THE EFFECT OF COSTLY VS. COSTLESS PENSION DISCLOSURE ON COMMON SHARE PRICES

By

DAVID ALLEN DURKEE

Bachelor of Arts
Brigham Young University
Provo, Utah
1965

Master of Business Administration
University of Utah
Salt Lake City, Utah
1972

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Thesis Approved:

James R Boatsman
Thesis Adviser

James E Groff

W. Gary Simpson

Kirkham Custis

Gary Meeks

Norman N. Durham
Dean of the Graduate College

PREFACE

This study examines whether the form of information disclosure (costly versus costless) affects the way that information impacts stock prices. Prior to 1980, certain pension data were filed with the Department of Labor and the Internal Revenue Service pursuant to the provisions of the Employee Retirement Income Security Act. These data were then compiled and made available to the public at a nominal cost. Beginning in 1980, these data were disclosed at no cost to the investor as part of the annual financial statements under Statement No. 36 of the Financial Accounting Standards Board. In this study annual abnormal stock returns were regressed on pre- and post-Statement No. 36 pension variables for a sample of reporting firms. These individual period regressions were compared to a pooled regression (for all periods) to determine whether the relationship between the pension variables and the abnormal stock returns was altered by the costless public disclosure of these data.

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CHAPTER I

THE RESEARCH PROBLEM

Introduction

Public availability of financial information is required by disclosure laws. The extent and form of this disclosure is determined by such government organizations as the Securities and Exchange Commission (SEC) and such private organizations as the Financial Accounting Standards Board (FASB). Firms also voluntarily disseminate financial information in a variety of ways. Investors and potential investors have access to a considerable amount of this financial information without incurring private cost. Since not all information is available at no cost to the investor, it follows that by incurring private cost an investor could obtain additional information that may be advantageous in developing trading strategies. In order for these private costs to be incurred, the investor would have to assess the usefulness of the information itself in terms of potential excess returns from the trading strategy adopted. This suggests that the benefits from information acquired at a cost and used in forming superior portfolio strategies will, at the margin, equal the costs associated with its acquisition.

One measure of the usefulness of financial information is its effect on stock prices when it is publicly disclosed. Beaver (1981) defines market efficiency with respect to the price mechanism. A security market is efficient with respect to an information system,

> if and only if prices act as if everyone observes the signals from the information system. In other words, prices act as if there is universal knowledge of the information. If prices have this property, they 'fully reflect' the information system.

Capital market theories provide the link that connects the accounting information system to its function in capital markets. Research generally supports the proposition that prices fully reflect accounting information that is available at no private cost to the public (see Lev and Ohlson, 1982). The impact on stock prices from information available at private cost is less clear, however. If the market is rational with respect to information cost, information is impounded in security prices for which the marginal benefit to the market exceeds the expected marginal benefit of producing and impounding it. Information could exist which is not impounded in stock prices because it is not remunerative to do so. According to May and Sundem (1973), the price structure of securities could be different with changes in the cost structure of information. For example, information which is available at a cost to the investor may not be impounded in security prices because of its cost. If the FASB subsequently requires this same

information to be disclosed and made costlessly available to the public, that information may then be impounded in market price. The issuance of Statement on Financial Accounting Standard (SFAS) No. 36, "Disclosure of Pension Information," in 1980 provides an opportunity to examine this issue.

SFAS No. 36 requires disclosure of pension information that was not required previously in a firm's published financial statements. SFAS No. 36 makes this data available at no cost to the individual. Prior to 1980, however, firms were required to report pension data annually to the Department of Labor (DOL) and Internal Revenue Service (IRS) under provisions of the Employment Retirement Income Security Act (ERISA) of 1974. The pension disclosures made under ERISA to the DOL/IRS were available at a cost to any interested individual for periods prior and subsequent to the issuance of SFAS No. 36. In 1980, some of the data filed with the DOL/IRS under ERISA were required to be disclosed in published financial statements by SFAS No. 36.

The issuance of SFAS No. 36 is one example of FASB taking data that are available at private cost and mandating their disclosure in published financial statements, which are cost free to the public. These data were available previously by simply requesting them from the IRS and paying a copying charge. FASB acts as if even these trivial costs prevent some information from reaching the market. Thus, there is benefit from mandating its costless disclosure. The reporting requirements of SFAS No. 36 provide an

opportunity to examine the effect of the cost of information on market efficiency using two information sources. Specifically, the purpose of this research is to compare the market effects of costly DOL/IRS pension information with its costless disclosure under SFAS No. 36.

The relationship between selected pension variables and stock prices is examined for the year prior to SFAS No. 36 and the three subsequent years. It is assumed that stock prices fully reflect the pension disclosures under SFAS No. 36 subsequent to their disclosure. If the same relationship between pension variables and stock prices exists for the pre-disclosure and post-disclosure years, it can be concluded that any information content of SFAS No. 36 was already fully reflected in securities prices from disclosures made to the IRS/DOL under ERISA. If a different relationship is found between the pre- and post-disclosure years, it can be concluded that the costly pension information that is available from the DOL/IRS was not fully reflected in stock prices. Such a finding would reinforce the role of FASB in standard setting for financial reporting since much information available in published financial statements can have been obtained earlier by users at private cost.

Organization of the Thesis

The remainder of this thesis is organized as follows: Chapter II develops the concepts of efficient markets and sketches the historical development of pension reporting.

Particular attention is given to ERISA and changes in pension reporting required by FASB. The ability of reported pension measures (e.g., pension expense, unvested and vested pension benefits, and net assets available for benefits) to affect common stock prices is also examined. Chapter III develops the methodology employed in this study. The test periods as well as variables are defined. Sample selection procedures are discussed. The research model and test statistic are then developed. Chapter IV presents the results of the research, and certain limitations of the study are discussed. Chapter V summarizes the major conclusions of the research, and the significance and various implications of the study are discussed.

CHAPTER II

LITERATURE REVIEW

The following review of the literature is divided into four categories. The first category briefly reviews the pertinent literature related to efficient capital markets which forms the theoretical framework for this study. The second category includes a review of legislation related to corporate pension plans and pension plan disclosure, principally ERISA. The third category reviews the authoritative literature provided by the American Institute of Certified Public Accountants (AICPA) and FASB concerning accounting requirements for corporate pension plans. The fourth category reviews empirical studies of the effect of reported pension disclosures on common stock prices.

Efficient Capital Markets

Fama (1970) defines market efficiency as a market where prices "fully reflect" the information available. He describes three major forms of market efficiency:

1. The market is efficient in the weak form if prices fully reflect information regarding past prices. If the market is weak-form efficient, the information in past prices or returns is not

relevant in obtaining excess returns. No investor can earn excess returns from a trading strategy based on historical prices or returns.

2. The market is efficient in the semi-strong form if prices fully reflect all publicly available information. If the market is semi-strong form efficient, no investor can earn excess returns based on publicly available information. Equilibrium prices react instantaneously and in an unbiased fashion to new information.

3. The market is efficient in the strong form if prices fully reflect all information including insider information. If the market is strong form efficient, no investor can earn excess returns using any information, regardless of its source whether or not it is publicly available.

Empirical evidence is generally supportive of the semi-strong form of market efficiency (see Dyckman and Morse, 1986).

Beaver (1981) distinguishes between information system efficiency and signal efficiency. He defines market efficiency with respect to the equality of security prices under two information configurations: with and without universal access to the information system of interest. A securities market is only efficient with respect to an information system, according to Beaver, if securities

prices act as if everyone knows the information system. Prices then "fully reflect" the information system.

"Good news" regarding a specific company will benefit shareholders if it is immediately made publicly available since the market value of the stock will increase. "Material" information is information which would be important to a reasonable investor considering a transaction in the security concerned and which, if disclosed, would reasonably be expected to affect the market price of the security (Ronen, 1977). When "material" information is made available publicly, it is fully reflected in the security price if the market is efficient in the semi-strong form.

