Table 6 (a random sample of the population of plans with 100% DBPART value for 1984) reports a t value ranging from 11.581 (OLS) to 8.081 (two way random effects). Table 8 (the population of plans with 0<DBPART<1 for 1984) reports a t value ranging from 8.238 (OLS) to 4.790 (two way random effects). All regressions resulted in a significance level of .001 or less. The correlation between PCUNION and DBPART probably did not happen by chance.

**HA-4.** The percentage of participants covered by a defined-benefit plan is positively related to the state of having ownership publicly held (CUSIP=1) versus closely held (CUSIP=0).

**Null form:** The coefficient on CUSIP is less than or equal to 0.

For the entire population of reporting firms, the existence of a CUSIP appeared to be positively related to the percentage of defined-benefit coverage. Table 4 reported a t-value of 3.476 at the 95% confidence level for the two-way random effects model. However, Table 6, reporting on a random sample of the population with a 100% defined-benefit participation in 1984, conveys a small
(-.01720 coefficient) negative value (t=-1.747) for CUSIP. Table 8, reporting on the population of firms whose largest defined-benefit plan was smaller than their largest defined-contribution plan in 1984, reports a positive (.03914 coefficient) value for CUSIP (t=2.42, p<.05). Because the regressions produced values with conflicting results regarding CUSIP, prudence dictated attributing any correlation to chance.

HA-5. The percentage of participants covered by a defined benefit plan is positively related to an industry-specific economic indicator.

Null form: The coefficient of INDSTRNG will be less than or equal to 0.

The industry-specific economic indicator used in this study (INDSTRNG) was the log of the total employees for all firms for the year in the firm's two-digit industry code. However, neither the regression on a sample of the entire population (Table 4), the regression on a sample of the population with a defined-benefit plan larger than any defined-contribution plan (Table 6), nor the firms with some defined-benefit participation but less than total DB participation (Table 8) found INDSTRNG significant. Thus, any correlation between INDSTRNG and PCDBPART probably happened by chance.

Pre-Existing Trend Models

HA-6. The percentage of participants covered by a defined benefit plan is related to the time dummies for 1984-1990.
Null form: The coefficients on the six time dummies for 1984-1990 are all simultaneously equal to 0.

The OLS regression found in Table 10 (a random sample of the entire population) was run without any post-86 or individual time dummies, producing an SSE of 3843.89. When compared with the SSE of 3834.20 for the regression with five time dummies, the resulting F test with 5 and 18651 degrees of freedom produced an F value of 9.42. At the 95% confidence level I may reject the null hypothesis that any correlation between the years and PCDBPART happened by chance. Thus, something was happening to the percentage of defined-benefit participation during this six-year period.

HA-7. The coefficients on the 1984-1986 time dummies are greater than the coefficients on the 1987-1990 time dummies.

Null Form The coefficients on the 1984-1986 time dummies are less than or equal to the coefficients on the 1987-1990 time dummies.

The coefficients on the second regression in Table 10 (reference=1986) show that 1984>1985>1986>1987>1988>1989. Therefore, I can conclude that there was a general downward trend in the percentage of defined-benefit participation over the six-year period.

The last three columns of Table 10 show that the trend during 1984-1989 was not a smooth linear downward slope. When 1984 and 1985 were combined, the difference between the SSE was insignificant (.16) when compared with the regression showing all six years. Therefore, the difference
between 1984 and 1985 has much less impact than the
difference between either and 1986.

Similarly, when 1988 and 1989 were combined, the
difference in SSE (.24) was insignificant when compared with
the regression showing all six years. When both 1984/85 and
1988/89 were combined, the SSE was only .08 different from
that of the individual year regression. The years between
1984 and 1985 appeared to have a gentle downward slope, as
do the years between 1988 and 1989. The period 1986-1987,
in contrast, showed a marked decline in PCDBPART.
Therefore, it appeared that a significant shift occurred

Multinomial LOGIT Models

Table 14 (Table 16) provides the marginal effects
(derivatives) from a multinomial LOGIT regression on the
population of firms with a defined-benefit plan sometime
The dependent variable had three possible values: 0 if the
defined-benefit plan was still in existence in 1989, 1 if
the defined-benefit plan had been terminated and replaced by
a defined-contribution plan by 1989, and 2 if there was no
reporting for any plan by 1989 (termination of all plans was
assumed). This table allows the testing of the LOGIT
regression hypotheses.

HB-1a. Given that a defined-benefit plan existed
before 1989, the 1989 continued existence of
a defined-benefit plan is positively related
to the SIZE variable (Log of total employees).

HB-1b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the SIZE variable.

Null form: The coefficient of SIZE is less than or equal to 0.

As was discovered in the panel data regressions, SIZE did not have the explanatory power it was a priori expected to have. A larger firm appeared to be somewhat more likely to keep its defined-benefit plan, and if the defined-benefit plan was terminated, it was more likely to switch to a defined-contribution plan than to terminate all plans.

A much stronger predictor of whether the firm would terminate the defined-benefit plan or not was the ratio of total participants divided by the total employees (PCTPTEES). A firm with a higher percentage of covered employees appeared to be a firm already committed to its employees going into the 1984-1989 period. For this subset of the population of firms having a defined-benefit plan at some time during 1984-1989, the likelihood of keeping the defined-benefit plan exceeded the likelihood of terminating it. If the plan was terminated, a high value of PCTPTEES predicted the implementation of a replacement defined-contribution plan.

HB-2a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of
a defined-benefit plan is positively related to the INDCODE variable.

HB-2b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the INDCODE variable.

Null form: The coefficient of INDCODE is less than or equal to 0.

The coefficients on the eight industry codes show that four of the eight were significant at the .01 level, one at the .05 level, and two at the .1 level. Thus, I can reject the null hypothesis of no significance. However, every one of the industries except tax-exempt organizations had a negative probability of retaining the defined-benefit plan. The reference was manufacturing, which has historically been the strongest sponsor of defined-benefit plans.

Tax-exempt organizations appeared to be more likely to keep their defined-benefit plans, which lent credence to the position that the 1986 and 1987 tax legislation reduced the prevalence of defined-benefit plans. These firms were less likely to be subject to changes due to the tax legislation. These firms may also have gone into the period with more equitable plans, which would make them less sensitive to the equity-enhancing provisions of TRA 86.

HB-3a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the PCUNION variable.
HB-3b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the PCUNION variable.

Null form: The coefficient of PCUNION is less than or equal to 0.

As found in the panel data regressions, the presence of participants covered by a collective bargaining agreement appeared to strongly predispose a firm toward the decision to keep its defined-benefit plan. The $t$-value for PCUNION was three times that of its nearest competitor (integration). In the rare case where a plan covering unionized participants was terminated, it was twice as likely to be replaced by a defined-contribution plan as it was to be terminated without replacement.

HB-4a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the TOPHEAVY variable.

HB-4b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the TOPHEAVY variable.

Null form: The coefficient of TOPHEAVY is equal to 0.

A top-heavy plan was one that had 60% of its benefits going to officer-employees or the more highly compensated. Perhaps because a top-heavy plan was more impacted by the equity-enhancing provisions of the TRA 86, a top-heavy plan was slightly more likely to be terminated than was a non-top-heavy plan. However, the percentage was insignificant.
On the other hand, given that the plan was terminated, it was much more likely to be replaced by a defined-contribution plan than it was to have no replacement plan. This was perhaps due to affected participants being more apt to be influential in the decision-making process.

HB-5a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the INTEGRAT variable.

HB-5b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the INTEGRAT variable.

Null form: The coefficient of INTEGRAT is equal to 0.

An integrated plan is one that takes social security benefits into account in the plan’s benefit structure. Therefore, a given level of benefit is less expensive to fund (because a portion of social security benefits are counted as part of the benefit) and the employees earning in excess of the social security level receive a higher level of benefit at retirement than do the majority of workers earning less than the maximum social security taxation level. Prior to 1986, firms had much more latitude in determining how much of the social security benefit could be counted as a plan benefit. The TRA 86 severely curtailed firms’ options regarding integration.

rules on social security integration, which permit an employer to eliminate any qualified plan benefits for lower-paid employees, undermine the original Congressional policy for providing the tax incentives for qualified plans."

Presumably, restricting the integration options resulted in a much higher required contribution level for some firms.

Surprisingly, an integrated plan appeared to be remarkably more likely to be continued than was a non-integrated plan. This was perhaps because integrated plans were less expensive and/or because more influential people had a higher stake in ensuring that it continued. If an integrated plan was terminated, it was weakly more likely to be replaced by a defined-contribution plan than to remain unreplaced by any qualified plan.

HB-6a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the FUNDDEF variable.

HB-6b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the FUNDDEF variable.

Null form: The coefficient of FUNDDEF is equal to 0.

A firm suffering from a funding deficiency appeared to be most likely to terminate the defined-benefit plan and not replace it with a defined-contribution plan. The coefficient for termination was significant at the .05 level.
HB-7a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the MXNTOVPP variable.

HB-7b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXNTOVPP variable.

Null form: The coefficient of MXNTOVPP is equal to 0.

An overfunded plan was expected to be unfavorably impacted by the provisions of the 1987 legislation limiting tax-deductible contributions to the actual benefit obligation rather than the projected benefit obligation. However, an overfunded plan appeared to be slightly more likely to be maintained than terminated. Although the t and p values indicated significance, the coefficients were so small that the impact does not appear to be noteworthy.

HB-8a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the MXNTUNPP variable.

HB-8b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXUNFDPP variable.

Null form: The coefficient of MXUNFDPP is equal to 0.

An underfunded plan was perceived to be a public policy problem due in part to the federal insurance program administered by the Pension Guaranty Benefit Corporation. The underfunded plans also appeared to be slightly more likely to be maintained than terminated. Although the
coefficient was about the same on both overfunding and underfunding, the t-value for underfunding was one-half that of overfunding. If an underfunded plan was terminated, it was less likely to be replaced by a defined-contribution plan. Presumably, a firm in such financial distress that it caused the defined-benefit plan to be terminated was unlikely to expend scarce resources to institute a replacement defined-contribution plan.

HB-9a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the CHGRTAGE variable.

HB-9b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the CHGRTAGE variable.

Null form: The coefficient of CHGRTAGE is equal to 0.

The 1986 TRA limited a plan's options regarding permissible retirement ages. Presumably, some firms were manipulating their retirement age so that they could contribute more to the defined-benefit plan to obtain a higher tax deduction in profitable years. It appeared that being forced to change the retirement age did not predispose a firm toward terminating the defined-benefit plan. However, once a plan that had to amend its retirement-age provisions was terminated, it was twice as likely to be replaced by a defined-contribution plan than to be terminated without a replacement. The coefficient on the
replacement by defined-contribution plan was the only one that was significant, however. It did not appear that being required to change the retirement age had a significant effect on the over-100 participant plans.
CHAPTER V

RESEARCH SUMMARY AND CONCLUSIONS

This research provides further evidence on the impact of tax legislation on the provision of qualified retirement plan benefits. Prior population research was extended by using a time-series panel data format. A panel data format enabled the distinction of a decline in the proportion of defined-benefit coverage due to new firms' tendency to sponsor defined-contribution plans from a decline because firms previously providing a defined-benefit plan had discontinued to do so. It was impossible to make this distinction using the research methods of existing cross-section population research.

This research documented that something happened during the 1986-1987 period that resulted in a decrease in the percentage of participants covered by defined-benefit plans. Although there was a pre-existing decreasing trend in defined-benefit coverage during the 1984-1989 period, the period 1986-1987 witnessed a more pronounced decline.

This study found that a large portion of the percentage decline in defined-benefit plan coverage over the entire firm population was due to the proliferation of new defined-
contribution plans coupled with the non-existence of new defined-benefit plans. Firms that did not have a pre-existing defined-benefit plan were not likely to start a new one during the 1984-1989 period.

The tendency for firms to terminate existing defined-benefit plans also contributed to this trend. The 1986 and 1987 legislation was correlated with an approximately seven percent decline in the percentage of participants covered by an existing defined-benefit plan.

Unions appeared to be the strongest influence in determining whether or not an existing defined-benefit plan would be terminated. A firm containing collective bargaining participants was much less likely to terminate its defined-benefit plan. Any new plans started were likely to be for a union shop. This could be due to the obvious explanation that unions force the implementation of a defined-benefit plan, or it could be because unionized workers are less concerned about losing their jobs and are therefore more willing to contract for the promises of future benefits a defined-benefit plan offers. Non-unionized employees may be sufficiently unsure they will still be employed by their current employer at retirement that they are unwilling to contract for these future promises.

The presence of integration with Social Security in the plan benefits formula was the second strongest predictor of
whether a defined-benefit plan would be maintained. An integrated plan benefits those with wages over the Social Security taxable wage ceiling more than those with wages under the Social Security wage ceiling. For the firm, it enables a given targeted benefit formula to require lower contributions and is thus less expensive. However, it was significantly more expensive post-86 than it was pre-86.

Integrated plans may be more likely to survive because they are more congruent with workers' desires. The employees earning wages over the Social Security wage ceiling may value future retirement promises more than current earnings while the employees earning under the Social Security wage ceiling may value current salary increases more than future promises. In any case, integrated plans must be working for someone, because they were much more likely to survive the 1984-1989 period.