The impact of accounting data on the stock prices of affected firms has been the subject of numerous studies (see Lev and Ohlson, 1982). These "event" studies are a test of market efficiency and have been employed to test market reactions to such events as stock splits, earnings reports, and other financial disclosures. A related issue is the economic consequences of accounting regulation and policy decisions which have spawned a number of event studies on the impact of such decisions on firms' security prices (see Collins and Dent, 1984). An abnormal security return which persists after a particular event is not consistent with the hypothesis that security prices adjust quickly to new publicly available information. If an event is unanticipated, the effect of the event on the magnitude

of the abnormal performance at the date the event occurs is a measure of the impact of that event on the wealth of the firm's shareholders (Brown and Warner, 1980). Accordingly, the information content of annual earnings announcements is reduced because alternative information sources are available preceding the publication of financial statements (Ball and Brown, 1968). Grant (1980), however, finds that the annual earnings announcements of over-the-counter firms appear to possess more information content than those of NYSE firms. He attributes his findings to the different amounts of interim information available on the two groups. In this study, the IRS/DOL reports are one potential source of pension data that could have been impounded in stock prices even before these data were required to be disclosed in financial statements under SFAS No. 36.

Several articles have been published on the value of public information (Hirshleifer (1971), Hirshleifer and Riley (1979), Verrecchia (1982)). Access to information may be the key to differential rewards from investment in capital markets. Corporate insiders are thought to have access to private information which provides them with an advantage in investments. If the market is efficient in the semi-strong form, insiders could use their information profitably, but once the information is made public, it will not have further trading value. Empirical research generally supports this position (Jaffe (1974), Ronen (1977), Finnerty (1976), Baesel and Stein (1979)). After

insiders act, the short-term effect is that the market follows either because the information is made public or because insider trading prompts the public to acquire or dispose of the same stock. In this latter case, the market will generally follow the lead of insiders. Applying Beaver's definition of market efficiency, prices will soon act as if everyone observes the signals from the insider's information system.

The present study assumes the semi-strong form of market efficiency. It extends the research cited by investigating the market effect of information available to the public at private cost. If the market is efficient with respect to the pension disclosures made to the DOL/IRS, common stock prices will fully reflect the information they contain if the perceived benefits from the information exceed the private costs required to obtain it.

Legislation Related to Pension Plans

Legislation related to pension plans is reviewed in order to examine the evolution of the DOL/IRS pension disclosures which form one data base for this study.

There are two basic types of pension plans: defined contribution and defined benefit. A defined contribution plan guarantees only that benefits will be paid from present contributions which will be invested until retirement. No fixed sum benefit on retirement is specified.

In a defined benefit plan, however, contributions to a pension fund occur periodically over the periods of employment, but the size of the retirement benefit is fixed by contract. Generally, if contributions and fund earnings are inadequate to pay benefits, additional contributions must be made by the employer.

The primary statutory source of regulation of private pension plans prior to 1974 was the Internal Revenue Code, which had only limited objectives. The Revenue Act of 1921 and the Internal Revenue Act of 1942 made private pension plans attractive for tax reasons. They allowed current deductions of pension contributions for employees, exclusion of the contributions from employee income and tax exemption of income earned by the pension trust (Munnel, 1982).

There was no single law or body of law that regulated all aspects of private pensions prior to the enactment of ERISA in 1974. ERISA gave joint jurisdiction over private pension plans to the DOL and the Treasury Department. The DOL was given primary jurisdiction over reporting, disclosure, and fiduciary matters. The Treasury Department was given jurisdiction over participation, vesting, and funding (McGill, 1975).

The primary aims of ERISA are the reduction of employee uncertainty about pension claims and the standardization of pension contracts (Logue, 1979). ERISA makes it easier for employees to qualify and acquire rights

to pension benefits, and prescribes that firms follow one of three vesting rules. Funding requirements are also strengthened.

ERISA also requires normal costs be fully funded each year, that liabilities from employees' prior service be funded over not more than forty years and that new plans or old plans which increase liabilities due to liberalization of benefits fund these liabilities over thirty years (Hall, 1979).

ERISA requires more extensive reporting and disclosure on the status of fund assets, liabilities and activity. Annual reports filed with the IRS consist of an audited set of financial statements and various supporting schedules (McGill, 1975). The plan's actuary must prepare, as part of the annual report, an actuarial statement that includes the following:

1. the number of participants and beneficiaries covered by the plan;
2. the normal cost for the year;
3. the current value of plan assets;
4. the present value of vested benefits;
5. the present value of nonvested benefits;
6. funding information for the plan year;
7. the contribution necessary to reduce any accumulated funding deficiency to zero;
8. the actuarial assumptions and methods used to determine plan costs and liabilities.

The actuary must certify the reasonableness of the actuarial assumptions used.

Information filed under ERISA is available from the IRS service center where the Annual Return/Report of Employee Benefit Plan (Form 5500) is filed. After the forms are processed, copies are furnished to the public on request and payment of a nominal charge for copying services, under Section 6104 (a)(1)(B) of the Internal Revenue Code. Processing time normally takes from four to six weeks, depending on the particular IRS service center. Form 5500 must be filed by the last day of the seventh month after the plan year ends. A penalty of twenty-five dollars per day (up to $15,000) for late or incomplete filing of Form 5500 is assessed unless reasonable cause is established (IRS, 1985). After an undefined period, the Forms 5500 are copied on microfiche after which the microfiche is made available to the public at the DOL in Washington, D.C.

The Development of Pension Accounting Standards

The issuance of SFAS No. 36 is one step in the evolution of reporting standards for pension plans by the accounting profession.

In 1966, the Accounting Principles Board (APB) issued Opinion No. 8, "Accounting for the Cost of Pension Plans," which narrowed the alternatives previously available for

accounting for pension plans. In essence, Opinion No. 8 required that a company recognize annual pension costs whether or not funded. This annual provision had to be based on one of several acceptable actuarial cost methods as long as the method was consistently applied and the resulting provision was between a minimum and maximum calculation stipulated in the opinion.

Opinion No. 8 required that differences between the provision and actual funding be shown on the balance sheet as an asset or liability, as the case may be. It also required the following disclosures:

1. a statement that such plans exist, identifying or describing the employee groups covered;
2. a statement of the company's accounting and funding policies;
3. the provision for pension cost for the period;
4. the excess, if any, of the actuarially computed value of vested benefits over the total of the pension fund (i.e., the unfunded vested benefit obligation) and any balance sheet pension accruals, less any pension prepayments of deferred charges (Accounting Principles Board, 1966).

Following the enactment of ERISA in 1974, FASB issued Interpretation No. 3, "Accounting for the Cost of Pension Plans Subject to the Employment Retirement Income Securities Act of 1974," in which it concluded that ERISA does not require a change in the minimum and maximum limit calculations for the annual provision of pension cost as set forth in Opinion No. 8, nor does it create a legal obligation that requires recognition of a liability for unfunded pension costs.

In 1980, FASB issued SFAS No. 35, "Accounting and Reporting by Defined Benefit Pension Plans," and No. 36, "Disclosure of Pension Information." The additional disclosure requirements were intended to improve the comparability and informational content of pension disclosure until FASB was able to complete its comprehensive examination of employer accounting for pension and other retirement benefits.

Since FASB had not specified the method of valuing unfunded vested benefits or unfunded prior service costs, these disclosures could vary depending on the valuation method used. To correct this problem, SFAS No. 35 specified a single method of valuation for computation of accumulated plan benefits and valuation of assets. The actuarial assumptions to determine accumulated plan benefits (those future benefits payments attributable under the plan's provisions to employees' service rendered to the benefit information date) include the following:

1. reasonable rate of return to determine present value;
2. reasonable estimates of retirement, death, disability, automatic benefit increases, or termination of plan participants;
3. expected dates of benefit payments (FASB, 1980).

SFAS No. 36 requires disclosure of the actuarial present value of accumulated plan benefits and net assets available for those benefits, as determined under SFAS No. 35. Accumulated plan benefits are measured in accordance with plan provisions. Net assets available for benefits as

of the end of the plan year is defined as the difference between a plan's assets and liabilities, determined under the accrual basis. Plan investments are included at their fair value. The disclosures required by Opinion No. 8 are continued under SFAS No. 36 except that the unfunded vested benefit obligation is replaced by the following more extensive disclosure:

1. the actuarial present value of vested accumulated plan benefits;
2. the actuarial present value of unvested accumulated plan benefits;
3. the plans' net assets available for benefits;
4. the assumed rates of return used in determining the actuarial present values of vested and unvested accumulated plan benefits;
5. the date as of which the benefit information is determined (FASB, 1980).