One contribution of this research was to validate assumptions made in prior research. The weakness of the CUSIP variable indicated that the research applicable to COMPUSTAT-sample research (widely held firms) was generalizable to the broader population. The similarity between the reactions of firms having 100% union participants and union participation positive but less than 100% validated the existing research employing a 0,1 variable for the presence of unions. The lack of difference between the reactions of those that have 100% defined-
benefit coverage and some but less than 100% defined-benefit coverage validated the convention used in existing research of a 0,1 variable for no DB, DB coverage.

Limitations of the Research

This research did not explicitly determine causation. Because many tax influences occurred during the decade of the 1980s it was impossible to partial out all extraneous factors.

In addition, there were so many tax laws passed with staggered effective dates during the 1980s that it was impossible to determine what the reaction was to any one piece of legislation. This is another argument for spacing apart any legislation regulating qualified plans; it is impossible to ascertain the effect of the last alteration before the next one is promulgated. In effect, the United States is driving blind on an issue that is crucial to its citizens' future financial security.

A limitation to the public policy generalizability is that only plans of larger employers (more than 100 participants) were examined. The retirement benefits for the employees of smaller employers (less than 100 participants) were not considered. However, a significant proportion of the nation's workforce was employed by smaller employers.

Of the over-100 participant plans reported in this study, the majority of them cover under 1000 participants.
Because each unique employer identification number was equally weighted, a small firm (under 1000 participants) carried as much impact as did a Fortune-100 multinational.

A further limitation of the study was that change in vesting is not addressed, although it was among the important changes in the 1986 Tax Act. The 5500 forms for 1984-1989 did not give adequate information to track vesting changes over time. There likely were many defined-benefit plans that had 100% cliff vesting at the end of ten years (e.g., 0% vesting until the end of the tenth year). This was no longer allowed post-TRA 86, and a measurement of the strength of the effect of this provision on the plan termination decision would be quite informative.

Suggestions for Future Research

If in fact defined-contribution plans are to be the only option in the retirement landscape of the future, workers need to begin saving for retirement at a much younger age. Defined-contribution plans can provide retirement pensions equivalent to those of defined-benefit plans, but the savings needs to be 10%-15% of salaries over a thirty-five year period (Smalhout, 1993, p. A18). Lump-sum terminations prior to retirement should be added to tax-deferred retirement accounts. Research discerning the tendency of employees to contribute to participatory defined-contribution plans and to rollover termination distributions is needed.
There appears to be a trend toward transferring the responsibility for funding retirement onto the employee's shoulders through matched or unmatched 401(k) plans. Documentation of this tendency by examining the time-series trend of employee contributions as a percent of total contributions and the amount of employer contribution per participant would provide information on the extent of this phenomenon.

Because legislation attempting to curb unfair discrimination results in the discontinuance of some defined-benefit plans, while a significant number of others are discontinued for some other reason, and most existing 401(k) plans will not provide for adequate additional retirement income, research on alternative proposals is indicated. The issue of portability of plan benefits is especially timely. If workforce trends have shifted to the extent that few workers will stay with any one firm for more than five years at a time, perhaps a system of employers funding expanded individual IRA-type accounts is the solution. Possibly some other form of government program should be considered.

A quantification of the impact on job mobility of the defined-benefit to defined-contribution switch is lacking. Because job mobility affects an employee's future earnings profile, and a defined-contribution plan presumably makes employees more mobile, the effect of a switch on job
mobility (and thus earnings) would assist in the public policy debate.

Research on the vehicles used for asset investment in qualified plans is also needed. There appears to be a trend in participant-directed 401(k) plans of investing disproportionately in fixed income investments rather than equities (Damato, January 8, 1993 WSJ, p. C1). Population research could document the extent of this trend. Assuming that it is widespread, case study research is needed to determine how firms are educating their workforce concerning the importance of personal savings for retirement and prudent investment of plan assets in the face of inflation.

Survey research could also be used to determine the extent of resources invested in employee education concerning retirement issues in firms with a 401(k) plan emphasis. Survey research could examine the extent of firms’ hesitation in investment direction due to fear of litigation under the fiduciary standards of ERISA. It is possible that one impetus for the growth of 401(k) participant-directed accounts is that employers are concerned about the risk of litigation under ERISA fiduciary standards.

Population research could also attempt to determine the relative administrative cost of participant-directed 401(k) plans versus defined-benefit plans. It is conceivable that the most expensive plan to administer is a participant-
directed 401(k) with numerous investment options. However, as noted in this study, the reporting of administrative costs is not uniformly practiced.

A final public policy question of interest is whether firms with defined-benefit plans are more likely to discriminate against hiring workers who are over the age of 45. Because firms are now unable to exclude workers from plans due to age, and defined-benefit contributions for employees over the age of 45 are much higher than are contributions for employees under the age of 45, firms with defined-benefit plans may strongly prefer younger workers.
APPENDIX A

TABLES
TABLE 1

Regression Models

1. [Tables 4, 6 and 8]

\[
PCDBPART_{it} = B_{oi} + B_1 SIZE_{it} + B_2 OTHER_{it} + B_3 TRADE_{it} + B_4 \text{SERVICE}_{it} + B_5 \text{FININRE}_{it} + B_6 PCUNION_{it} + B_7 \text{INDSTRNG}_{it} + B_8 \text{CUSIP}_{it} + B_9 \text{POST86}_{it}
\]

2. [Tables 4A, 6A and 8A]

\[
PCDBPART_{it} = B_{oi} + B_1 SIZE_{it} + B_2 PCUNION_{it} + B_3 \text{INDSTRNG}_{it} + B_4 \text{POST86}_{it}
\]

3. [Table 10]

\[
PCDBPART_{it} = B_{oi} + B_1 SIZE_{it} + B_2 OTHER_{it} + B_3 TRADE_{it} + B_4 \text{SERVICE}_{it} + B_5 \text{FININRE}_{it} + B_6 PCUNION_{it} + B_7 \text{INDSTRNG}_{it} + B_8 \text{CUSIP}_{it} + B_9 1984_{it} + B_{10} 1985_{it} + B_{11} 1987_{it} + B_{12} 1988_{it} + B_{13} 1989_{it}
\]

4. [Table 10]

\[
PCDBPART_{it} = B_{oi} + B_1 SIZE_{it} + B_2 OTHER_{it} + B_3 TRADE_{it} + B_4 \text{SERVICE}_{it} + B_5 \text{FININRE}_{it} + B_6 PCUNION_{it} + B_7 \text{INDSTRNG}_{it} + B_8 \text{CUSIP}_{it} + B_9 1984/85_{it} + B_{10} 1987_{it} + B_{11} 1988_{it} + B_{12} 1989_{it}
\]

5. [Table 10]

\[
PCDBPART_{it} = B_{oi} + B_1 SIZE_{it} + B_2 OTHER_{it} + B_3 TRADE_{it} + B_4 \text{SERVICE}_{it} + B_5 \text{FININRE}_{it} + B_6 PCUNION_{it} + B_7 \text{INDSTRNG}_{it} + B_8 \text{CUSIP}_{it} + B_9 1984/85_{it} + B_{10} 1987_{it} + B_{11} 1988/89_{it}
\]

6. [Table 14 and 16]

\[
DBSTATUS_i = B_{oi} + B_1 SIZE_i + B_2 PCTPTEES_i + B_3 AGFRFS_i + B_4 MINCON_i + B_5 \text{TRCMUTIL}_i + B_6 \text{WSTRADE}_i + B_7 \text{FININRE}_i + B_8 \text{SERV}_i + B_9 \text{MDHRSR}_i + B_{10} \text{TXEXOR}_i + B_{11} \text{PCUNION}_i + B_{12} \text{TOPHEAVY}_i + B_{13} \text{INTEGRAT}_i + B_{14} \text{MXNTOVPP}_i + B_{15} \text{MXNTUNPP}_i + B_{16} \text{FUNDDEF}_i + B_{17} \text{CHGRTAGE}_i
\]

WHERE:

- DBSTATUS_i = 0 IF PERMDB
- DBSTATUS_i = 1 IF DBTODC
- DBSTATUS_i = 2 IF DBTONULL

SIC Code Reference: Manufacturing [All Models and Tables]

Year Reference: 1986 [Models 2-4, Table 10]
TABLE 2
Summary of Population and Sample Definition

### Populations

<table>
<thead>
<tr>
<th>YEAR</th>
<th>PCDBPART = 1</th>
<th>0&lt; PCDBPART &lt; 1</th>
<th>PCDBPART = 0</th>
<th>TOTAL FIRMS FILING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>12864</td>
<td>1892</td>
<td>10302</td>
<td>25058</td>
</tr>
<tr>
<td>1985</td>
<td>12785</td>
<td>1997</td>
<td>11821</td>
<td>26603</td>
</tr>
<tr>
<td>1986</td>
<td>12456</td>
<td>2027</td>
<td>12987</td>
<td>27470</td>
</tr>
<tr>
<td>1987</td>
<td>10879</td>
<td>1721</td>
<td>12765</td>
<td>25365</td>
</tr>
<tr>
<td>1988</td>
<td>11743</td>
<td>1991</td>
<td>16066</td>
<td>29800</td>
</tr>
<tr>
<td>1989</td>
<td>10934</td>
<td>2329</td>
<td>17887</td>
<td>31150</td>
</tr>
</tbody>
</table>

### Samples

Sample 1: [Tables 4, 4A & 10] Random sample of 3622 firms (as adjusted) drawn from the 25058 firms reporting in 1984.

Sample 2: [Table 6 and 6A] Random sample of 3978 firms drawn from the 12864 firms reporting in 1984 with PCDBPART = 1 for 1984, adjusted as follows:

- Number of firms in sample: 3978
- Adjustment for firms dropping out of and back into reporting status or reporting for only one year: <966>
- Firms in sample: 3012
  [2045 reported for the entire 6 years]

Sample 3: [Table 8 and 8A] The 1892 firms reporting in 1984 with 0< PCDBPART < 1 for 1984, adjusted as follows:

- Number of firms reporting: 1892
- Adjustment for firms dropping out of and back into reporting status or reporting for only one year: <270>
- Firms in sample: 1622
TABLE 2 (Continued)

Sample 4: [Table 14] The 26,603 firms reporting in 1985, adjusted as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms reporting in 1985</td>
<td>26603</td>
</tr>
<tr>
<td>Adjustment for defined-contribution only firms and firms that drop out of and back into reporting</td>
<td>&lt;12460&gt;</td>
</tr>
<tr>
<td>Firms in sample</td>
<td>14143</td>
</tr>
</tbody>
</table>

Sample 5: [Table 16] The 25,058 firms reporting in 1984, adjusted as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms reporting in 1984</td>
<td>25058</td>
</tr>
<tr>
<td>Adjustment for defined-contribution only firms and firms that drop out of and back into reporting</td>
<td>&lt;11846&gt;</td>
</tr>
<tr>
<td>Firms in sample</td>
<td>13212</td>
</tr>
</tbody>
</table>
TABLE 3
Variable Definitions

*PCDBPART = Number of DBParticipants in Largest D.B. Plan for Year

**TOTPART = The greater of the number of participants in the largest DB plan or the number of participants in the largest DC plan for the year

* SIZE = natural log of total employees

4 SIC Industry Codes:
- Other = All industries except manufacturing and TRADE, SERVICE, FININRE
- Trade = Wholesale and retail trade [5010-5996]
- Service = All services [7012-8999]
- FININRE = Finance, Insurance and Real Estate [6030-6749]

8 SIC Industry Codes:
- AGFRFS = Agriculture, Forestry, Fishing [0120-0970]
- MINCON = Mining and Construction [1510-1790]
- TRCMUTIL = Transportation, Communication, and Utilities [4000-4990]
- WSTRADE = Wholesale and Retail Trade [5010-5996]
- FININRE = Finance, Insurance and Real Estate [6030-6749]
- SERV = All services except medical [7012-7980 and 8111-8999]
- MDHLSR = Medical and Health Services [8011-8098]
- TXEXOR = Tax-Exempt Organizations [9002-9904]

*PCTPTEES =

Total Employees for the firm for the year

**PCUNION =

Number of Union Participants

**TOTPART

**INDSTRNG = Natural log of the number of participants in that industry's 2 digit SIC code for the year.

**CUSIP = "1" if have a CUSIP designation on the 1987-1989 5500
"0" Otherwise

**POST 86 = "1" if year is 1987, 1988, or 1989

**TOPHEAVY = "1" if any defined benefit plan is topheavy for first plan year (box checked on 5500)
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGRATED = &quot;1&quot;</td>
<td>If any defined benefit plan is integrated for the first plan year.</td>
</tr>
<tr>
<td>MXNTO VPP =</td>
<td>Maximum amount of overfunding - Maximum amount of underfunding.</td>
</tr>
<tr>
<td></td>
<td>DB participants in first plan year where maximum overfunding &gt; maximum underfunding for the 6 years.</td>
</tr>
<tr>
<td>MXNTUNPP =</td>
<td>Same as MXNTO VPP except maximum overfunding &lt; absolute value of maximum underfunding for the 6 years.</td>
</tr>
<tr>
<td>FUNDDEF =</td>
<td>Have applied for a funding deficiency waiver [Box checked on 5500].</td>
</tr>
<tr>
<td>CHGRTAGE =</td>
<td>Maximum retirement age - Retirement age for the first DB year.</td>
</tr>
<tr>
<td></td>
<td>* For the LOGIT regression, these values are set as of the first plan year and remain unchanged over the six year period.</td>
</tr>
<tr>
<td>DBSTATUS = 0</td>
<td>If a firm has DB participants in 1989.</td>
</tr>
<tr>
<td></td>
<td>1 if a firm has no DB participants, but has DC participants in 1989.</td>
</tr>
<tr>
<td></td>
<td>2 if a firm has no reporting in 1989.</td>
</tr>
</tbody>
</table>
### TABLE 4