The disclosure under SFAS No. 36 includes the IRS/DOL data that presumably is significant to an investor analyzing the potential pension obligations of a firm.

First, Opinion No. 8 required disclosure of only the unfunded portion of vested obligations. SFAS No. 36 requires disclosure of the total market value of the pension fund as well as the total vested benefit obligation, actuarially determined. The unfunded vested benefit is the net of these two numbers. Feldstein and Morck (1982) have shown that the actuarial assumptions selected are not uniform across firms. For example, firms with substantial pension obligations relative to pension assets tend to choose high interest rate assumptions in

order to reduce the present value of their pension obligations. The ability to increase or decrease the vested benefit obligation by selecting different interest rates would tend to obscure the information content of the unfunded vested benefit disclosure under Opinion No. 8. It is anticipated, therefore, that the total fair market value of the pension fund and the total vested benefit obligation provide additional information of value to the investor.

Second, SFAS No. 36 requires the additional disclosure of the actuarial present value of unvested accumulated plan benefits for plan years beginning after December 15, 1979. This information was available for previous years from Forms 5500 filed with the DOL/IRS. Unvested benefits are earned pension benefits that are contingent upon the employee continuing in the service of the employer. Empirical evidence discussed in the next section has consistently found the unfunded vested benefits to be an understatement of the market's perception of the overall pension obligation. This result may be due to investors including in their assessment an estimate of the previously undisclosed unvested benefit.

FASB issued SFAS No. 36 to improve the comparability and relevance of pension disclosure. That value of the additional disclosure should be measurable by its market impact on common stock prices. This impact provides the background for testing the market effect of this same disclosure in its costly form when filed with the IRS under

provisions of ERISA. It is this effect which is the focus of this study.

Empirical Studies of the Effect of Reported Pension Disclosure on Common Stock Prices

The purpose of this section is to review empirical research related to pension disclosures in order to demonstrate that a market effect associated with these disclosures is a reasonable expectation and to identify variables from previous studies that are of potential interest.

While pension disclosures have been included in financial statements for many years, there was little empirical research undertaken on pensions until recently. Most of these studies attempt to relate the level of pension liabilities to equity values as reflected in the market price of common stock.

Oldfield (1977) examines the effect of the unfunded vested benefit (UVB) obligations on common stock values of the firm, using a conceptual framework developed by Modigliani and Miller (MM) (1958). MM propose that the expected yield on common stock should increase with leverage; that is, the expected yield of a share is equal to an appropriate capitalization rate (independent of the firm's capital structure) plus a premium related to financial risk which is a function of the debt-equity

ratio. Oldfield concludes that the reported value of the UVB is treated by the market as a fairly accurate but somewhat understated representation of the true pension obligation.

Gersovitz (1980) also examines the relationship between the UVB obligation and the market value of a firm's shares. Gersovitz concludes that liabilities above some discrete level do not diminish the value of a firm's shares. This effect seems to be associated with the insurance benefits provided under ERISA. He also concludes that the stock market treats reported pension liabilities as understated.

Feldstein and Seligman (FS) (1981) also examine the effect of the UVB obligations on corporate share prices and discuss the implications of their results on national savings, the decline in the stock market in the 1970's, the rationality of corporate financial behavior regarding pension funding policies. Their results indicate the UVB obligations reduce the market value of firms and that the market regards this number as understating the true pension liability. FS indicate that although there are a number of problems with the conventional accounting measure of the UVB obligation, "the data are consistent with the conclusion that shareholders accept the conventional measure as the best available information and reduce share prices by a corresponding amount."

FS conclude that the market is responding to the "best available information." They do not raise the possibility that the market may be responding to the other source of pension disclosure (the Forms 5500 filed under ERISA). This question of possible market reaction to Forms 5500 information filed with the DOL/IRS is examined in this study.

Feldstein and Morck (FM) (1982) study the effect of interest rate assumptions used to discount future benefit obligations. They conclude that investors appear to value firms as if a standard actuarial rate were used to discount pension obligations regardless of the actual rate they select for their computations. FM present evidence that the market gives more weight to pension liabilities than to pension assets since the market responds more to variations in the excess of liabilities over assets than to the excess of assets over liabilities. In the DOL/IRS filings under ERISA, the pension asset and liability are each disclosed and their individual effects could be examined. After 1979, SFAS No. 36 requires this same presentation.

Daley (1984) investigates the effect of cross-sectional differences in the actuarial assumption about interest rates used in discounting future pension obligations, concluding that chosen discount rates are not used by the markets in evaluating data on pension costs. This confirms the findings of FM (1982). He reaches the following additional conclusions:

1. pension expense captures an annualized measure of the effect on firm value resulting from the defined benefit plan;
2. the unfunded vested benefits measure understates the magnitude of the after-tax future pension cash flows as impounded in equity value.

Landsman (1986) and Dhaliwal (1986) study the effect of pension assets and liabilities on the market for sponsoring corporations' common stock. They both conclude that the market views pension assets and liabilities as a form of corporate assets and liabilities.

Each of these studies has assumed that pension plans create present and future cash flow for a sponsoring firm that has a measurable effect on the market price of the firm's common stock. The UVB obligation and pension expense variables in these studies appear to capture most consistently the equity market's aggregate assessment of the future cash flows associated with the pension plans. It is assumed that SFAS No. 36 requires disclosure that increases the pension information content of published financial statements. Investor assessment of these data should have an observable impact on the market price of common stock unless that information is already impounded in market price from an alternate information source, such as Forms 5500 filed with the DOL/IRS.

The question raised extends prior research by investigating the impact of costly information on the

market. Much of the pension disclosure required publicly by SFAS No. 36 since 1980 has been available since 1978 and earlier from Forms 5500 filed with the IRS under ERISA. Analyzing selected variables from this latter data source (e.g., UVB obligation, unfunded unvested benefit obligation, and fair market value of fund assets) should help determine if information filed with the DOL/IRS is impounded in securities prices.

CHAPTER III

METHODOLOGY

Introduction

In this study, the market effect of pension data from two different information systems is examined. The first system consists of pension data available from forms filed for pension plans with the DOL/IRS, which is described as the "costly" information system. The second system consists of pension data disclosed by firms in their published financial statements under SFAS No. 36, which is described as the "costless" information system. The effect of selected pension data on the market price of securities is examined for the period 1980 through 1983. Pension data from 1979 DOL reports were filed in 1980; therefore, the market effect of selected pension data from the 1979 DOL reports is examined in 1980. During the year 1981, pension data required by SFAS No. 36 were first disclosed in 1980 published financial statements. The market effect of selected pension data from the post-disclosure period beginning with 1981 and including 1982 and 1983 is also examined. These pension data were available from the costly information system only during 1980. During 1981, 1982, and

1983, these pension data were available from both the costly and costless information systems.

In the first test, individual cross-sectional regressions (across firms) are run to measure the relationship of pension data disclosed in 1980 and 1981 to the market price of common stock. The pension data disclosed in 1980 was from the costly information system. The pension data disclosed in 1981 was from the costless information system. A pooled, cross-sectional regression (across firms and years) is also run on the pension data disclosed in 1980 and 1981. The individual regressions are then compared with the pooled regression and the following hypothesis is tested:

H_o1: The sets of coefficients of the individual and pooled regressions for 1980 and 1981 are equal.

If the null hypothesis of no difference is rejected, it would indicate that the change in information systems had a measurable impact on securities prices. To reinforce this conclusion, two additional tests are run on SFAS No. 36 pension disclosures during 1981, 1982 and 1983. In the second test, individual regressions are run on pension variables disclosed in 1981 and 1982 (both from the costless information system). A pooled, cross-sectional regression (across firms and years) is also run on the pension variables of 1981 and 1982. The individual regressions are then compared with the pooled regression and the following hypothesis is tested:

H_o2: The sets of coefficients of the individual and pooled regressions for 1981 and 1982 are equal.

If the initial disclosure under SFAS No. 36 in 1981 produced a significant effect on securities prices in the first test, the null hypothesis of no difference would be rejected. In the second test, the null hypothesis should not be rejected since the pension variables of both years come from the same costless information system. The years 1982 and 1983 are compared in the third test and the following hypothesis is tested:

Ho3: The sets of coefficients of the individual and pooled regressions for 1982 and 1983 are equal.

The null hypothesis of the third test should not be rejected since the pension variables of both years come from the same costless information system. Anticipated results from these three tests would lend further support to the proposition that even trivial costs of information acquisition can prevent data from reaching the market.

Test Period

The test period includes the years 1980 through 1983. The year 1980 precedes pension disclosure under SFAS No. 36 in a firm's published financial statements. During 1980, pension data relevant to this study was disclosed in reports to the IRS/DOL but not in published financial statements. In 1981, 1982, and 1983, pension data required by SFAS No. 36 were disclosed in both published financial statements and reports filed with the IRS/DOL.

Pension data filed with the IRS/DOL for 1979 were available to the public in 1980 at a nominal cost to cover copying services and mailing. Pension data required by SFAS No. 36 for 1980, 1981, and 1982 plan years were available in 1981, 1982, and 1983, respectively, in published financial statements at no cost to the investor.

Sample Selection

The sample includes calendar year firms which meet the following conditions:

1. All pension plans have calendar year ends.
2. Published financial statements beginning with 1980 conform to the requirements of SFAS No. 36.
3. Pension plans were in existence during the entire test period with no substantive plan modifications.
4. No pension disclosures were made voluntarily in the firm's published financial statements previous to the effective date of SFAS No. 36 .
5. Relevant pension disclosures are available for calendar year 1979 plans from Form 5500 Operational Data Tapes available from the DOL.
6. Monthly return data are available on the files of the Center for Research in Security Prices (CRSP) at the University of Chicago for companies listed on the New York Stock Exchange (NYSE) since the beginning of the estimation period, January, 1976.

In addition, regulated public utilities are also excluded from the sample. Since extensive additional disclosure is required of these companies by their respective regulatory bodies, the information available to the public regarding pension plans is not mandated solely by the pronouncements of the FASB. It was, therefore, concluded that pension data may have been disclosed as part of the regulatory reporting.

Data Gathering

Pension information from the costly information system was obtained from the DOL. Information on pension plans is required to be filed annually with the IRS/DOL under provisions of ERISA. The DOL provided magnetic tapes containing data filed for individual pension plans in the 1979 and 1980 Annual Return/Report of Employee Benefit Plan (Form 5500). Data pertinent to this study is contained on Schedule B of Form 5500.

Table I presents a reconciliation of sample size. Those firms with December 31 year ends which had security price data available from January, 1976, were selected from the CRSP tape. These firms were matched with the plan sponsors on the Form 5500 data tapes whose pension plans all had December 31 year ends. From this matching, the preliminary sample consisted of 485 companies.

The 1980 published financial statements of calendar year companies were the first to disclose pension data under SFAS No. 36. The pension data of interest to this study

TABLE I

RECONCILIATION OF SAMPLE SIZE

Number of December 31 year-end companies listed on the DOL Pension Data Tape and CRSP tape that have only December 31 year-end pension plans.	485
Number of companies with no match between SFAS No. 36 data on 1980 financial statements and data on 1980 DOL Pension Data Tape	349
	136
Number of utilities.	34
Final sample size for test of pension data disclosure for 1979 and 1980 plan years	102
Number of companies with mergers in 1981	1
Number of companies that terminated plans in 1981.	1
Final sample size for test of pension data disclosure for 1981 plan years	100
Number of companies with mergers in 1982	6
Number of companies that terminated plans in 1982.	3
Final sample size for test of pension data disclosure for 1982 plan years	91

were first available from both information systems in their 1980 reports. The pension disclosures from 1980 published financial statements under SFAS No. 36 were compared with pension disclosures in the 1980 Forms 5500 filed with DOL/IRS to ensure that pension data from the two information systems were consistent. A separate Form 5500 is filed with IRS/DOL for each plan of a firm. The pension data disclosed under SFAS No. 36 in the sponsor's annual financial statements is a summary of all its pension plans. It was necessary to sum the Form 5500 pension data for each variable selected for the study for all pension plans of a firm, and then to make a comparison with the SFAS No. 36 disclosure. This comparison reduced the sample to 136 companies where the data from the Forms 5500 matched the SFAS No. 36 disclosure. There was no match for 349 companies. Retaining the 349 companies in the sample would have had no effect on the results if the relationship between pension variables and stock returns is independent of the information system used in disclosure. If the relationship between pension variables and stock returns is dependent on the information system, it follows that increasing the sample size by 349 for 1980 would bias the results in favor of rejecting the null hypothesis of no difference between 1980 and 1981. The more conservative approach of excluding the 349 companies was adopted.

The elimination of utilities further reduced the sample to 102 companies. These firms comprised the sample for 1980

(when 1979 reports were first available) and 1981 (when 1980 reports were first available).

Pension data for the firms in the sample were also collected from their 1981 and 1982 financial statements, which were published in 1982 and 1983, respectively. The sample for these years was reduced to 100 and 91, respectively. There was one merger and one plan termination which reduced the sample size in 1982. There were six mergers and three plan terminations which reduced the sample size in 1983.

Pension Variables

In issuing SFAS No. 36, FASB stated that the present reporting requirements did not provide "comparable and meaningful pension disclosures." To improve disclosure, FASB concluded that "the information developed for disclosure by the pension plan was a logical basis for employer's disclosures (under SFAS No. 36) because of its relevance and because little or no additional cost would be involved." The following variables were selected for this study because they were the only new disclosures required by SFAS No. 36, and they were previously available on the IRS/DOL reports:

1. The fair market value of plan assets (ASSETS);
2. The actuarial present value of unvested accumulated plan benefits (UB);

3. The actuarial present value of vested accumulated plan benefits (VB).

ASSETS, UB and VB were available during subperiod one from the DOL/IRS. For subperiod two, they were available from both the DOL/IRS and published financial statements.

Procedures

Annual abnormal stock returns were regressed on pre- and post-SFAS No. 36 pension variables for a sample of reporting firms for each year of the test period. These individual year regressions were compared with pooled regressions to test the null hypotheses that there was no change in the relationship between the pension variables and abnormal stock returns. Individual regressions for 1980 and 1981 were compared to the pooled regression for 1980 and 1981 and the null hypothesis of no difference was tested. Since 1981 was the first year of pension disclosure under SFAS No. 36, a significant difference was anticipated. Similar tests were run on 1981 and 1982 as well as 1982 and 1983. Since there was no change in reporting pension data in these years, no significant difference was anticipated.

Residuals were calculated using the market model:

$$R_{ijk} = a_{ij} + b_{ij}R_{mjk} + e_{ijk} \qquad (1)$$

where,

R_{ijk} = the stock return for firm i in year j and month k;

R_{mjk} = the return on the CRSP equally weighted index in year j and month k;

a_{ij} = parameter unique to firm i, representing the intercept;

b_{ij} = parameter unique to firm i, respresenting the systematic risk;

e_{ijk} = the unsystematic component of R_{ijk} for firm i in year j and month k;

Ordinary least squares was used to obtain the parameter estimates, using observations from the forty-eight months prior to the beginning of each calendar year of the test period. Monthly returns for the forty-eight month period beginning January, 1976, through December, 1979, were used to compute the parameter estimates for 1980, the first year of the test period. The estimation period for 1981 included January, 1977, through December, 1980. The procedure was repeated for each year of the test period.

A cumulative abnormal return (CAR) measure for firm i in year j of the test period was calculated as follows:

$$CAR_{ij} = \sum_{k=1}^{12} e_{ijk} \qquad (2)$$

where,

all variables are defined as before.