**OLS & Random Effects Models: Unrestricted Sample of 3622 Firms From 1984**

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>Random Effects</th>
<th>Random Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One Way*</td>
<td>Two Way**</td>
</tr>
<tr>
<td><strong>CONSTANT</strong></td>
<td>-0.30918</td>
<td>0.42604</td>
<td>0.38379</td>
</tr>
<tr>
<td></td>
<td>(-5.683)*</td>
<td>(7.933)*</td>
<td>(6.895)*</td>
</tr>
<tr>
<td><strong>SIZE</strong></td>
<td>0.05144</td>
<td>0.01758</td>
<td>0.01794</td>
</tr>
<tr>
<td></td>
<td>(22.73)*</td>
<td>(7.585)*</td>
<td>(7.869)*</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td>0.08266</td>
<td>0.00127</td>
<td>0.00527</td>
</tr>
<tr>
<td></td>
<td>(6.930)*</td>
<td>(0.053)</td>
<td>(0.220)</td>
</tr>
<tr>
<td><strong>TRADE</strong></td>
<td>-0.12475</td>
<td>-0.17790</td>
<td>-0.17543</td>
</tr>
<tr>
<td></td>
<td>(-11.265)*</td>
<td>(-7.725)*</td>
<td>(-7.613)*</td>
</tr>
<tr>
<td><strong>SERVICE</strong></td>
<td>0.00230</td>
<td>-0.02541</td>
<td>-0.02465</td>
</tr>
<tr>
<td></td>
<td>(0.260)</td>
<td>(-1.340)</td>
<td>(-1.299)</td>
</tr>
<tr>
<td><strong>FININRE</strong></td>
<td>0.10018</td>
<td>0.05096</td>
<td>0.05322</td>
</tr>
<tr>
<td></td>
<td>(8.744)*</td>
<td>(2.102)c</td>
<td>(2.194)c</td>
</tr>
<tr>
<td><strong>PCUNION</strong></td>
<td>0.34810</td>
<td>0.25375</td>
<td>0.25092</td>
</tr>
<tr>
<td></td>
<td>(30.559)*</td>
<td>(12.338)*</td>
<td>(12.303)*</td>
</tr>
<tr>
<td><strong>INDSTRNG</strong></td>
<td>0.03565</td>
<td>0.00200</td>
<td>0.00563</td>
</tr>
<tr>
<td></td>
<td>(9.969)*</td>
<td>(0.582)</td>
<td>(1.616)</td>
</tr>
<tr>
<td><strong>CUSIP</strong></td>
<td>0.01567</td>
<td>0.08647</td>
<td>0.08543</td>
</tr>
<tr>
<td></td>
<td>(1.397)</td>
<td>(3.519)*</td>
<td>(3.476)b</td>
</tr>
<tr>
<td><strong>POST86</strong></td>
<td>-0.04077</td>
<td>-0.03965</td>
<td>-0.07004</td>
</tr>
<tr>
<td></td>
<td>(-6.070)*</td>
<td>(-15.931)*</td>
<td>(-6.672)*</td>
</tr>
</tbody>
</table>

Dependent Variable: PCDBPART

- $R^2$ : 0.1126 0.0925 0.0920
- $AdjR^2$ : 0.1122
- $SSE$ : 3835.99
- $F$ : 262.79
- $P$ : 0.0000
- Lagrange Multiplier : 29709.5 29710.4
- $P$-Value For Lagrange : 0.0000 0.0000
- Estimated Autocorrelation of $e (i, t)$ : 0.0535 0.0550
  
a. significant at .001
b. significant at .01
c. significant at .05
d. significant at .1

* Stratified by Firm  ** Stratified by Firm and By Year
TABLE 4A

OLS, Fixed & Random Effects Models: Unrestricted
Sample of 3622 Firms From 1984

<table>
<thead>
<tr>
<th>OLS</th>
<th>Fixed Effects</th>
<th>Random Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>One Way*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-0.27651</td>
<td>0.0065</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.05221</td>
<td>(2.306)^a</td>
</tr>
<tr>
<td>PCUNION</td>
<td>0.34939</td>
<td>0.07535</td>
</tr>
<tr>
<td>INDSTRNG</td>
<td>0.03352</td>
<td>(-1.121)</td>
</tr>
<tr>
<td>POST86</td>
<td>-0.04072</td>
<td>(-14.257)^a</td>
</tr>
</tbody>
</table>

Dependent Variable: PCDBPART

| R^2  | 0.09491       | 0.8965         | 0.07602         |
| AdjR^2 | 0.09472   | 0.8715         |                |
| SSE   | 3912.4       | 447.39         |                |
| F     | 488.84       | 35.90          |                |
| p     | 0.0000       | 0.0000         |                |

Lagrange Multiplier                  29993.15
P-Value For Lagrange                0.0000
Hausman Test                        159.297
P-Value For Hausman                 0.0000
Estimated Autocorrelation of e (i, t) 0.053097

a. significant at .001
b. significant at .01
(c. significant at .05
d. significant at .1

* Stratified by Firm
TABLE 5

Descriptive Statistics for Table 4, 4A and Table 10: Unrestricted Random Sample From 1984

[For 1984]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
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[For 1984-1989 Pooled Data]

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### TABLE 6

OLS & Random Effects Models: Random Sample of 3012 Firms Where DB Participants = Total Participants In 1984

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Dependent Variable: PCDBPART

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<tr>
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<td></td>
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<tr>
<td>b. significant at .01</td>
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<tr>
<td>c. significant at .05 *</td>
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<td>d. significant at .1 **</td>
<td>Stratified by Firm and by Year</td>
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TABLE 6A

OLS, Fixed & Random Effects Models: Random Sample of 3012 Firms Where DB Participants = Total Participants In 1984

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Dependent Variable: PCDBPART

<p>| | | | |</p>
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Lagrange Multiplier | 6040.771 |

P-Value For Lagrange | 0.0000 |

Hausman Test | 13.0162 |

P-Value For Hausman | 0.011197 |

Estimated Autocorrelation of e (i, t) | 0.049163 |

a. significant at .001
b. significant at .01
c. significant at .05
d. significant at .1

* Stratified by Firm
TABLE 7
Descriptive Statistics for Table 6 and 6A: Random Sample of Firms Where DB Participants = Total Participants in 1984

[For 1984]

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[For 1984-1989 Pooled Data]

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TABLE 8

OLS & Random Effects Models: Population (As Adjusted) of 1662 Firms Where 0 < PCDBPART < 1 for 1984

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Dependent Variable: PCDBPART

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<tr>
<td>p</td>
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<td>Estimated Autocorrelation of e (i,t)</td>
<td>0.02276</td>
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</tr>
</tbody>
</table>

a. significant at .001
b. significant at .01
c. significant at .05  * Stratified by Firm
d. significant at .1  ** Stratified by Firm and Year
### TABLE 8A

OLS, Fixed & Random Effects Models: Population (As Adjusted) of 1662 Firms Where 0 < PCDBPART < 1 for 1984

<table>
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<td>-0.04643 (-8.705)*</td>
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Dependent Variable: PCDBPART

| R²                  | 0.007202 | 0.60789 | 0.00693 |
| AdjR²               | 0.006764 | 0.51987 |          |
| SSE                 | 1129.96  | 446.28  |          |
| F                   | 16.463   | 6.91    |          |
| p                   | 0.0000   | 0.0000  |          |

Lagrange Multiplier 5736.52
P-Value For Lagrange 0.0000
Hausman Test 7.775
P Value for Hausman 0.1002

Estimated Autocorrelation of e (i,t) 0.022699

| a. significant at .001 |
| b. significant at .01 |
| c. significant at .05 |
| d. significant at .1 |

* Stratified by Firm
TABLE 9

Descriptive Statistics for Table 8 and 8A: Random Sample of Firms Where 0 < PCDBPART < 1

[For 1984]

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<th>Maximum</th>
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[For 1984-1989 Pooled Data]

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a. Significant at .001  
b. Significant at .01  
c. Significant at .05  
d. Significant at .1
TABLE 11


Section 1: 100% Union Participation 100% D.B. Participation

<table>
<thead>
<tr>
<th>Total Participants</th>
<th>Integrated or Non-Integrated</th>
<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
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<td>≥ 1000</td>
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</table>

Section 2: 0 < % Union Participation < 1 100% D.B. Participation

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<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
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Section 3: 0% Union Participation 100% D.B. Participation

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<th>Integrated or Non-Integrated</th>
<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
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<td>39.92</td>
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### TABLE 11 (Continued)

#### Section 4: 100% Union Participation

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<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
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<td>4.00</td>
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#### Section 5: 0% Union Participation < 1

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<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
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#### Section 6: 0% Union Participation

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<th>Number of Firms</th>
<th>% Remain DB</th>
<th>% Switch to DC</th>
<th>% Terminate Plans</th>
</tr>
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TABLE 12
Summary of Population of Firms with Defined Benefit Plans
During 1984-1989 and Reporting for 1985: Stratified
by Level of Total Participants

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<th>LEVEL OF TOTAL PARTICIPANTS</th>
<th>NUMBER OF FIRMS</th>
<th>MEAN</th>
<th>MEAN</th>
<th>MEAN INTEGRATED</th>
<th>% REMAINING TO TERMINATE</th>
<th>% SWITCH TO D.C. PLANS</th>
<th>% IN D.B. PLANS 1989</th>
<th>% BY 1989</th>
<th>% BY 1989</th>
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<td>91.90</td>
<td>77.20</td>
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<td>= 5,000 to &lt; 10,000</td>
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TABLE 13


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[PERM D.B. = 1]

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[DB TO DC = 1]
### TABLE 13 (Continued)

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Number Participants in Perm D.B. by 1989: 11,298,441 68.03%
Number Participants in D.B. to D.C. by 1989: 2,591,198 15.60%
Number Participants in D.B. to NULL by 1989: 2,718,435 16.37%
**TABLE 14**

Marginal Effects From Logit Regression on Population (As adjusted) of Firms Reporting in 1985 and Having a D.B. Plan Between 1984 and 1989

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<td>(3.535)</td>
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**DEPENDENT VARIABLE:** D.B. STATUS (PERMDB, DBTODC, DBTNULL)

Chi-Squared = 1674.06
p Value = 0.0000

a. Significant at .001
b. Significant at .01
c. Significant at .05
d. Significant at .1
TABLE 15

Descriptive Statistics for Tables 11 - 14

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<td>14143</td>
<td>-66640.</td>
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<td>0.9026</td>
<td>14143</td>
<td>0.00</td>
<td>55.00</td>
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</table>
### TABLE 16

Marginal Effects From Logit Regression on Population (As Adjusted) of Firms Reporting in 1984 and Having a D.B. Plan Between 1984 and 1989

<p>| Variable     | Constant | Size | Pctpctees | Nmincon | TRCmutil | Wstrade | Fininre | SERV | MDHLSR | Texor | PCUnioin | Toplehey | Integrat | Mxntovpp | Mxntunpp | Funddef | Chgrtage |
|--------------|----------|------|-----------|---------|----------|---------|---------|------|--------|-------|---------|----------|----------|----------|----------|---------|---------|----------|
|              | -0.07120 | 0.01188 | 0.11038 | -0.11331 | -0.04288 | -0.04253 | -0.05016 | -0.05639 | -0.06201 | 0.07796 | 0.44941 | -0.00906 | 0.17999 | 0.00002 | 0.00002 | -0.05126 | 0.02756 |
|              | (-1.942) | (3.101) | (5.211) | (-3.590) | (-1.383) | (-1.782) | (-3.168) | (-3.672) | (-2.215) | (4.693) | (51.303) | (-18.906) | (5.401) | (16.932) | (3.646) | (1.768) | (1.712) |
| Chi-Squared  | 1565.70  |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |
| p Value      | 0.0000   |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |
| a. Significant at .001 |       |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |
| b. Significant at .01  |       |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |
| c. Significant at .05  |       |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |
| d. Significant at .1   |       |       |          |         |          |         |         |       |        |       |         |          |         |          |         |         |         |         |</p>
<table>
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<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>N.</th>
<th>Minimum</th>
<th>Maximum</th>
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<td>0.1453</td>
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<td>13212</td>
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<td>1.00</td>
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<td>13212</td>
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<td>1.00</td>
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<td>1.00</td>
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<td>TOPHEAVY</td>
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<td>0.00</td>
<td>1.00</td>
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<td>INTEGRAT</td>
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<td>1.00</td>
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<td>13212</td>
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<td>55.00</td>
</tr>
</tbody>
</table>
APPENDIX B

SUMMARY OF HYPOTHESES
Time-Series Panel-Data Models:

HA-1. The percentage of participants covered by a defined benefit plan is positively related to the SIZE variable (Log of total employees).