Equation (1) separates a security's return into a systematic component (R_{mjk}) and firm-specific or individualistic component (e_{ijk}). The CAR in equation (2) is a summation of this firm-specific component over the twelve months of each year of the test period. The CAR is a measurement of the market reaction to all firm-specific events, including any possible reaction to pension disclosures. One of the effects that can be controlled for

is unexpected earnings. Several studies have shown that unexpected earnings affects the CAR. Ball and Brown (1968) concluded that stock prices reflect earnings expectations. Their study measured the market reaction to unexpected earnings. They observed that the CAR was affected by these unexpected earnings. Beaver, Clark and Wright (1979) and Ball and Watts (1972) suggest that there is a correlation between the CAR measure and earnings forecast errors or unexpected earnings. In order to eliminate this unexpected earnings effect from the CAR, the CAR is divided into two components in equation (3) below. The first component is the unexpected earnings variable (UE). The second component (u_{ij}) is that portion of the CAR relating to all other firm-specific effects on CAR other than the UE. It is this component of the CAR that would reflect the market effect generated by any announcement of pension information.

$$CAR_{ij} = c_{ij1} + c_{ij2}UE_{ij} + u_{ij} \qquad (3)$$

where,

UE_{ij} = the unexpected earnings (loss) of firm i in year j standardized by the value of firm i at the beginning of year j (measured by the number of common stock at the beginning of the year multiplied by the common stock price);

c_{ijk} = the regression coefficients of the respective variables;

u_{ij} = the residual of firm i in year j;

and all other variables as defined before.

Unexpected earnings (UE) of firm i in year j was computed using the following random walk model:

$$UE_{ij} = E_{ij} - E_{i,j-1} \quad (4)$$

where,

E_{ij} = operating profit or loss of firm i in year j of the test period;

$E_{i,j-1}$ = operating profit or loss of firm i in year j-1.

The UE in equation (4) is standardized using the value of the firm at the beginning of that year. Ball and Watts (1972) examined growth rates in earnings of U.S. companies. They concluded that net income and earnings per share time series data could be described by a random walk model. In a study by Watts and Leftwich (1977), random walk models forecasted better than identified Box-Jenkins models, suggesting that "the random walk is still a good description of the process generating annual earnings in general, and for individual firms." According to Foster (1986),

> the result that, on average, annual reported earnings or EPS can be well described by a random walk model is one of the most robust empirical findings in the financial statement literature.

The random walk model was used because of these descriptive properties.

The u_{ij} is the component of CAR with the unexpected earnings effect eliminated. To determine the relationship of pension disclosure on common stock prices, the u_{ij} is regressed on standardized pension variables for each year of the test period:

$$u_{ij} = d_{ij1} + d_{ij2}ASSETS_{ij} + d_{ij3}UB_{ij} + d_{ij4}VB_{ij} + r_{ij} \quad (5)$$

where,

u_{ij} = the CAR of firm i in year j reflecting all firm-specific effects other than unexpected earnings;

d_{ijk} = the intercept and the coefficients of the respective pension variables;

$ASSETS_{ij}$ = the fair market value of plan assets of firm i disclosed in year j divided by the value of the firm at the beginning of year j (the number of common stock outstanding at the beginning of the year multiplied by common stock price);

UB_{ij} = the actuarial present value of unvested accumulated plan benefits of firm i disclosed in year j divided by the value of the firm at the beginning of year j;

VB_{ij} = the actuarial present value of vested accumulated plan benefits of firm i disclosed in year j divided by the value of the firm at the beginning of year j;

r_{ij} = the residual of firm i in year j;

and all other variables defined as before.

For each regression, the uij of one year is regressed on the standardized pension variables of the previous year. For example, the pension data disclosed for plan year 1979 were released to the public in 1980. Any effect on stock prices would have taken place in 1980. The regression for 1980 of the test period, therefore, regresses the 1980 CAR on the 1979 standardized pension variables.

The estimates of the coefficients of the pension variables were obtained using generalized least squares estimation (GLS). If the off-diagonal elements of the

variance-covariance matrix from a regression model are non-zero, then efficiency can be increased by using GLS if the correct model of error covariance is known. In most applications, the elements of the correct variance-covariance structure of abnormal returns are estimated since they are unknown. The GLS estimates are formed by inserting the estimate of the variance-covariance matrix into the formulas of the coefficients and their variances so that the OLS properties are satisfied (Kmenta, 1971). The GLS model that is used in this study is the Zellner (1962) Seemingly Unrelated Regressions model (SUR). Zellner suggests that efficiency in estimation can be gained if one views a system of seemingly unrelated equations as a single large equation to be estimated. The SUR model achieves an improvement in efficiency by taking into account the fact that cross-equation error correlations may not be zero among a system of seemingly unrelated equations. SUR estimation from cross-sectional models with two or more years of data permits disturbances for different equations to be mutually correlated (Pindyck and Rubinfeld, 1981).

In this study, residuals may be correlated cross sectionally between firms in the same industry, and there may be factors unique to each year of the test period which are unspecified by the model. Unlike conventional estimation procedures which give equal weight to all observations in computing a sample mean, the GLS estimate weights each security's forecast error in inverse proportion

to its relative variance/covariance with other securities in the sample. In the case of observations with error terms of unequal variance, the procedure effectively gives greater weight to those observations whose error terms have smaller variances. Collins and Dent (1984) show GLS estimation procedures to have clear advantages over alternative estimators. They find GLS estimation to be sufficiently flexible to allow for "(1) different residual variances across securities, (2) nonzero cross-sectional dependency in the return data, and (3) possible multiplicative changes in residual variances from the estimation to the test period."

Using the SUR model, a variance/covariance matrix was calculated for the companies included in the sample of year j. This matrix was calculated from the residuals obtained from the forty-eight month estimation period for year j in equation (1). The GLS procedure to obtain the regression coefficient of an independent variable in matrix format is

$$d = (x'L^{-1}x)^{-1}(x'L^{-1}y) \qquad (6)$$

where,

d = (K x 1) vector of K coefficients of the independent variables;

y = (N x 1) vector of N dependent variables.

x = (N x K) matrix of the independent variables;

L = the (N x N) variance/covariance matrix.

In addition to the individual regressions for each year of the test period, pooled regressions were run for the following years of the test period: 1980 and 1981, 1981 and

1982, and 1982 and 1983. The GLS procedure to estimate the coefficients in a pooled regression is similar to the procedure in the single regressions, except the covariance matrix used in the estimation is a block matrix with each year's variance/covariance matrix as an element in the diagonal with all off-diagonal elements equal to zero. The off-diagonal elements are zero because of the assumption that the disturbance terms are temporally independent.

To test the equality between sets of coefficients in two linear regressions, the sum of squares of the residuals (SSE) assuming the equality and the sum of squares without assuming the equality are calculated. The pooled regression for 1980 and 1981, for example, assumes the relationship between the pension variables and stock returns is equal for the two years, under the null hypothesis (H_o1) that 1980 and 1981 belong to the same regression model. The individual regressions for 1980 and 1981 do not impose the assumption of equality. The ratio of the difference between the sum of squares for the pooled and the individual year regressions, adjusted for corresponding degrees of freedom, is distributed as the F ratio. This F ratio, which has been called the Chow test, was developed by Chow (1960). The Chow test is the test statistic for this study. In symbols, using SSE, we have

$$SSE_j + SSE_{j+1} \lessgtr SSE_{j+(j+1)} \qquad (7)$$

where subscripts j and j+1 represent two consecutive years of the test period and j+(j+1) represents the two years

combined or pooled. Let K represent the number of parameters in the model being estimated and N represent the number of observations. The parameters consist of K-1 slope coefficients and one intercept. The appropriate test statistic is defined as

$$F = \frac{(SSE_{j+(j+1)} - (SSE_j + SSE_{j+1}))/K}{(SSE_j + SSE_{j+1})/(N-2K)}. \qquad (8)$$

The test statistic follows the F distribution with K and N-2K degrees of freedom, respectively.

The first test was run comparing 1980 and 1981 of the test period. The second test compared 1981 and 1982 and the third test compared 1982 and 1983. It was hypothesized that the first test would indicate a significant difference between the two years since pension disclosure became publicly available through the costless information system for the first time during the second year of the test. It was further hypothesized that the second and third tests would produce no significant difference because the pension variables were available from the costless and costly information systems for both years of each test.

CHAPTER IV

TEST RESULTS

Introduction

This chapter focuses on the tests of the hypotheses developed in Chapter III concerning the security market impact of a change in the mode of disclosure of pension data from a costly information system to a costless information system. The pension data of interest are net assets available for benefits (ASSETS), unfunded unvested benefits (UB), and unfunded vested benefits (VB). A two stage regression is run. In the first stage, the cumulative abnormal return (CAR) is regressed on unexpected earnings (UE). The purpose of this first stage regression is to remove the unexpected earnings effect from the CAR. In the second regression, r_{ij} (the residual from the first regression) is regressed on the standardized pension variables.