Null form: The coefficient of SIZE is less than or equal to 0.

HA-2. Industry Code is related to the percentage of participants covered by a defined-benefit plan.

Null form: The coefficients for INDUSTRY CODES are all simultaneously equal to 0.

HA-3. The percentage of participants covered by a defined benefit plan is positively related to the degree of union participation in the firm, measured by the number of union participants divided by the total participants.

Null form: The coefficient on PCUNION is less than or equal to zero.

HA-4. The percentage of participants covered by a defined-benefit plan is positively related to the state of having ownership publicly held (CUSIP=1) versus closely held (CUSIP=0).

Null form: The coefficient on CUSIP is less than or equal to 0.

HA-5. The percentage of participants covered by a defined benefit plan is positively related to an industry-specific economic indicator.

Null form: The coefficient of INDSTRNG will be less than or equal to 0.

Pre-Existing Trend Models

HA-6. The percentage of participants covered by a defined benefit plan is related to the time dummies for 1984-1990.
Null form: The coefficients on the six time dummies for 1984-1990 are all simultaneously equal to 0.

HA-7. The coefficients on the 1984-1986 time dummies are greater than the coefficients on the 1987-1990 time dummies.

Null Form The coefficients on the 1984-1986 time dummies are less than or equal to the coefficients on the 1987-1990 time dummies.

Multinomial Logit Models:

HB-1a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the SIZE variable (Log of total employees).

HB-1b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the SIZE variable.

Null form: The coefficient of SIZE is less than or equal to 0.

HB-2a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the INDCODE variable.

HB-2b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is positively related to the INDCODE variable.

Null form: The coefficient of INDCODE is less than or equal to 0.

HB-3a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is positively related to the PCUNION variable.

HB-3b. Given that a defined-benefit plan existed before 1989 and that it was terminated by
1989, the continued existence of a defined-contribution plan in 1989 is positively related to the PCUNION variable.

Null form: The coefficient of PCUNION is less than or equal to 0.

HB-4a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the TOPHEAVY variable.

HB-4b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the TOPHEAVY variable.

Null form: The coefficient of TOPHEAVY is equal to 0.

HB-5a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the INTEGRAT variable.

HB-5b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the INTEGRAT variable.

Null form: The coefficient of INTEGRAT is equal to 0.

HB-6a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the FUNDDEF variable.

HB-6b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the FUNDDEF variable.

Null form: The coefficient of FUNDDEF is equal to 0.

HB-7a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of
a defined-benefit plan is related to the MXNTOVPP variable.

HB-7b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXNTOVPP variable.

HB-8a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the MXNTUNPP variable.

HB-8b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the MXUNFDPP variable.

Null form: The coefficient of MXUNFDPP is equal to 0.

HB-9a. Given that a defined-benefit plan existed before 1989, the 1989 continued existence of a defined-benefit plan is related to the CHGRTAGE variable.

HB-9b. Given that a defined-benefit plan existed before 1989 and that it was terminated by 1989, the continued existence of a defined-contribution plan in 1989 is related to the CHGRTAGE variable.

Null form: The coefficient of CHGRTAGE is equal to 0.
APPENDIX C

COBOL PROGRAMS USED IN MANIPULATING 5500 DATA
COBOL Program to Compress 1988 data into a single line per firm

//IG90CP2 JOB (IG90,:10,35), 'L
BRADLEY', PASSWORD=HWWRMJ,
   //CLASS=A, MSGLEVEL=(0,0)
   //COM00010
/*ROUTE PRINT UNTVM1.IG90
   //COM00020
//STEP1 EXEC COBCLG, PARM.COB=(NOSOURCE, NOSXREF)
   //COM00030
   //COM00040
***********************
IDENTIFICATION DIVISION.

***********************
PROGRAM-ID. COMPRS88.

***********************
ENVIRONMENT DIVISION.

***********************
INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT IN-FILE
   ASSIGN TO FILEIN.

FD IN-FILE

   LABEL RECORDS ARE STANDARD
   BLOCK CONTAINS 100 RECORDS
   RECORD CONTAINS 169 CHARACTERS.
01 IN-REC.
   COM00240
   05 IN-EIN.
   COM00250
      10 IN-EIN-STATE-CODE PIC X(2).
   COM00260
      10 IN-EIN-REST PIC X(7).
   COM00270
      05 IN-FIRST-PLAN-RPT-IND PIC X(1).
   COM00280
      05 IN-AMENDED-RPT-IND PIC X(1).
   COM00290
      05 IN-FINAL-RPT-IND PIC X(1).
   COM00300
      05 IN-BUSINESS-CODE.
   COM00310
         10 IN-BUSINESS-CODE-A PIC X(2).
   COM00320
         10 FILLER PIC X(2).
   COM00330
      05 IN-CUSIP-ISS-NUM PIC X(6).
   COM00340
      05 IN-TYPE-PLAN-ENTITY-IND PIC X(1).
   COM00350
      05 IN-PLAN-EFFECT-DATE PIC X(6).
   COM00360
      05 IN-DEF-CONTR-TYPE PIC X(1).
   COM00370
      05 IN-CASH-DEFERRED-IND PIC X(1).
   COM00380
      05 IN-FULLY-VESTED-CNT PIC X(7).
   COM00390
      05 IN-NON-VESTED-CNT PIC X(7).
   COM00400
      05 IN-TOT-ACTIVE-PART-CNT PIC X(8).
   COM00410
      05 IN-PLAN-TERM-IND PIC X(1).
   COM00420
      05 IN-PLAN-ASS-DIST-IND PIC X(1).
   COM00430
      05 IN-TERM-ADOPT-IND PIC X(1).
   COM00440
      05 IN-PLAN-MRGD-CONSLD-IND PIC X(1).
   COM00450
      05 IN-COLLECT-BARGAIN-IND PIC X(1).
   COM00460
      05 IN-BENFIT-PLAN-MFS-IND PIC X(1).
   COM00470
      05 IN-CONTR-PLAN-MFS-IND PIC X(1).
   COM00480
05 IN-FUND-DEFIC-AMT PIC X(12).
COM00490
05 IN-TOP-HEAVY-PLAN-IND PIC X(1).
COM00500
05 IN-TOTAL-EMP-CNT PIC X(8).
COM00510
05 IN-ELIGIBLE-PART-CNT PIC X(8).
COM00520
05 IN-PLAN-INTEGRTD-SS-IND PIC X(1).
COM00530
05 IN-PBGC-TERM-INSURE-IND PIC X(1).
COM00540
05 IN-LEGAL-FEES PIC X(13).
COM00550
05 IN-TOTAL-ADMIN-FEES PIC X(13).
COM00560
05 IN-ADMIN-FEES-NOT-RPT-IND PIC X(1).
COM00570
05 IN-FUND-DEF-IND PIC X(1).
COM00580
05 IN-DEF-AMORT-CY-IND PIC X(1).
COM00590
05 IN-ACTUARIAL-GL PIC X(11).
COM00600
05 IN-ACCUM-FUND-DEF PIC X(10).
COM00610
05 IN-TOTAL-CHARGES PIC X(11).
COM00620
05 IN-TOTAL-CREDITS PIC X(11).
COM00630
05 IN-FND-STD-PRE-RTMT-AGE-IND PIC X(2).
COM00640
05 IN-AGE-40-MALE-RATIO-PRCT PIC X(3).
COM00650
05 IN-TYPE-PENSION-BEN-IND PIC X(1).
COM00660
**********************************
COM00670
WORKING-STORAGE SECTION.
COM00680
**********************************
COM00690
01 WORK-VARIABLES.
COM00700
05 EIN-COUNT PIC S9(7) VALUE ZERO.
COM00710
05 CURRENT-EIN PIC X(9) VALUE SPACE.
COM00720
05 REC-COUNT PIC S9(7) VALUE ZERO.
COM00730
05 EDIT-COUNT PIC Z,ZZZ,ZZ9.

05 FILE-FLAG PIC X VALUE 'N'.

88 END-FILE VALUE 'Y'.

05 SKIP-FLAG PIC X VALUE 'N'.

88 SKIPPED VALUE 'Y'.

05 WORK-EMP-CNT PIC 9(8) VALUE ZERO.

05 WORK-ACTIVE-PART-CNT PIC 9(8) VALUE ZERO.

05 WORK-ADMIN-FEES PIC 9(12) VALUE ZERO.

05 WORK-DEFIC-AMT PIC 9(10) VALUE ZERO.

05 WORK-AGE-IND PIC 9(2) VALUE ZERO.

05 WORK-MALE-RATIO-PRCT PIC 9(3) VALUE ZERO.

05 WORK-ACCUM-FUND-DEF PIC 9(10) VALUE ZERO.

05 WORK-TOTAL-CREDITS PIC 9(10) VALUE ZERO.

05 WORK-LEGAL-FEES PIC 9(13) VALUE ZERO.

01 WS-OUT-REC.

05 OUT-EIN.

10 OUT-EIN-STATE-CODE PIC X(2).

10 OUT-EIN-REST PIC X(7).

05 OUT-BUSINESS-CODE PIC X(2).

05 OUT-MAX-DB-PARTICIPATION PIC 9(10).

05 OUT-MAX-PARTICIPATION-CNT PIC 9(10).

05 OUT-PLAN-TERM-IND PIC X(1).

05 OUT-TERM-ADOPT-IND PIC X(1).

05 OUT-PLAN-MRGD-CONSLED-IND PIC X(1).

05 OUT-PLAN-INTEGRATED-SS-IND PIC X(1).
05 OUT-ACCUM-FUND-DEF PIC 9(10).
COM01050
05 OUT-TOTAL-CHARGES PIC 9(10).
COM01060
05 OUT-TOTAL-CREDITS PIC 9(10).
COM01070
05 OUT-DB-ADMIN-FEES PIC 9(10).
COM01080
05 OUT-DC-ADMIN-FEES PIC 9(10).
COM01090
05 OUT-CUSIP-IND PIC X(1).
COM01100
05 OUT-UNION-TOT-PART PIC 9(8).
COM01110
****************************************************************************
COM01120
PROCEDURE DIVISION.
COM01130
****************************************************************************
COM01140
000-MAIN.
COM01150
OPEN INPUT IN-FILE.
COM01160
PERFORM 800-READ-FILE.
COM01170
MOVE '????????? BEGIN OF DATA *********' TO
COM01180
    WS-OUT-REC.
COM01190
PERFORM 100-PROCESS
COM01200
UNTIL END-FILE.
COM01210
PERFORM 200-BREAK.
COM01220
MOVE REC-COUNT TO EDIT-COUNT.
COM01230
DISPLAY '????????? TOTAL RECORDS: '  EDIT-COUNT.
COM01240
MOVE EIN-COUNT TO EDIT-COUNT.
COM01250
DISPLAY '????????? TOTAL EINS : '  EDIT-COUNT.
COM01260
CLOSE IN-FILE.
COM01270
STOP RUN.
COM01280
100-PROCESS.
COM01290
ADD 1 TO REC-COUNT.
COM01300
  IF IN-EIN NOT EQUAL CURRENT-EIN
COM01310
    PERFORM 200-BREAK.
COM01320
  MOVE IN-TOTAL-EMP-CNT TO
COM01330
    WORK-EMP-CNT.
COM01340
  MOVE IN-TOT-ACTIVE-PART-CNT TO
COM01350
    WORK-ACTIVE-PART-CNT.
COM01360
  IF WORK-ACTIVE-PART-CNT GREATER
COM01370
    OUT-MAX-PARTICIPATION-CNT
COM01380
  MOVE WORK-ACTIVE-PART-CNT TO
COM01390
    OUT-MAX-PARTICIPATION-CNT
COM01400
  MOVE IN-BUSINESS-CODE-A TO
COM01410
    OUT-BUSINESS-CODE
COM01420
  MOVE IN-TOTAL-EMP-CNT TO
COM01430
    OUT-TOTAL-EMP-CNT.
COM01440
  IF IN-COLLECT-BARGAIN-IND EQUAL '1'
COM01450
    IF WORK-ACTIVE-PART-CNT GREATER
COM01460
      OUT-UNION-TOT-PART
COM01470
    MOVE WORK-ACTIVE-PART-CNT TO
COM01480
      OUT-UNION-TOT-PART.
COM01490
  IF IN-CUSIP-ISS-NUM NUMERIC
COM01500
    MOVE '1' TO OUT-CUSIP-IND.
COM01510
  IF IN-TYPE-PENSION-BEN-IND EQUAL '1'
COM01520
    PERFORM 150-DO-THE-A
COM01530
ELSE
COM01540
PERFORM 125-DO-THE-B.
COM01550
PERFORM 800-READ-FILE.
COM01560

125-DO-THE-B.
COM01570
IF IN-TOTAL-ADMIN-FEES NUMERIC
COM01580
MOVE IN-TOTAL-ADMIN-FEES TO
COM01590
WORK-ADMIN-FEES
COM01600
ADD WORK-ADMIN-FEES TO
COM01610
OUT-DC-ADMIN-FEES.
COM01620
IF IN-LEGAL-FEES NUMERIC
COM01630
MOVE IN-LEGAL-FEES TO WORK-LEGAL-FEES
COM01640
SUBTRACT WORK-LEGAL-FEES FROM
OUT-DC-ADMIN-FEES.
COM01650

150-DO-THE-A.
COM01660
IF WORK-ACTIVE-PART-CNT GREATER
COM01670
OUT-MAX-DB-PARTICIPATION
COM01680
MOVE WORK-ACTIVE-PART-CNT TO
COM01690
OUT-MAX-DB-PARTICIPATION.
COM01700
IF IN-PLAN-TERM-IND EQUAL '1'
COM01710
MOVE '1' TO OUT-PLAN-TERM-IND.
COM01720
IF IN-TERM-ADOPT-IND EQUAL '1'
COM01730
MOVE '1' TO OUT-TERM-ADOPT-IND.
COM01740
IF IN-PLAN-MRGD-CONSLD-IND EQUAL '1'
COM01750
MOVE '1' TO OUT-PLAN-MRGD-CONSLD-IND.
COM01760
IF IN-PLAN-INTEGRATED-SS-IND EQUAL '1'
COM01770
MOVE '1' TO OUT-PLAN-INTEGRATED-SS-IND.
COM01780
IF IN-TOP-HEAVY-PLAN-IND EQUAL '1'
COM01790
MOVE '1' TO OUT-TOP-HEAVY-PLAN-IND.
COM01800
IF IN-FUND-DEF-IND EQUAL '1'
COM01810
    MOVE '1' TO OUT-FUND-DEF-IND.
COM01820
IF IN-FUND-DEFIC-AMT NUMERIC
COM01830
    MOVE IN-FUND-DEFIC-AMT TO WORK-DEFIC-AMT
COM01840
    IF WORK-DEFIC-AMT GREATER
COM01850
        OUT-FUND-DEFIC-AMT
COM01860
    MOVE WORK-DEFIC-AMT TO
COM01870
        OUT-FUND-DEFIC-AMT.
COM01880
    IF IN-FND-STD-PRE-RTMT-AGE-IND NUMERIC
COM01890
        MOVE IN-FND-STD-PRE-RTMT-AGE-IND TO
COM01900
            WORK-AGE-IND
COM01910
    IF WORK-AGE-IND LESS
COM01920
        OUT-FND-STD-PRE-RTMT-AGE-IND
COM01930
    MOVE WORK-AGE-IND TO
COM01940
        OUT-FND-STD-PRE-RTMT-AGE-IND.
COM01950
    IF IN-AGE-40-MALE-RATIO-PRCT NUMERIC
COM01960
        MOVE IN-AGE-40-MALE-RATIO-PRCT TO
COM01970
            WORK-MALE-RATIO-PRCT
COM01980
    IF WORK-MALE-RATIO-PRCT GREATER
COM01990
        OUT-AGE-40-MALE-RATIO-PRCT
COM02000
    MOVE WORK-MALE-RATIO-PRCT TO
COM02010
        OUT-AGE-40-MALE-RATIO-PRCT.
COM02020
    IF IN-ACCUM-FUND-DEF NUMERIC
COM02030
        MOVE IN-ACCUM-FUND-DEF TO
COM02040
WORK-ACCUM-FUND-DEF
COM02050
  IF WORK-ACCUM-FUND-DEF GREATER
COM02060
    OUT-ACCUM-FUND-DEF
COM02070
    MOVE WORK-ACCUM-FUND-DEF TO
COM02080
    OUT-ACCUM-FUND-DEF.
COM02090
  IF IN-TOTAL-CREDITS NUMERIC
COM02100
    MOVE IN-TOTAL-CREDITS TO
COM02110
    WORK-TOTAL-CREDITS
COM02120
  IF WORK-TOTAL-CREDITS GREATER
COM02130
    OUT-TOTAL-CREDITS
COM02140
    MOVE WORK-TOTAL-CREDITS TO
COM02150
    OUT-TOTAL-CREDITS
COM02160
  IF IN-TOTAL-CHARGES NUMERIC
COM02170
    MOVE IN-TOTAL-CHARGES TO
COM02180
    OUT-TOTAL-CHARGES.
COM02190
  IF IN-TOTAL-ADMIN-FEES NUMERIC
COM02200
    MOVE IN-TOTAL-ADMIN-FEES TO
COM02210
    WORK-ADMIN-FEES
COM02220
    ADD WORK-ADMIN-FEES TO
COM02230
    OUT-DB-ADMIN-FEES.
COM02240
  IF IN-LEGAL-FEES NUMERIC
COM02250
    MOVE IN-LEGAL-FEES TO WORK-LEGAL-FEES
COM02260
    SUBTRACT WORK-LEGAL-FEES FROM
    OUT-DB-ADMIN-FEES.
COM02270
200-BREAK.
COM02280
  ADD 1 TO EIN-COUNT.
COM02290
DISPLAY WS-OUT-REC.
COMO2300
MOVE SPACE TO WS-OUT-REC.
COMO2310
MOVE IN-EIN TO OUT-EIN.
COMO2320
MOVE IN-BUSINESS-CODE-A TO OUT-BUSINESS-CODE.
COMO2330
MOVE ZERO TO OUT-MAX-DB-PARTICIPATION
COMO2340
OUT-MAX-PARTICIPATION-CNT
COMO2350
OUT-TOTAL-EMP-CNT
COMO2360
OUT-FUND-DEFIC-AMT
COMO2370
OUT-ACCUM-FUND-DEF
COMO2380
OUT-TOTAL-CHARGES
COMO2390
OUT-TOTAL-CREDITS
COMO2400
OUT-DB-ADMIN-FEES
COMO2410
OUT-DC-ADMIN-FEES
COMO2420
OUT-UNION-TOT-PART
COMO2430
OUT-AGE-40-MALE-RATIO-PRCT.
COMO2440
MOVE '0' TO OUT-PLAN-TERM-IND
COMO2450
OUT-TERM-ADOPT-IND
COMO2460
OUT-PLAN-MRGD-CONSLD-IND
COMO2470
OUT-PLAN-INTEGRTD-SS-IND
COMO2480
OUT-TOP-HEAVY-PLAN-IND
COMO2490
OUT-CUSIP-IND
COMO2500
OUT-FUND-DEF-IND.
COMO2510
MOVE 99 TO OUT-FND-STD-PRE-RTMT-AGE-IND.
COMO2520
MOVE IN-EIN TO CURRENT-EIN.
COMO2530
* IF EIN-COUNT GREATER 1200
COMO2540
MOVE 'Y' TO FILE-FLAG.

800-READ-FILE.
COM02560 READ IN-FILE
COM02570 AT END MOVE 'Y' TO FILE-FLAG.
COM02580 MOVE 'Y' TO SKIP-FLAG.
COM02590 IF NOT END-FILE
COM02600 PERFORM 850-READ-MORE
COM02610 UNTIL NOT SKIPPED.

COM02620

850-READ-MORE.
COM02630 MOVE 'N' TO SKIP-FLAG.
COM02640 IF IN-TYPE-PENSION-BEN-IND GREATER '2' OR
COM02650 IN-TYPE-PENSION-BEN-IND LESS '1'
COM02660 MOVE 'Y' TO SKIP-FLAG.
COM02670 IF IN-TOTAL-EMP-CNT NOT NUMERIC
COM02680 MOVE 'Y' TO SKIP-FLAG
COM02690 ELSE
COM02700 MOVE IN-TOTAL-EMP-CNT TO WORK-EMP-CNT
COM02710 IF WORK-EMP-CNT EQUAL ZERO
COM02720 MOVE 'Y' TO SKIP-FLAG.
COM02730 IF IN-TOT-ACTIVE-PART-CNT NOT NUMERIC
COM02740 MOVE 'Y' TO SKIP-FLAG
COM02750 ELSE
COM02760 MOVE IN-TOT-ACTIVE-PART-CNT TO WORK-EMP-CNT
COM02770 IF WORK-EMP-CNT EQUAL ZERO
COM02780 MOVE 'Y' TO SKIP-FLAG.
COM02790
DECLARE FUNCTION getran$ (arg$)
'Create a list of random EIN numbers
CLS
DIM ct AS LONG
RANDOMIZE TIMER
PRINT "Create a list of random EIN numbers"
PRINT
INPUT "Enter name of date file to extract numbers from:"; ifile$
INPUT "Enter name of output file in which to put EIN's:"; ofile$
INPUT "Enter name of EIN miscellaneous file (EXCLEIN) :"; efile$
IF efile$ = "" THEN efile$ = "EXCLEIN"
INPUT "Enter number of EIN's:"; einct$
DIM eintbl$(20)
OPEN "i", #1, efile$
DO WHILE NOT EOF(1)
LINE INPUT #1, einrec$
IF LEFT$(einrec$, 4) = "EIN:" THEN
ein$ = MID$(einrec$, 5, 9)
ce$ = ec$ + 1
PRINT ein$
eintbl$(ec$) = ein$
ELSE
   cm$ = INSTR(einrec$, ",")
   IF cm$ = 0 THEN cm$ = 1
   IF LEFT$(einrec$, cm$ - 1) = ifile$ THEN
PRINT einrec$
  ercnt& = VAL(MID$(einrec$, cm% + 1))
PRINT "Suggested record count:"; ercnt&
INPUT "Use this count (Y/N)"; Ucnt$
END IF
END IF
LOOP
CLOSE 1
PRINT "EIN's excluded:"; ec%
PRINT
IF Ucnt$ <> "Y" AND Ucnt$ <> "y" THEN
  PRINT "stand by, counting records in file"
  OPEN "i", #1, ifile$
  ct = 0
  DO WHILE NOT EOF(1)
    LINE INPUT #1, r$
    ct = ct + 1
  LOOP
  CLOSE 1
ELSE
  ct = ercnt&
END IF
OPEN "o", #2, ofile$
PRINT "record count is"; ct
PRINT
PRINT "Creating random EIN's now"
intv% = (ct \ einct%) * 2
PRINT "skip interval is"; intv%
DIM sk%(intv%)
OPEN "i", #1, ifile$
done% = 0
DO WHILE done% = 0
  rl% = getran%(intv%)
  sk%(rl%) = sk%(rl%) + 1
  FOR x% = 1 TO rl% - 1
    IF EOF(1) THEN
      x% = rl%
    ELSE
      LINE INPUT #1, r$
    END IF
  NEXT x%
  IF EOF(1) THEN
    done% = 1
  ELSE
    LINE INPUT #1, r$
  END IF
END IF
NEXT x%
IF EOF(1) THEN
done% = 1
ELSE
  LINE INPUT #1, r$
  ein$ = LEFT$(r$, 9)
  GOSUB searchein:
  IF fein% = 0 THEN
    ctr% = ctr% + 1
PRINT #2, ein$
 p% = VAL(LEFT$(ein$, 1))
d%(p%) = d%(p%) + 1
IF ctr% = einct% THEN
     done% = 1
END IF
END IF
END IF
END IF
CLOSE 1, 2
PRINT "total ein's obtained: "; ctr%
PRINT "EIN's are dumped"
PRINT
PRINT
PRINT "0's "; d%(0)
PRINT "1's "; d%(1)
PRINT "2's "; d%(2)
PRINT "3's "; d%(3)
PRINT "4's "; d%(4)
PRINT "5's "; d%(5)
PRINT "6's "; d%(6)
PRINT "7's "; d%(7)
PRINT "8's "; d%(8)
PRINT "9's "; d%(9)
END

searchein:
fein% = -1
ecp% = 1
DO WHILE fein% = -1
    IF ecp% > ec% THEN
        fein% = 0
    ELSE
        IF ein$ = eintbl$(ecp%) THEN
            fein% = 1
        ELSE
            ecp% = ecp% + 1
        END IF
    END IF
END IF
LOOP
RETURN

FUNCTION getran% (arg%)
loopit:
r% = RND(99) * arg%
IF r% = 0 THEN GOTO loopit:
getran% = r%
END FUNCTION
COBOL Program to Stratify a Random (or Population) Sample
Into Three Stratified Subsamples

DECLARE FUNCTION getran% (arg%)
'Create a list of random EIN numbers into three files
CLS
DIM ct AS LONG
PRINT "Create a list of ALL EIN numbers"
PRINT
INPUT "Enter name of date file to extract numbers from:"; ifile$
PRINT
PRINT "Enter name of output EIN file where the Max DB participation equals the Max participation count:"; ofile1$
PRINT
PRINT "Enter name of output EIN file where 0<PCDBPART<1 the EIN's" INPUT "":"; ofile2$
PRINT
PRINT "Enter name of output EIN file where for the max DB participation equals zero":; ofile3$
PRINT
GOSUB message:
OPEN "i", #1, ifile$
OPEN "o", #2, ofile1$
OPEN "o", #3, ofile2$
OPEN "o", #4, ofile3$
DO WHILE NOT EOF(1)
LINE INPUT #1, r$
ein$ = LEFT$(r$, 9)
ctr% = ctr% + 1
mxdbpt& = VAL(MID$(r$, 12, 10))
mxpt& = VAL(MID$(r$, 22, 10))
IF mxdbpt& = 0 THEN
   PRINT #4, ein$
   cnt3% = cnt3% + 1
ELSE
   IF mxdbpt& = mxpt& THEN
      PRINT #2, ein$
      cnt1% = cnt1% + 1
   ELSE
      PRINT #3, ein$
      cnt2% = cnt2% + 1
   END IF
END IF
END IF
p% = VAL(LEFT$(ein$, 1))
d%(p%) = d%(p%) + 1
LOOP
CLOSE 1, 2, 3, 4
PRINT "total ein's obtained: "; ctr%
PRINT "total ein's in file "; ofile1$; " is "; cnt1%
PRINT "total ein's in file "; ofile2$; " is "; cnt2%
PRINT "total ein's in file "; ofile3$; " is "; cnt3%
PRINT "EIN's are dumped"
PRINT
PRINT "0's "; d%(0)
PRINT "1's "; d%(1)
PRINT "2's "; d%(2)
PRINT "3's "; d%(3)
PRINT "4's "; d%(4)
PRINT "5's "; d%(5)
PRINT "6's "; d%(6)
PRINT "7's "; d%(7)
PRINT "8's "; d%(8)
PRINT "9's "; d%(9)
END