The chapter begins with an examination of the hypotheses concerning ASSETS, UB and VB and the tests of these hypotheses. Results are presented for the tests of the hypotheses using generalized least squares to estimate the coefficients of the independent variables. Results are

also presented for the tests using ordinary least squares. The significance of multicollinearity in the data is also discussed. The chapter concludes with a discussion of certain limitations of the study.

Restatement of the Hypotheses

The first hypothesis of this study can be stated as follows:

H_o1: The sets of coefficients of the pension variables for 1980 and 1981 are equal.

If the first disclosure of ASSETS, UB and VB in the costless information system in 1981 had an impact of common stock prices, there should be a measurable difference in the relationship of pension variables to common stock prices when 1980 and 1981 are compared. In that case, the differences in the coefficients of the variables between 1980 and 1981 would lead to rejection of the null hypothesis. To test the first hypothesis, the 1980 CAR adjusted for unexpected earnings is regressed on the standardized ASSETS, UB and VB disclosed in the costly information system in 1980. The regression is repeated using the ASSETS, UB and VB disclosed through the costless information system in 1981 and the 1981 r_{ij}. The sum of squared errors (SSE) from the 1980 and the 1981 regressions are compared against the SSE from a pooled regression of 1980 and 1981. The Chow test is used to determine if there is a measurable difference between the sets of pension variables in the 1980 and the 1981 regressions. A

measurable difference would lead to rejection of H_o1 and lend support to the proposition that a change in the information disclosure from a costly to costless system produced the observed difference.

The second and third hypotheses in the null form support the first hypothesis in its alternate form:

H_o2: The sets of coefficients of the pension variables for 1981 and 1982 are equal.

H_o3: The sets of coefficients of the pension variables for 1982 and 1983 are equal.

If the difference in comparing 1980 and 1981 is due to the change in information systems, it follows that similar tests conducted in subsequent years should produce no such effect since there was no change in information systems during those years. The rejection of H_o1 and the acceptance of H_o2 and H_o3 would support the proposition that the change in information systems for pension disclosure had an effect on the market for common shares.

Each of these hypotheses implies a particular set of statistical tests in the context of the basic model. The first test is a comparison of 1980 and 1981. The year 1981 was the first year of SFAS No. 36 pension disclosure in published financial statements. The second test is a comparison of 1981 and 1982. The third test is a comparison of 1982 and 1983.

Estimates of the coefficients of the pension variables are obtained using generalized least squares. Generalized least squares is appropriate where the residuals have

nonconstant variance and are cross correlated. GLS estimates are formed by inserting an estimate of the variance-covariance matrix into formulas for coefficients and their variances which take into account this cross-correlation. The GLS procedure assumes that return distributions are normal and stable throughout the estimation and test periods in estimating the variance-covariance matrix. Instability of return distributions would adversely affect the precision of the GLS estimates resulting in inaccurate adjustment for the cross correlation. Since the GLS model uses an estimated variance-covariance matrix and the level of cross-correlation is not known with certainty, there is a possibility that noise may be introduced which affects the results. The tests were, therefore, repeated using OLS estimation to provide a comparison to the results using GLS estimation.

Results of Statistical Tests Using Generalized Least Squares

Tables II, III, and IV present summary statistics of the basic model for the three tests using GLS estimation. There are several prominent general findings associated with the results appearing on Tables II through IV. The key findings are the following:

1. The results from the first test, presented in Table II, indicate a significant difference

TABLE II

REGRESSION SUMMARY STATISTICS USING
GENERALIZED LEAST SQUARES
1980-1981

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1980 vs. 1981: 3.7834
Prob > F: 0.0055

	d_1	d_2	d_3	d_4	F	N
1980 Model					0.13	102
Estimate	-0.035	0.811	-0.886	-0.511	(.941)	
t-ratio	-0.246	0.603	-0.184	-0.514		
Prob ≠ |t|	0.8062	0.5480	0.8546	0.6084		
1981 Model					2.21	102
Estimate	-0.197	3.288	-3.242	-2.114	(.091)	
t-ratio	-1.385	2.501	-0.568	-1.924		
Prob ≠ |t|	0.1692	0.0140	0.5710	0.0572		
1980-1981 Model					1.12	204
Estimate	-0.080	1.695	-1.725	-1.081	(.341)	
t-ratio	-1.481	1.813	-0.462	-1.481		
Prob ≠ |t|	0.4324	0.0714	0.6448	0.1402		

F: F test for individual year and pooled regressions
N: Number of observations in the sample

TABLE III

REGRESSION SUMMARY STATISTICS USING
GENERALIZED LEAST SQUARES
1981-1982

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1981 vs. 1982: 1.6257
Prob > F: 0.1693

	d_1	d_2	d_3	d_4	F	N
1981 Model					2.21	102
Estimate	-0.097	3.288	-3.242	-2.114	(.091)	
t-ratio	-1.385	2.501	-0.568	-1.924		
Prob ≠ |t|	0.1692	0.0140	0.5710	0.0572		
1982 Model					2.03	100
Estimate	-0.074	1.366	-4.075	-0.773	(.115)	
t-ratio	-0.446	1.782	-0.772	-0.755		
Prob ≠ |t|	0.6566	0.0778	0.4418	0.4522		
1981-1982 Model					3.78	202
Estimate	-0.099	1.658	-3.374	-1.013	(.011)	
t-ratio	-0.943	2.947	-0.930	-1.588		
Prob ≠ |t|	0.3466	0.0036	0.3536	0.1140		

F: F test for individual year regressions
N: Number of observations in the sample

TABLE IV

REGRESSION SUMMARY STATISTICS USING
GENERALIZED LEAST SQUARES
1982-1983

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1982 vs. 1983: 0.7882
Prob > F: 0.5342

	d_1	d_2	d_3	d_4	F	N
1982 Model					2.03	100
Estimate	-0.074	1.366	-4.075	-0.773	(.114)	
t-ratio	-0.446	1.782	-0.772	-0.775		
Prob ≠ |t|	0.6566	0.0778	0.4418	0.4522		
1983 Model					2.89	91
Estimate	-0.163	0.890	-2.903	-0.226	(.040)	
t-ratio	-1.385	1.580	-0.990	-0.512		
Prob ≠ |t|	0.1694	0.1178	0.3248	0.6102		
1982-1983 Model					3.85	191
Estimate	-0.106	0.969	-5.278	-0.162	(.011)	
t-ratio	-1.019	2.209	-1.991	-0.370		
Prob ≠ |t|	0.3098	0.0284	0.0480	0.7120		

F: F test for individual year and pooled regressions
N: Number of observations in the sample

between 1980 and 1981 regressions using GLS. The F statistic for the first test is significant at the .0055 level of significance. This result supports rejection of H_o1 and is consistent with the proposition that the market reacted to the change of information systems for pension data disclosure from costly to costless in 1981. In 1980, disclosure of ASSETS, UB, and VB were available from DOL reports. In 1981, disclosure of ASSETS, UB, and VB were made available in published financial statements as well.

2. The sign for ASSETS is positive and the signs of UB and VB (the standardized pension variables used in the regressions) are negative in Tables II, III, and IV. According to Landsman (1986), the pension plan assets and liabilities are viewed by the market as assets and liabilities of the sponsoring company. ASSETS would be viewed as an asset of the firm and should be positive with respect to stock price. The UB and VB would be viewed as liabilities of the sponsoring firm and should be negative with respect to stock price, according to Landsman (1986).

3. ASSETS is significant in the pooled regressions of 1980-1981 and 1981-1982. ASSETS and UB are significant in the pooled regression of 1982-1983.

Results related to the individual variables will be examined in a later section.

4. In the 1980 regression, none of the pension variables is significant. If ASSETS, UB, and VB were not impacting the market in their costly form in 1980, their coefficients would not be significant in the 1980 regression. Indeed, none of them is significant in the 1980 regression.