FUNCTION getran% (arg%)
loop1:
r% = RND(99) * arg%
IF r% = 0 THEN GOTO loop1:
getran% = r%
END FUNCTION

Merge File to Create the Time-Series Panel-Data Records

DECLARE FUNCTION getrec$ (recnum$)
DECLARE FUNCTION getein$ ()
'Merge the yearly files to a limdep file 4: MERGEFL4.BAS
DIM infile$(7), icfile$(7)
infile$(1) = "file84.new"
infile$(2) = "file85.new"
infile$(3) = "file86.new"
infile$(4) = "file87.new"
infile$(5) = "file88.new"
infile$(6) = "file89.new"
infile$(7) = "file90.new"
icfile$(1) = "icode84.dat"
icfile$(2) = "icode85.dat"
icfile$(3) = "icode86.dat"
icfile$(4) = "icode87.dat"
icfile$(5) = "icode88.dat"
icfile$(6) = "icode89.dat"
icfile$(7) = "icode90.dat"
DIM icodes&(99, 7)
CLS
PRINT "Merge the yearly files to a limdep file 4"
PRINT "This program creates 4 binary variables for industry codes"
PRINT "This is the latest version of the merge program"
PRINT "This is the program that will include ALL of the records,"
PRINT "not just the EIN's where there is a record for every year"
PRINT
INPUT "Enter number of years to look at (default is 6):"; fct%
IF fct% = 0 THEN fct% = 6
PRINT "CURRENTLY PRINTING ONLY 84 -"; 83 + fct%
INPUT "Do you want to print EIN's? n(y) :"; pe$
IF LEN(pe$) = 0 THEN pe$ = "n"
PRINT
INPUT "enter the ein file name:"; efile$
INPUT "enter the output file name:"; ofile$
GOSUB loadic:
OPEN "I", #1, efile$
OPEN "O", #2, ofile$
IF pe$ = "y" THEN
   LPRINT "Wo 1 nnH nrr »••«• •  "wDarc II DATE$; "
   LPRINT
   LPRINT
   LPRINT
   LPRINT
   LPRINT
   LPRINT
   END IF
FOR X% = 1 TO fct%
   OPEN "i", x% + 2, infile$(x%)
NEXT x%
FOR x% = 1 TO fct%
   rec$(x%) = getrec$(x%)
NEXT x%
ein$ = getein$
eqcnt% = 0
DO WHILE ein$ <> "999999999"
ecnt% = ecnt% + 1
eqcnt% = 0
FOR z% = 1 TO fct%: fd$(z%) = " ": NEXT z%
FOR x% = 1 TO fct%
   DO WHILE LEFT$(rec$(x%), 9) < ein$
      rec$(x%) = getrec$(x%)
   LOOP
   IF LEFT$(rec$(x%), 9) = ein$ THEN
      eqcnt% = eqcnt% + 1
      fd$(x%) = "+"
   END IF
NEXT x%
IF eqcnt% = fct% THEN
  ocnt& = ocnt& + 1
END IF
GOSUB Checkcont:
IF chcc% = 1 THEN
  GOSUB equalein:
  prtit$ = " ***"
ELSE
  prtit$ = " 
END IF
IF pe$ = "y" THEN
  LPRINT ein$; ">"; fd$(1); fd$(2); fd$(3); fd$(4); fd$(5); fd$(6); fd$(7); "<"; prtit$
ELSE
  PRINT ein$; ">"; fd$(1); fd$(2); fd$(3); fd$(4); fd$(5); fd$(6); fd$(7); "<"; prtit$
END IF
  ein$ = getein$
  eqcnt% = 0
LOOP
CLOSE 1, 2
PRINT "The file is printed"
PRINT "Input EIN file used: " ; efile$
PRINT "output merge file ofile$"
PRINT "number of EIN's in EIN file: " ; ecnt%
PRINT "Number of EIN's where all of the years were used: " ; ocnt&
PRINT "number of EIN's in the output file: " ; pcnt&
PRINT "number of total records in the output file: " ; rcnt&
PRINT
INPUT "Press <Enter> to exit the program" ; ans$
SYSTEM
END
equalein:
IF fd$(5) = "+" THEN
  cp$(5) = MID$(rec$(5), 111, 1)
ELSE
  cp$(5) = " 
END IF
IF fd$(6) = "+" THEN
  cp$(6) = MID$(rec$(5), 111, 1)
ELSE
  cp$(6) = " 
END IF
IF fd$(7) = "+" THEN
    cp$(7) = MID$(rec$(5), 111, 1)
ELSE
    cp$(7) = " 
END IF

IF cp$(5) = "1" OR cp$(6) = "1" OR cp$(7) = "1" THEN
    cp$(1) = "1"
    cp$(2) = "1"
    cp$(3) = "1"
    cp$(4) = "1"
ELSE
    cp$(1) = "0"
    cp$(2) = "0"
    cp$(3) = "0"
    cp$(4) = "0"
END IF

GOSUB calcunion:
buscode1$ = "?"
cpnt& = cpnt& + 1
FOR x% = 1 TO fct%
    IF fd$(x%) = "+" THEN
        rents = rents + 1
        GOSUB DOCALC:
        PRINT #2, USING "##### # ####### ####### # # # 
        MXDBPART&; MXPARTCT&; TOTEMPCTN&; 
        b%(1); b%(2); b%(3); b%(4); empctn&; cp$(x%); 
        PRINT #2, USING "##### # ####### ####### # # # 
        DBADM&; DCADM&; UNNRTIO(x%); 
        UNIONPRT&; TOTCHARG#; TOTCREDT#; PLNTRMIND$; TRMAIND$ 
    END IF
NEXT x%
RETURN

DOCALC:
rc$ = rec$(x%)
MXDBPART& = VAL(MID$(rc$, 12, 10))
MXPARTCT& = VAL(MID$(rc$, 22, 10))
TOTEMPCTN& = VAL(MID$(rc$, 38, 8))
DBADM& = VAL(MID$(rc$, 91, 10))
DCADM& = VAL(MID$(rc$, 101, 10))
TOTCHARG# = VAL(MID$(rc$, 71, 10))
TOTCREDT# = VAL(MID$(rc$, 81, 10))
PLNTRMIND$ = MID$(rc$, 32, 1)
TRMAIND$ = MID$(rc$, 33, 1)
BUSCODE$ = MID$(rc$, 10, 2)
IF x% > 4 THEN
    UNIONPRT& = VAL(MID$(rc$, 112, 8))
ELSE
    UNIONPRT& = 0
END IF
'calculate the business code binary values
IF buscodel$ = "?" THEN
  buscodel$ = MID$(rc$, 10, 1)
  buscode$ = MID$(rc$, 10, 2)
END IF
buscode% = VAL(buscode$)
empcnt$ = icodesS(buscode%, x%)

'code for 4 binary values
FOR z% = 1 TO 4: b%(z%) = 0: NEXT z%
bb% = INSTR("0123456789", buscodel$)
IF bb% = 0 THEN bb% = 2
bbb% = VAL(MID$("1100324331", bb%, 1))
b%(bbb%) = 1
RETURN

'code for 9 binary values
FOR z% = 1 TO 9: b%(z%) = 0: NEXT z%
bb% = INSTR("0123456789", buscodel$)
IF bb% <> 0 AND bb% <> 3 THEN
  b%(bb%) = 1
END IF
RETURN
calcunion:
sigma = 0: scnt% = 0
FOR z% = 5 TO fct%
  IF fd$(z%) = "+" THEN
    scnt% = scnt% + 1
    nmr = VAL(MID$(rec$(z%), 112, 8))
    dnr = VAL(MID$(rec$(z%), 22, 10))
    sigma = sigma + (nmr / dnr)
    unnrtio(z%) = (nmr / dnr) * VAL(MID$(rec$(z%), 22, 10))
  ELSE
    unnrtio(z%) = 0
  END IF
NEXT z%
IF scnt% > 0 THEN
  unnrtavg = sigma / scnt%
ELSE
  unnrtavg = 0
END IF
FOR z% = 1 TO 4
  unnrtio(z%) = VAL(MID$(rec$(z%), 22, 10)) * unnrtavg
NEXT z%
RETURN

Checkcont:
chcc% = 0
IF eqcnt% < 2 THEN RETURN
chk$ = " "
chkcnt% = 0
FOR y% = 1 TO fct%
IF fd$(y%) <> chk$ THEN
  IF chk$ = " " THEN
    chkcnt% = chkcnt% + 1
  END IF
  chk$ = fd$(y%)
END IF
NEXT y%
IF chkcnt% < 2 THEN chcc% = 1
RETURN
loadic:
PRINT "loading the industry code files"
FOR x% = 1 TO fct%
PRINT " opening file "; icfile$(x%)
OPEN "i", #1, icfile$(x%)
DO WHILE NOT EOF(1)
  INPUT #1, icode$, empcnt&
  icode% = VAL(icode$)
  icodes&(icode%, x%) = empcnt&
LOOP
CLOSE 1
NEXT x%
RETURN
FUNCTION getein$
IF EOF(1) THEN
  getein$ = "999999999"
ELSE
  LINE INPUT #1, getein$
END IF
END FUNCTION
FUNCTION getrec$ (recnum%)
IF EOF(recnum% + 2) THEN
  getrec$ =
  "999999999xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx"
ELSE
  LINE INPUT #recnum% + 2, R$
  getrec$ = R$
END IF
END FUNCTION

Program to Set Up the Multinomial Logit Database

DECLARE FUNCTION getrec$ (recnum%)
DECLARE FUNCTION getein$ ()
'Regression #2: REGRESS2.BAS

DIM infile$(7), icfile$(7), mxdbpart&(7)

infile$(1) = "file84.new"
infile$(2) = "file85.new"
infile$(3) = "file86.new"
infile$(4) = "file87.new"
infile$(5) = "file88.new"
infile$(6) = "file89.new"
infile$(7) = "file90.new"
icfile$(1) = "icode84.dat"
icfile$(2) = "icode85.dat"
icfile$(3) = "icode86.dat"
icfile$(4) = "icode87.dat"
icfile$(5) = "icode88.dat"
icfile$(6) = "icode89.dat"
icfile$(7) = "icode90.dat"

DIM icodes&(99, 7)

CLS
PRINT "Regression program #2"
PRINT
fct% = 6
PRINT "CURRENTLY PRINTING ONLY 84 - 89"

INPUT "Do you want to print EIN's? n(y) "; pe$
IF LEN(pe$) = 0 THEN pe$ = "n"
PRINT
INPUT "enter the ein file name:"; efile$
INPUT "enter the output file name:"; ofile$
PRINT "here we go"
'GOSUB loadic:
OPEN "I", #1, efile$
OPEN "O", #2, ofile$
IF pe$ = "y" THEN
    LPRINT "We are looking at"; fct%; " years ";
    LPRINT "EIN file used: "; efile$
    LPRINT "Merge file : "; ofile$
    LPRINT "EIN number Found in file?"
END IF

FOR x% = 1 TO fct%
OPEN "i", x% + 2, infile$(x%)
NEXT x%
FOR x% = 1 TO fct%
    rec$(x%) = getrec$(x%)
NEXT x%
ein$ = getein$
eqcnt% = 0
DO WHILE ein$ <> "999999999"
    ecnt% = ecnt% + 1
    LPRINT ein$;
    LPRINT "Found in file?"
    LPRINT " "
    LPRINT "EIN number Found in file?"
    LPRINT " "
NEXT x%
egcnt% = 0
FOR z% = 1 TO fct%: fd$(z%) = " ": NEXT z%
FOR x% = 1 TO fct%
    DO WHILE LEFT$(rec$(x%), 9) < ein$
        rec$(x%) = getrec$(x%)
    LOOP
    IF LEFT$(rec$(x%), 9) = ein$ THEN
        egcnt% = egcnt% + 1
        fd$(x%) = " + "
    END IF
NEXT x%
IF egcnt% = fct% THEN
    ocnt% = ocnt% + 1
END IF
GOSUB Checkcont:
IF chcc% = 1 THEN
    GOSUB equalein:
    PRINT #2, USING " ! ! ! ########  ########  ########  \"
        ; permdb$; stoppeddb$; stoppedplan$; mxdbpart&; mxpartct&;
        totempcnt&; frstretage$;
    PRINT #2, USING " \ ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! "; maxretage$; topheavy$; integss$; funddef$;
        planterm$; unionpart#; maxoverfnd#; maxundfnd#;
    PRINT #2, USING " # # # # # # # # "; b%(1); b%(2); b%(3);
        b%(4); b%(5); b%(6); b%(7); b%(8); b%(9)
        prtit$ = " ***"
ELSE
    prtit$ = " 
END IF
IF pe$ = "y" THEN
    LPRINT ein$; " >"; fd$(1); fd$(2); fd$(3); fd$(4); fd$(5);
    fd$(6); fd$(7); " <"; prtit$; " " ; permdb$; " ";
    stoppeddb$; " " ; stoppedplan$
    LPRINT " >"; db$(1); db$(2); db$(3); db$(4);
    db$(5); db$(6); db$(7); " <" ; prtit$
ELSE
    PRINT ein$; " >"; fd$(1); fd$(2); fd$(3); fd$(4); fd$(5);
    fd$(6); fd$(7); " <"; prtit$; " " ; permdb$; " ";
    stoppeddb$; " " ; stoppedplan$
    PRINT " >"; db$(1); db$(2); db$(3); db$(4);
    db$(5); db$(6); db$(7); " <" ; prtit$
END IF
    ein$ = getein$
    egcnt% = 0
LOOP
CLOSE 1, 2
PRINT "The file is printed"
PRINT "Input EIN file used:"; efile$
PRINT "output merge file :"; ofile$
PRINT "number of EIN's in EIN file :"; ecnt%
PRINT
PRINT "Number of records in output limdep file:"; pcnt&
PRINT "Number of records where all years used :"; ocnt&
PRINT
INPUT "Press <Enter> to exit the program"; ans$
SYSTEM
END

equalein:
GOSUB calcunion:
pcnt& = pcnt& + 1
rc$ = rec$(firstdb%)
mxdbpart& = VAL(MID$(rc$, 12, 10))
mpartct& = VAL(MID$(rc$, 22, 10))
totempcnt& = VAL(MID$(rc$, 38, 8))
frstretage$ = MID$(rc$, 56, 2)
topheavy$ = "0"
tegs$ = "0"
undf$ = "0"
planterm$ = "0"
maxage$ = frstretage$
maxoverfnd# = 0
maxundf# = 0
unionpart# = unnrtio(firstdb%)
IF firstdb% > 4 THEN
    unionprts = VAL(MID$(rc$, 112, 8))
ELSE
    unionprts = 0
END IF
IF firstdb% > 4 THEN
    unionprt& = VAL(MID$(rc$, 112, 8))
ELSE
    unionprt& = 0
END IF
'code for 9 business code binary values
buscode$ = MID$(rc$, 10, 1)
FOR z% = 1 TO 9: b%(z%) = 0: NEXT z%
bb$ = INSTR("0123456789", buscode$)
IF bb$ <> 0 AND bb$ <> 3 THEN
    b%(bb$) = 1
END IF
FOR x% = firstdb% TO fct%
IF fds$(x%) = "+" AND db$(x%) = "^" THEN
    rc$ = rec$(x%)
    IF MID$(rc$, 36, 1) = "1" THEN toph# = "1"
    IF MID$(rc$, 37, 1) = "1" THEN funddef$ = "1"
    IF MID$(rc$, 35, 1) = "1" THEN integs$ = "1"
    IF MID$(rc$, 56, 2) > maxage$ THEN maxage$ =
MID$(rc$, 56, 2)
IF MID$(rc$, 32, 1) = "1" OR MID$(rc$, 33, 1) = "1" THEN
planterm$ = "1"
totcharg# = VAL(MID$(rc$, 71, 10))
totcredt# = VAL(MID$(rc$, 81, 10))
sum# = totcredt# - totcharg#
IF sum# > maxoverfnd# THEN maxoverfnd# = sum#
IF sum# < maxundfnd# THEN maxundfnd# = sum#
END IF
NEXT x%
RETURN

'code for 4 binary values
FOR Z% = 1 TO 4: b%(Z%) = 0: NEXT Z%
bb% = INSTR("0123456789", buscodel$)
IF bb% = 0 THEN bb% = 2
bbb% = VAL(MID$("1100324331", bb%, 1))
b%(bbb%) = 1
RETURN

calcunion:
sigma = 0: scnt% = 0
FOR z% = 5 TO fct%
IF fd$(z%) = "+" THEN
 nmr = VAL(MID$(rec$(z%), 112, 8))
dnr = VAL(MID$(rec$(z%), 22, 10))
sigma = sigma + (nmr / dnr)
unnrtio(z%) = VAL(MID$(rec$(z%), 112, 10))
scnt% = scnt% + 1
ELSE
 unnrtio(z%) = 0
END IF
NEXT Z%
IF scnt% > 0 THEN
 unnrtavg = sigma / scnt%
ELSE
 unnrtavg = 0
END IF
FOR z% = 1 TO 4
unnrtio(z%) = VAL(MID$(rec$(z%), 22, 10)) * unnrtavg
NEXT z%
RETURN

Checkcont:
chkcc% = 0
FOR x% = 1 TO fct%: db$(x%) = "": NEXT x%
IF eqcnt% < 2 THEN RETURN
permdb$ = "0"
stoppeddb$ = "0"
stoppedplan$ = "0"
chkcnt% = 0
chkcnt2% = 0
yrcnt% = 0
firstdb% = 0
lastdb% = 0
FOR y% = 1 TO fct%
  IF fd$(y%) = "+" THEN
    yrcnt% = yrcnt% + 1
    rc$ = rec$(y%)
mxdbp%(y%) = VAL(MID$(rc$, 12, 10))
    IF mxdbp%(y%) > 0 THEN
      db$(y%) = "+"
      IF chkcnt% = 0 THEN
        firstdb% = y%
        END IF
      chkcnt% = chkcnt% + 1
      lastdb% = y%
      END IF
  IF firstdb% > 0 THEN
    chkcnt2% = chkcnt2% + 1
  END IF
  END IF
END IF
NEXT y%
IF chkcnt% = 0 THEN
  RETURN
ELSE
  chcc% = 1
  IF chkcnt% = chkcnt2% THEN
    IF lastdb% = fct% THEN
      permdb$ = "1"
    ELSE
      stoppedplan$ = "1"
    END IF
  ELSE
    stoppeddb$ = "1"
  END IF
END IF
RETURN

loadic:
PRINT "loading the industry code files"
FOR x% = 1 TO fct%
PRINT " opening file "; icfile$(x%)
OPEN "i", #1, icfile$(x%)
DO WHILE NOT EOF(1)
INPUT #1, icode$, empcnt&
  icode% = VAL(icode$)
icodes&(icode%, x%) = empcnt&
LOOP
CLOSE 1
END IF
RETURN
FUNCTION getein$
IF EOF(1) THEN
    getein$ = "999999999"
ELSE
    LINE INPUT #1, getein$
END IF
END FUNCTION

FUNCTION getrec$ (recnum%)
IF EOF(recnum% + 2) THEN
    getrec$ = 
    "999999999xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx"
ELSE
    LINE INPUT #recnum% + 2, r$
    getrec$ = r$
END IF
END FUNCTION
APPENDIX D

1988 Form 5500 and Schedule B
Annual Return/Report of Employee Benefit Plan
(With 100 or more participants)

This form is required to be filed under sections 104 and 4065 of the Employee Retirement Income Security Act of 1974 and sections 6039, 6057(h), and 6059 of the Internal Revenue Code, referred to as the Code.

For the calendar plan year 1988 or fiscal plan year beginning , 1988, and ending , 1988.

Caution: A penalty for the late or incomplete filing of this return/report will be assessed unless reasonable cause is established.

Check box if plan year changed since the last return/report filed, check this box •

If (i) through (iii) do not apply to this year's return/report, leave the boxes unmarked. This return/report is:

- [ ] Yes •  No. If No, enter the information from the last return/report in a and/or b

Check the appropriate box to indicate the type of plan entity (check only one box):

- [ ] Single-employer plan
- [ ] Multiemployer plan
- [ ] Plan of controlled group of corporations or common control employers
- [ ] Multiple-employer—collectively bargained plan
- [ ] Group insurance arrangement (of welfare plans)

Name of plan sponsor (employer if for a single-employer plan)

Name of plan administrator (if same as plan sponsor, enter "Same")

City or town, state, and ZIP code

City or town, state, and ZIP code

EIN

Plan number

Business code number

Administrator's employer identification no.

Administrator's issuer number

Effective date of plan

Retirement benefit plan (plan numbers 501 through 999) must check applicable items (A) through (P) and 6c.

Pension benefit plan (plan numbers 501 through 999) must check applicable items in (i) through (vii) and answer 6c through 6f.

Signatures of employee/administrator:

Date

Form 5500 (1988)
Other plan features:

- ☐ ESOP
- ☐ Leveraged ESOP
- ☐ Participant-directed account plan
- ☐ Pension plan maintained outside the United States
- ☐ Master trust (see instructions)
- ☐ 103-12 investment entity (see instructions)
- ☐ Common/collective trust
- ☐ Pooled separate account

Single-employer plans enter the tax year end of the employer in which this plan year ends. Month Day Year

Is the employer a member of an affiliated service group?

Does this plan contain a cash or deferred arrangement described in Code section 401(k)?

Number of participants as of the end of the plan year (welfare plans complete only (iv), b, c, and d):

- Active participants:
  - Number fully vested
  - Number partially vested
  - Number not vested
- Retired or separated participants receiving benefits
- Retired or separated participants entitled to future benefits
- Subtotal (add (i), (ii), and (iii))

Total (add (i) and (iv))

Was any participant(s) separated from service with a deferred vested benefit for which a Schedule SSA (Form 5500) is required to be attached to this form?

If "Yes," enter the number of separated participants required to be reported

Were any plan amendments adopted during the plan year?

Did any amendment result in the retroactive reduction of accrued benefits for any participant?

Enter the date the most recent amendment was adopted. Month Day Year

If "Yes," did any amendment change the information contained in the latest summary plan descriptions or summary description of modifications available at the time of the amendment?

If "Yes," has a summary plan description or summary description of modifications that reflects the plan amendments referred to in (d) been furnished to participants and filed with the Department of Labor?

Was this plan terminated during this plan year or any prior plan year?

Were all plan assets either distributed to participants or beneficiaries, transferred to another plan, or brought under the control of PBGC?

Was a resolution to terminate this plan adopted during this plan year or any prior plan year?

If "Yes," have you received a favorable determination letter from IRS for the termination?

Has a determination letter been requested from IRS?

Has Form 5310 been filed?

In this plan year, was this plan merged or consolidated into another plan(s), or were assets or liabilities transferred to another plan(s)?

If "Yes," identify other plan(s):

Employer identification number(s)

Plan number(s)

Has Form 5510 been filed?

Is this a plan established or maintained pursuant to one or more collective bargaining agreements?

If "Yes," enter the appropriate six-digit LM number(s) of the sponsoring labor organization(s) (see instructions):

If any benefits are provided by an insurance company, insurance service, or similar organization, enter the number of Schedules A (Form 5500), Insurance Information, that are attached. If none, enter "O."
15. If this is a defined benefit plan, is it subject to the minimum funding standards for this plan year? 
   If "Yes," attach Schedule B (Form 5500).
   If "Yes," complete (i), (ii), and (iii) below:
   (i) Amount of employer contribution required for the plan year under Code section 412 $[10000].
   (ii) Amount of contribution paid by the employer for the plan year $[100].
   (iii) Enter date of last payment by employer: Month Day Year.

16. Has the plan been top-heavy at any time beginning with the 1984 plan year?

17. Has the plan accepted any transfers or rollovers with respect to a participant who had attained age 70½?

18a. If the plan distributed any annuity contracts this year, did these contracts contain a requirement that the spouse consent before any distributions under the contract are made in a form other than a qualified joint and survivor annuity?
   a. Did the plan make distributions to participants or spouses in a form other than a qualified joint and survivor annuity? (If a waiver was granted, see instructions.)
   b. Did the plan make distributions or loans to married participants and beneficiaries without the required consent of the participant’s spouse?
   c. Upon plan amendment or termination, do the accrued benefits of every participant include the subsidized benefits that the participant may become entitled to receive subsequent to the plan amendment or termination?

19. Were the spousal consent requirements for distributions under Code section 417(e) complied with?
   a. Were any contributions made or benefits accrued in excess of the Code section 415 limits, as amended by theTax Reform Act of 1986?
   b. Has the plan made the required distributions in 1988 under Code section 401(a)(9)?

20. Is it intended that this plan qualify under Code section 401(a)?
   a. Is "Yes," complete b and c.
   b. Enter the date of the most recent IRS determination letter Month Year.
   c. Is a determination letter request pending with IRS?

21. Is the plan integrated with social security or railroad retirement?

22. Does the plan satisfy the percentage test of Code section 410(b)(1)(A)?
   a. Is "Yes," complete b through i. If "No," complete only b and c below and see specific instructions.
   b. Number of employees who are aggregated with employees of the employer as a result of the employer being aggregated with any employer covered by this plan under Code section 414(b), (c), or (m)...
   c. Total number of employees (including any employees aggregated in b)...
   d. Number of employees excluded under the plan because of (i) minimum age or years of service, (ii) employees on whose behalf retirement benefits were the subject of collective bargaining, or (iii) nonresident aliens who receive earned income from United States sources...
   e. Total number of employees not excluded (subtract d from c)...
   f. Employees ineligible (specify reason)...
   g. Employees eligible but not participating (subtract f from e)...
   h. Employees participating (subtract h from g)...