5. The results on Tables III and IV indicate no significant difference in the 1981 and 1982 test or in the 1982 and 1983 test. The F statistics for the second and third tests are not significant with alphas of only .1693 and .5342, respectively. Since the ASSETS, UB and VB were available during both years from the costly and costless information systems, this result supports H_o2 and H_o3, as predicted. Since there was no change in information systems for pension data disclosure during these years, there would be no significant difference in the relationship of pension data to stock price.

The basic conclusion from this review of the results using GLS estimation is that there appears to be a significant market impact when the form of disclosure of ASSETS, UB, and VB changed from the costly to the costless information system in 1981. The conclusion is supported by

the results of repetitions of the test in subsequent periods when no such market effect was predicted or observed.

Results of Statistical Tests Using Ordinary Least Squares

Tables V, VI, and VII present summary statistics of the basic model for the three tests. There are several prominent general findings associated with the results appearing on Tables V through VII that conform favorably with the results using GLS estimation. The key findings are the following:

1. The results from the first test, presented in Table V, indicate a significant difference between 1980 and 1981 regressions using OLS. The F statistic for the first test is significant at the .0021 level. This result is consistent with the result using GLS.

2. The ASSETS and VB are significant in the 1980-1981 pooled regression. ASSETS is significant in the 1981-1982 and 1982-1983 pooled regressions. These results are consistent with the GLS results with the exception of VB which is not significant under GLS. The t-ratios are higher in most cases using GLS estimation--a predictable result since GLS increases the efficiency of the estimates.

TABLE V

REGRESSION SUMMARY STATISTICS USING
ORDINARY LEAST SQUARES
1980-1981

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1980 vs. 1981: 4.3593
Prob > F: 0.0021

	d_1	d_2	d_3	d_4	F	N
1980 Model					0.16	102
Estimate	-0.002	0.155	-0.495	-0.078	(.920)	
t-ratio	-0.06	0.50	-0.42	-0.35		
Prob ≠ |t|	0.0974	0.7608	0.6462	0.5400		
1981 Model					3.80	102
Estimate	-0.068	1.121	-0.484	-0.776	(.013)	
t-ratio	-1.85	3.33	-0.33	-2.82		
Prob ≠ |t|	0.1346	0.0024	0.5166	0.0118		
1980-1981 Model					1.91	204
Estimate	-0.027	0.545	-0.436	-0.356	(.129)	
t-ratio	-1.04	2.39	-0.46	-2.03		
Prob ≠ |t|	0.5962	0.0354	0.7074	0.0878		

F: F test for individual year and pooled regressions
N: Number of observations in the sample

TABLE VI

REGRESSION SUMMARY STATISTICS USING
ORDINARY LEAST SQUARES
1981-1982

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1981 vs. 1982: 1.5846
Prob > F: 0.1800

	d_1	d_2	d_3	d_4	F	N
1981 Model					3.80	102
Estimate	-0.068	1.121	-0.484	-0.776	(.013)	
t-ratio	-1.85	3.33	-0.33	-2.82		
Prob ≠ |t|	0.1346	0.0024	0.5166	0.0118		
1982 Model					1.78	100
Estimate	-0.028	0.361	-0.322	-0.288	(.156)	
t-ratio	-0.56	1.72	-0.21	-0.95		
Prob ≠ |t|	0.8522	0.1756	0.3372	0.6884		
1981-1982 Model					3.36	202
Estimate	-0.025	0.390	-0.291	-0.295	(.020)	
t-ratio	-0.86	2.80	-0.30	-1.67		
Prob ≠ |t|	0.7764	0.0112	0.4722	0.1932		

F: F test for individual year and pooled regressions
N: Number of observations in the sample

TABLE VII

REGRESSION SUMMARY STATISTICS USING
ORDINARY LEAST SQUARES
1982-1983

Model: $u_j = d_{j1} + d_{j2}ASSETS_j + d_{j3}UB_j + d_{j4}VB_j + r_j$

F Statistic for 1982 vs. 1983: 1.5987
Prob > F: 0.1765

	d_1	d_2	d_3	d_4	F	N
1982 Model					1.78	100
Estimate	-0.028	0.361	-0.322	-0.288	(.156)	
t-ratio	-0.56	1.72	-0.021	-0.95		
Prob ≠ |t|	0.8522	0.1756	0.5166	0.0118		
1983 Model					4.32	91
Estimate	-0.047	0.216	-0.404	-0.068	(.007)	
t-ratio	-1.52	1.39	-0.53	-0.57		
Prob ≠ |t|	0.2618	0.3356	0.8106	0.8574		
1982-1983 Model					3.64	191
Estimate	-0.034	0.220	-0.983	-0.047	(.014)	
t-ratio	-1.15	1.95	-1.37	-0.39		
Prob ≠ |t|	0.5028	0.1060	0.3418	0.6014		

F: F test for individual year and pooled regressions
N: Number of observations in the sample

3. The signs of the coefficients on Tables V, VI, and VII conform to the GLS result.

4. In 1980, none of the pension variables is significant. This result also conforms to the GLS result.

5. As predicted, the results on Tables VI and VII indicate no significant difference between either the 1981 and 1982 regressions or the 1982 and 1983 regressions, with significance levels of .1800 and .1765, respectively.

The basic conclusions from the tests using OLS estimation are almost identical with those where GLS estimation was used. The basic difference, as expected, was in the overall significance of the F statistics as well as the t-ratios of the individual variables. These differences are explained by the improved efficiency of the GLS procedure.

Multicollinearity and the Basic Model

While OLS and GLS estimates of regression coefficients are unbiased in the presence of multicollinearity, several problems are potentially introduced. For example, imprecise estimates may result from the presence of multicollinearity. Imprecise estimates are imprecise relative to those that would be obtained from estimation if the regressors were uncorrelated (Johnston, 1972). The

presence of severe multicollinearity could result in the drawing of misleading inferences from sample t-ratios of the coefficients of the independent variables. Another potential consequence of severe multicollinearity is that the estimates of coefficients become very sensitive to particular sets of sample data, and the addition of a few more observations can sometimes produce dramatic shifts in some of the coefficients (Johnston, 1972). Tables VIII and IX present correlation coefficients of the variables for the pooled and individual year regressions, respectively, using OLS estimation. As indicated in these tables, there is severe multicollinearity among the pension variables.

The multicollinearity problem makes it difficult to interpret any of the coefficients of the pension variables individually. The t-tests are still valid tests of the significance of adding a variable after all the other variables are in the model. In this study, however, no interpretation is being made regarding the individual variables. The focus here is to compare the joint effect of ASSETS, UB, and VB for the years of the test period to determine if their first costless disclosure in 1981 had a noticeable effect on the market. The preliminary conclusion supports the hypothesis that such a change did occur in 1981. If the ASSETS, UB, and VB jointly produced the effect observed, multicollinearity would not affect that conclusion, even though it would affect the ability to interpret each variable's individual effect.

TABLE VIII

CORRELATION COEFFICIENTS OF VARIABLES FROM POOLED REGRESSIONS USING ORDINARY LEAST SQUARES

1980-1981			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.943	1.000	
VB	0.986	0.948	1.000

1981-1982			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.952	1.000	
VB	0.987	0.953	1.000

1982-1983			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.903	1.000	
VB	0.972	0.943	1.000

TABLE IX

CORRELATION COEFFICIENTS OF VARIABLES FROM INDIVIDUAL REGRESSIONS USING ORDINARY LEAST SQUARES

1980			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.936	1.000	
VB	0.985	0.939	1.000

1981			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.951	1.000	
VB	0.988	0.958	1.000

1982			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.851	1.000	
VB	0.962	0.942	1.000

1983			
	ASSETS	UB	VB
ASSETS	1.000		
UB	0.952	1.000	
VB	0.987	0.953	1.000

Limitations

The major problem of this study relates to data collection. The DOL data tape contains information filed by individual pension plan. The disclosures required in a company's financial statement for pension data is a summary of all plans sponsored by the company. Obviously, in preparing pension data for the footnote disclosure required by SFAS No. 36, a company would aggregate relevant data from its individual pension plans. In selecting companies for the sample, the DOL tape data were aggregated and matched with the SFAS No. 36 disclosure for 1980 financial statements. The 1980 financial statements were published in 1981, which was the first year of the study when the data was available from both information sources. The sample in this study consisted of calendar year companies with calendar year pension plans in order to facilitate that matching process. In restricting the sample to calendar year companies with all calendar year plans, some bias could have been introduced into the results.