23a. Is it intended that this plan qualify under Code section 401(a)?
   a. Is "Yes," complete b and c.
   b. Enter the total number of plans, including this plan.
   c. Does the employer/sponsor listed in 1a of this form maintain other qualified pension benefit plans?

24a. If this is a plan with Employee Stock Ownership features, was a current appraisal of the value of the stock made immediately before any contribution of stock or the purchase of the stock by the trust for the plan year covered by this return/report?

25. Is this plan integrated with social security or railroad retirement?

26. Does the employer/sponsor listed in 1a of this form maintain other qualified pension benefit plans?
   a. If "Yes," add the number of plans, including this plan.

27. If this plan is an adoption of a master, prototype, or uniform plan, indicate which type by checking the appropriate box:
   a. Master
   b. Prototype
   c. Uniform
28a. Did any person who rendered services to the plan receive directly or indirectly $5,000 or more in compensation from the plan during the plan year (except for employees of the plan who were paid less than $1,000 in each month)?
   
   If "Yes," complete Part I of Schedule C (Form 5500).

28b. Did the plan have any trustees who must be listed in Part II of Schedule C (Form 5500)?

29a. Has there been a termination in the appointment of any person listed in e below?
   
   If "Yes," check the appropriate box(es), answer e and f, and complete Part III of Schedule C (Form 5500):
   
   (i) Accountant
   (ii) Enrolled actuary
   (iii) Insurance carrier
   (iv) Custodian
   (v) Administrator
   (vi) Investment manager
   (vii) Trustee
   
   Have there been any outstanding material disputes or matters of disagreement concerning the above termination?

30a. Is this plan exempt from the requirement to engage an independent qualified public accountant?

31. Did the plan acquire individual whole life insurance contracts during the plan year?

32. During the plan year:
   
   a. (i) Was this plan covered by a fidelity bond?
   
   (ii) If (i) is "Yes," enter amount of bond.

   b. (i) Was there any loss to the plan, whether or not reimbursed, caused by fraud or dishonesty?
   
   (ii) If (i) is "Yes," enter amount of loss.

33a. Is the plan covered under the Pension Benefit Guaranty Corporation termination insurance program?

   a. If a is "Yes" or "Not determined," enter the employer identification number and the plan number used to identify it.
Current value of plan assets and liabilities at the beginning and end of the plan year. Combine the value of plan assets held in more than one trust. Allocate the value of the plan's interest in a commingled trust containing the assets of more than one plan on a line-by-line basis unless the trust meets one of the specific exceptions described in the instructions. Do not enter the value of that portion of an insurance contract which guarantees, during this plan year, to pay a specific dollar benefit at a future date. Round off amounts to the nearest dollar. Plans with no assets at the beginning and the end of the plan year, enter zero on line 34f.

<table>
<thead>
<tr>
<th>Assets</th>
<th>(a) Beginning of Year</th>
<th>(b) End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Total noninterest-bearing cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b Receivables (net):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Employer contributions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Participant contributions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c General investments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Interest-bearing cash (including money market funds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Certificates of deposit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) U.S. Government securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Corporate debt instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Corporate stocks:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Preferred</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) Common</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) Partnership/joint venture interests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) Real estate:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Income-producing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) Nonincome-producing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(viii) Loans (other than to participants) secured by mortgages:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Residential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) Commercial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ix) Loans to participants:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Mortgages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x) Other loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(xi) Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(xii) Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d Employer-related investments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Employer securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) Employer real property</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e Buildings and other property used in plan operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f Total assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g Benefit claims payable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h Operating payables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i Acquisition indebtedness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j Other liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k Total liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l Net Assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Line l minus line k
Plan income, expenses, and changes in net assets for the plan year:

Include all income and expenses of the plan, including any trust(s) or separately maintained fund(s), and any payments/receipts to/from insurance carriers. Round off amounts to the nearest dollar.

**Income**

<table>
<thead>
<tr>
<th>(a) Contributions:</th>
<th>(b) Earnings on investments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Received or receivable from:</td>
<td>(i) Interest:</td>
</tr>
<tr>
<td>(A) Employers</td>
<td>(A) Interest-bearing cash (including money market funds)</td>
</tr>
<tr>
<td>(B) Participants</td>
<td>(B) Certificates of deposit</td>
</tr>
<tr>
<td>(C) Others</td>
<td>(C) U.S. Government securities</td>
</tr>
<tr>
<td>(II) Noncash contributions</td>
<td>(D) Corporate debt instruments</td>
</tr>
<tr>
<td>(B)</td>
<td>(E) Mortgage loans</td>
</tr>
<tr>
<td></td>
<td>(F) Other loans</td>
</tr>
<tr>
<td></td>
<td>(G) Other</td>
</tr>
</tbody>
</table>

(b) Earnings on investments:

(i) Interest:

(A) Interest-bearing cash (including money market funds)

(B) Certificates of deposit

(C) U.S. Government securities

(D) Corporate debt instruments

(E) Mortgage loans

(F) Other loans

(G) Other

(ii) Dividends:

(A) Preferred stock

(B) Common stock

(iii) Rents

(iv) Net gain (loss) on sale of assets:

(A) Aggregate proceeds

(B) Aggregate costs

(v) Unrealized appreciation (depreciation) of assets

(vi) Net investment gain (loss) from certain investment arrangements—see instructions

c Other income

d Total income (add a, b, and c)

<table>
<thead>
<tr>
<th>Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e) Benefit payment and payments to provide benefits:</td>
</tr>
<tr>
<td>(i) Directly to participants or beneficiaries</td>
</tr>
<tr>
<td>(ii) To insurance carriers for the provision of benefits</td>
</tr>
<tr>
<td>(iii) Other</td>
</tr>
</tbody>
</table>

(f) Interest expense

g Administrative expenses:

(i) Salaries and allowances

(ii) Accounting fees

(iii) Actuarial fees

(iv) Contract administrator fees

(v) Investment advisory and management fees

(vi) Legal fees

(vii) Valuation/appraisal fees

(viii) Trustees fees/expenses (including travel, seminars, meetings, etc.)

<table>
<thead>
<tr>
<th>Other</th>
</tr>
</thead>
</table>

h Total expenses (add e, f, and g)

i Net income (loss) (d minus h)

j Transfers to (from) the plan (see instructions)

k Net assets at beginning of year (line 341, column (a))

l Net assets at end of year (line 341, column (b))

Yes: No

Did any employer sponsoring the plan pay any of the administrative expenses of the plan that were not reported in column (g)?

Yes: No

<table>
<thead>
<tr>
<th>Total</th>
</tr>
</thead>
</table>

Yes: No
SCHEDULE B
(Form 5500)  
Department of the Treasury
Internal Revenue Service
Employee Retirement Income Security Act of 1974, referred to as ERISA, and section 6059(a) of the Internal Revenue Code, referred to as the Code.

Actuarial Information

This schedule is required to be filed under section 104 of the Employee Retirement Income Security Act of 1974, referred to as ERISA, and section 6059(a) of the Internal Revenue Code, referred to as the Code.

- Attach to Forms 5500, 5500-C, 5500-R, or 5500EZ if applicable.

This Form Is Open to Public Inspection

For calendar plan year 1988 or fiscal plan year beginning , 1988, and ending , 1988.

- Please complete every item on this form. If an item does not apply, enter "N/A." • Round off amounts to nearest dollar.

- Caution: A penalty of $1,000 will be assessed for late filing of this report unless reasonable cause is established.

- Name of plan sponsor as shown on line 1a of Form 5500, 5500-C, 5500-R, or 5500EZ

- Employer identification number

- Enter three-digit employer identification number • Yes • No

- Has a waiver of a funding deficiency for this plan been approved by the IRS?

- If "Yes," attach a copy of the IRS approval letter.

- Is a waived funding deficiency of a prior plan year being amortized in this plan year?

- If "Yes," attach a copy of the IRS approval letter.

- Has the actuarial information been prepared for this plan year by an actuary?

- If "Yes," attach a copy of the IRS approval letter.

- Is this plan a multiemployer plan which, for this plan year, is in reorganization?

- If "Yes," you are required to attach the information described in the instructions.

- Has a change in funding method for this plan year been made?

- If "Yes," attach either a copy of the letter showing IRS approval or state applicable Revenue Procedure authorizing approval if used.

- Operational Information:

- Enter most recent actuarial valuation date

- Enter date(s) and amount of contributions received this plan year for prior plan years and not previously reported:

- Current value of the assets accumulated in the plan as of the beginning of the plan year

- Present value of vested benefits as of the beginning of the plan year:

- (i) For retired participants and beneficiaries receiving payments

- (ii) For other participants

- (iii) Total

- Present value of nonvested accrued benefits as of the beginning of the plan year

- Number of persons covered (included in the most recent actuarial valuation):

- (i) Active participants

- (ii) Terminated participants with vested benefits

- (iii) Retired participants and beneficiaries of deceased participants

- Contributions made to the plan for the plan year by employer(s) and employees:

<table>
<thead>
<tr>
<th>Month Year</th>
<th>Amount paid by employer</th>
<th>Amount paid by employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
</tr>
<tr>
<td></td>
<td>(c)</td>
<td>(d)</td>
</tr>
<tr>
<td></td>
<td>(e)</td>
<td>(f)</td>
</tr>
</tbody>
</table>

- Total

Statement by Enrolled Actuary (see instructions before signing):

To the best of my knowledge, the information noted in this schedule and the accompanying statement, if any, is correct and accurate, and in my opinion the assumptions used in the aggregate (a) are reasonably related to the experience of the plan and to reasonable expectations, and (b) represent my best estimate of anticipated experience under the plan.

Signature of actuary

Date

Print or typewrite name of actuary

Name and address

For Paperwork Reduction Act Notice, see the instructions for Form 5500

Schedule B (Form 5500) 1988

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Schedule B (Form 5500, 1988)

8. Funding standard account and other information:
   a) Accrued liabilities as determined for funding standard account as of (enter date) ....
   b) Value of assets as determined for funding standard account as of (enter date) ....
   c) Unfunded liability for spread-gain methods with bases as of (enter date) ....
   d) Actuarial gains or (losses) for period ending ....
   e) Shortfall gains or (losses) for period ending ....
   f) Amount of contribution certified by the actuary as necessary to reduce the funding deficiency to zero, from 9m or 10h (or the attachment for 4b if required) ....

9. Funding standard account statement for the plan year ending ....
   a) Employer's normal cost for plan year as of mo. day yr. ....
   b) Amortization charges
      (i) Funding waivers (outstanding balance as of mo. day yr. $)
      (ii) Other than waivers (outstanding balance as of mo. day yr. $)
   c) Interest as applicable to the end of the plan year on a, b, and c ....
   d) Total charges (add a through c) ....
   e) Credits to funding standard account:
      f) Prior year credit balance, if any ....
      g) Employer contributions (total from column (b) of item 7) ....
      h) Amortization credits (outstanding balance as of mo. day yr. $)
      i) Interest as applicable to end of plan year on f, g, and h ....
      j) Other (specify) ....
   f) Total credits (add f through j) ....
   g) Balance:
      h) Credit balance: if k is greater than e, enter the difference ....
      i) Funding deficiency: if e is greater than k, enter the difference ....

10. Alternative minimum funding standard account (omit if not used):
    a) Was the entry age normal cost method used to determine entries in item 9 above? ....
       i) Yes ....
       ii) No ....
    b) Prior year alternate funding deficiency, if any ....
    c) Normal cost ....
    d) Excess, if any, of value of accrued benefits over market value of assets ....
    e) Interest on b, c, and d ....
    f) Employer contributions (total from column (b) of item 7) ....
    g) Interest on f ....
    h) Funding deficiency: if the sum of b through e is greater than the sum of f and g, enter difference ....

11. Actuarial cost method used as the basis for this plan year's funding standard account computation:
    a) Attained age normal ....
    b) Aggregate ....
    c) Entry age normal ....
    d) Individual level premium ....
    e) Other (specify) ....

12. Checklist of certain actuarial assumptions:
    a) Rates specified in insurance or annuity contracts ....
    b) Mortality table code:
       (i) Males ....
       (ii) Females ....
    c) Interest rate ....
    d) Retirement age ....
    e) Expense loading ....
    f) Annual withdrawal rate:
       (i) Age 25 ....
       (ii) Age 40 ....
       (iii) Age 55 ....
    g) Ratio of salary at normal retirement to salary at:
       (i) Age 25 ....
       (ii) Age 40 ....
       (iii) Age 55 ....
    h) Investment return on actuarial value of plan assets for the year ending on the valuation date ....

[Note: The image contains a form with various sections and details related to financial and actuarial information for a funding standard account.]
REFERENCES


Chernoff, Joel, "Crushed by the Weight: Fifteen Years Later, Is ERISA Too Much of a Good Thing?" *Pension World* (September 1989).


Yoder, Edwin M., "Pension Plans are the S&L’s of the 90’s," Houston Chronicle, (December 26, 1992): 36A.