A necessary assumption to the selection of the sample was that those firms that were selected from the matching discussed above were assumed to have accurate data on the DOL tape of the previous year. The data from the 1979 data tapes were reviewed and compared with the 1980 data. All data appeared reasonable.

A further potential problem that did not appear to have significant effect was the requirements of SFAS No.

35, which was also released in 1979. SFAS No. 35 standardized the accounting for defined benefit plans. In reviewing the footnote disclosure in 1980, there was no indication of major changes that would impede comparability between years for the firms sampled.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary of Results

This thesis set out to investigate whether the form of information disclosure (costly versus costless) affects the way information impacts stock prices. Two information systems were identified for pension data. The first is defined as a costly system. Under ERISA, pension plans must file annually with the IRS/DOL. The forms filed by each plan are available to the public, but copies of the forms must be requested from either the IRS or DOL. The cost is nominal but even a nominal cost may have a deterrent effect on information reaching the market according to May and Sundem (1976). The second information system is defined as a costless system. FASB required that certain data items from the forms filed with the IRS/DOL be disclosed in firms' published financial statements, beginning with the 1980 financial statements. This new costless disclosure was required by SFAS No. 36. The intent of this research project was to determine if the first disclosure of these pension data in the costless information system had an observable impact on the market.

A cross-sectional model was chosen for use in examining the hypotheses. Pension data from the costly information system came from data tapes available from the DOL. These data were collected for 1979. These data would have been filed and available to the public in 1980; therefore, 1980 was the first year of the test period. Pension data were collected for the three subsequent years from published financial statements. During these three years, the pension data were available from the costless as well as the costly information systems. The first test consisted of running three regressions:

1. the 1980 CAR of each sample firm adjusted for unexpected earnings was regressed on standardized pension variables for 1979 from the costly information system;
2. the 1981 CAR adjusted for unexpected earnings was regressed on standardized pension variables for 1980 from the costless information system;
3. a pooled regression was run for the two years.

An F statistic (the Chow test) was calculated to determine if there was a noticeable change in the coefficients of the pension variables in 1981, the first year of their costless disclosure. The second test consisted of a repetition of the three regressions for 1981 and 1982. The third test consisted of a repetition for 1982 and 1983. It was hypothesized that if a significant change observed in the first test was due to a change in information systems, no

such change would be observed in comparisons made between subsequent years.

The three tests were repeated using GLS estimation and then OLS estimation. GLS estimation was selected to control for cross-sectional correlation. Cross-sectional correlation would result from specific year or industry effects inherent in the data. OLS estimation was selected as an alternative to GLS in confirming the results.

The results of the tests using GLS estimation indicate that there was a significant market effect during the first year pension data was disclosed in the costless information system. When the tests were repeated for subsequent years, no such effect was observed. These results support the hypothesis that there was a market reaction to the change from a costly to a costless information system. The implication is that new information reached the market when the form of disclosure changed from costly to costless.

The results of the tests using OLS estimation confirm those using GLS estimation. In addition, the dummy variable included to test for year effects was not significant for any of the years of the test period. Multicollinearity was also observed in the data. Multicollinearity affects the ability to conclude regarding the effect of each individual pension variable on the overall results. Any conclusion regarding individual pension variables is beyond the scope of this study. Since the presence of multicollinearity does not affect the

overall results of the study, no correction for its presence was employed.

Significance of Results

From the results just discussed, it appears that the change from a costly to a costless information system had an effect on the market for common shares. The results reinforce the importance of a firm's published financial statements as a source of information. In mandating what should be publicly disclosed in a firm's published financial statements, FASB behaves as if it requires disclosures that are informational. If alternative information systems were adequate, these disclosures would be redundant. In the context of market studies, any informational effect from a change in disclosure requirements by FASB should theoretically be observable in the market.

One of the reasons given by FASB in issuing SFAS No. 36 was that

> the information developed for disclosure by the pension plan was a logical basis for the employer's disclosure because of its relevance and because little or no additional cost would be involved (FASB,1979).

The apparent benefit of SFAS No. 36 was that it made certain pension data costlessly available to the investor. Changing from a costly to a costless information system appears to have produced an observable market effect and, therefore, supports FASB's justification for SFAS No. 36.

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APPENDIX

FIRMS INCLUDED IN SAMPLE

AMF Inc.
Abbott Laboratories
Allis-Chalmers Corp.
Amerada Hess Corp.
American Standard Inc.
AMP Inc.
Armco Inc.
Avon Products
Barnes Group Inc.
Beker Industries
Beneficial Corp.
Brown & Sharpe Mfg. Co.
CBS Inc.
CNA Financial
Cadence Industries
Carolina Freight Corp.
Ceco Industries Inc.
Champion Spark Plug
Citicorp
Coastal Corp.
Coleco Industries
Colonial Penn Group Inc.
Consolidated Freightways Inc.
Conwood Inc.
Cox Communications Inc.
Culbro Corp.
Dr. Pepper Co.
Earle M. Jorgansen Co.
Eastman Kodak Co.
Elgin National Industries
Equifax Inc.
Equimark Inc.
Eli Lilly & Co.
Evans Products Co.
FMC Corp.
Faberge Inc.
Fieldcrest Mills Inc.
First Charter Financial Corp.
First Interstate Bankcorp.
First Pennsylvania Corp.
Foote, Cone & Belding Communications Inc

Frank B. Hall & Co., Inc.
General Dynamics Corp.
Getty Oil Co.
Global Marine Inc.
Golden West Financial Corp.
B.F. Goodrich Co.
Grumman Corp.
Guardian Industries Corp.
Homestake Mining Co.
Hughes Tool Co.
Illinois Tool Works Inc.
Inexco Oil Co.
Irving Bank
Itek Corp.
Jonathan Logan Inc.
Kaiser Aluminum & Chemical Corp.
Kysor Industrial Corp.
Lehigh Valley Industries Inc.
Manufacturers Hanover Corp.
Marine Midland Banks Inc.
Metromedia Inc.
Mirro Corp.
Monarch Machine Tool Co.
Motorola Inc.
Munsingwear Inc.
Nashua Corp.
North American Coal Corp.
Northrop Corp.
Oakite Products Inc.
Occidental Petroleum Corp.
Olin Corp.
Overnite Transportation Co.
Owens Corning Fiberglas Corp.
Owens Illinois Inc.
Pacific Lumber Co.
Polaroid Corp.
Publicker Industries Inc.
Reece Corp.
Rexham Corp.
A. H. Robbins Inc.
Sargent Welch Scientific Co.
Simmonds Precision Products Inc.
A. O. Smith Corp.
Soo Line Railroad Co.
Southeast Banking Corp.
Square D Co.
Sterling Drug Inc.
Stewart Warner Corp.
Stone & Webster Inc.
Stone Container Corp.
Sunshine Mining Co.
Texas Instruments Inc.

United Jersey Banks
Upjohn Co.
USLife Corp.
V F Corp.
Wean United Inc.
Western Co. North America
White Consolidated Industries Inc.
Witco Chemical Corp.

VITA

David Allen Durkee

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECT OF COSTLY VS. COSTLESS PENSION DISCLOSURE ON COMMON SHARE PRICES

Major Field: Business Administration

Biographical:

Personal Data: Born in Long Beach, California, February 12, 1941, the son of Edward N. and Mary P. Durkee. Married to Carol Phyllis Starr on September 11, 1964.

Education: Graduated from Santa Ana High School, Santa Ana, California, in June, 1959; received Bachelor of Arts Degree from Brigham Young University in June, 1965; received Master of Business Administration degree from the University of Utah in June, 1972; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in July, 1987.

Professional Experience: Naval Supply Officer, 1965 to 1970; public accountant, Arthur Andersen & Co., Los Angeles, California, 1972-1974; public accountant, Kueckelhan and Crutcher, Seattle, Washington, 1975-1977; controller, Reintree Corporation, Seattle, Washington, 1977-1981; assistant professor, University of Wisconsin, Platteville, 1981-1982; instructor, Central State Univeristy, Edmond, Oklahoma, 1982-1986; visiting lecturer, Oklahoma State University, 1986 to present.