An Empirical Investigation of the Financial Statement Characteristics of Firms Engaging in In-Substance Defeasance of Debt.

Raymond Jeffords Jr

Louisiana State University and Agricultural & Mechanical College

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An empirical investigation of the financial statement characteristics of firms engaging in in-substance defeasance of debt

Jeffords, Raymond, Jr., Ph.D.
The Louisiana State University and Agricultural and Mechanical Col., 1989

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AN EMPIRICAL INVESTIGATION OF THE FINANCIAL STATEMENT CHARACTERISTICS OF FIRMS ENGAGING IN IN-SUBSTANCE DEFEASANCE OF DEBT

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

The Department of Accounting

by

Raymond Jeffords, Jr.
B.A., University of Chicago, 1966
B.B.A., University of Massachusetts, 1971
M.B.A., University of Massachusetts, 1974
May 1989
ACKNOWLEDGEMENTS

I wish to express heartfelt thanks to the members of my dissertation committee for their guidance and support: Professors Nicholas G. Apostolou (chairman), Robert M. Harper, Michael J. R. Hoffman, W. Douglas McMillin (economics), and Kenneth N. Orbach. I also want to extend special thanks to Professor Barbara A. Apostolou for enriching every aspect of the doctoral program at Louisiana State University.

Most of all I want to thank my wife, Carla, for her unfailing love, support, and assistance. This dissertation is dedicated to her.
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ABSTRACT

Extinguishment of debt through in-substance defeasance is a powerful debt management tool that enables corporations to eliminate debt from their balance sheets and record substantial gains on extinguishment whenever market rates of interest exceed the coupon rate of defeased debt. Corporations engaging in in-substance defeasance must conform to the provisions of Statement of Financial Accounting Standards No. 76, *Extinguishment of Debt*, issued by the Financial Accounting Standards Board in 1983. Critics of Statement No. 76 charge that in-substance defeasance may be used to window dress the financial statements.

This study represents an initial test of the assertion that in-substance defeasance is chosen by firms as a tool for window dressing the financial statements. The major research question was: Can the window dressing hypothesis be used to identify statistically significant differences in the financial statement characteristics of defeased and defeasible firms? A defeasible firm is one that could record a gain by engaging in an in-substance defeasance transaction, but chooses not to do so.

Five research hypotheses were developed to test the window dressing motive. Each hypothesis dealt with a specific financial statement characteristic: 1) earnings
growth, 2) nonrecurring losses, 3) current ratio, 4) debt-to-total-assets ratio, and 5) liquidity. Values for each of the five variables were computed for samples of defeased and defeasible firms. Data were analyzed using both univariate and multivariate (logistic regression) analysis.

The major conclusion of this study is that the window dressing hypothesis cannot be ruled out as a significant factor influencing the decision to engage in in-substance defeasance of debt. Empirical evidence showed that firms with high liquidity, high leverage, and declining earnings per share are more likely to engage in in-substance defeasance of debt than firms holding defeasible debt, but without those financial characteristics. There was no evidence to indicate that firms defease current debt to window dress the balance sheet by increasing the current ratio. Nor was there any evidence to suggest that defeasance gains were used to mask nonrecurring losses.
CHAPTER 1
OVERVIEW OF THE STUDY

Introduction

Extinguishment of debt through in-substance defeasance was generally unknown in corporate America before 1982. Before then defeasance was a term usually associated with tax-exempt debt. For many years nonprofit organizations and governmental units had relied on the defeasance provisions of their bond covenants to refund outstanding debt. Such provisions set forth the "terms by which the debt may be legally satisfied and the related lien released without the debt necessarily being retired" (AICPA 1978). Refunding (i.e., substituting new debt for existing debt) might be done to take advantage of lower interest rates, to extend maturity dates, or to revise the terms of payment. Defeasance provisions enabled tax-exempt borrowers to refund outstanding debt in advance of the debt's maturity or call dates.

In the most common form of advance refunding the borrower places the proceeds of its new (refunding) debt issue in an escrow account from which interest and principal on the original (refunded) issue will be paid
(Evans 1987, 38). After sufficient funds are placed in an escrow account, the original debt is said to be "defeased"—i.e., it is no longer regarded as a debt obligation of the borrower and does not appear on the borrower's balance sheet. Only the new (refunding) debt obligation will appear among the borrower's liabilities.

In June 1978, the American Institute of Certified Public Accountants (AICPA) issued a Statement of Position providing guidance on accounting for advance refunding of tax-exempt debt. The Statement also provided guidance on how to account for the advance refunding of debt for which there were no defeasance provisions. Specifically, tax-exempt borrowers adhering to the advance refunding criteria outlined in the Statement were permitted to account for the transaction "in the same manner as defeased transactions because the obligation for the refunded debt is satisfied in substance, even though in [legal] form the refunded debt is not defeased" (AICPA 1978, 125, emphasis added). The criteria outlined in the Statement include the creation of an irrevocable trust in which U.S. Treasury obligations (or securities backed or collateralized by the U.S. government) are placed. The trusteed obligations must be sufficient to refund the old debt and must have maturities approximating the debt service requirements of the trust.

As long as U.S. Treasury obligations provided yields lower than the coupon rates on corporate debt, in-substance
defeasance held little appeal for corporate borrowers. But in the summer of 1982, U.S. Treasury bonds were yielding double-digit returns—while many corporations carried outstanding long-term debt with coupon rates of only 5 or 6 percent. The stage was set for in-substance defeasance of corporate debt.

The next section of this paper describes the first in-substance defeasance transactions undertaken by corporations and the regulatory actions that followed. In section 3 the criteria for corporate in-substance defeasance of debt are outlined. Section 4 examines the legal, financial, economic and accounting implications of in-substance defeasance. Sections 5 through 7 present, respectively, the research question, an overview of the methodology, and the expected contribution of this study.

A Brief History of In-Substance Defeasance by Corporations

Exxon Corporation

The defeasance transaction initiated by Exxon Corporation in the second quarter of 1982 has served as a prototype for many corporate financial officers. Exxon defeased $515 million dollars in long-term debt by buying and placing into trust $313 million of U.S. government securities. The debt extinguished by Exxon carried coupon rates ranging between 5.8 and 6.7 percent. The U.S.
government securities acquired by Exxon provided a yield of 14 percent. The difference between the carrying value of the defeased debt and the cost of the government securities was reported as an extraordinary gain (net of deferred taxes). Exxon described the transaction in a footnote to the financial statements in its 1982 annual report:

During 1982, U.S. government securities costing $313 million were deposited in an irrevocable trust, the principal and interest of which will be sufficient to fund the scheduled principal and interest payments on six debt issues of Exxon Corporation totaling $515 million. The debt issues and government securities were removed from the balance sheet and, after adjustments including a provision of $66 million for income taxes, $132 million was taken into income (Exxon 1982, 28).

This single transaction in the second quarter of 1982 reduced Exxon's debt-to-equity ratio by 0.45 percent. More importantly, the transaction increased Exxon's reported earnings by approximately 15 percent, "allowing Exxon to hold its reported decline in earnings to 51.5 percent rather than 58.9 percent, in the second quarter of 1982" (Agudelo and Harmon 1983, 62).

By the end of July 1982 Exxon was besieged with inquiries from corporate treasurers interested in knowing how the transaction was arranged. Morgan Guaranty Trust had first proposed the idea of in-substance defeasance to Exxon. Exxon had been looking for ways to reduce its long-term debt and had been actively engaged in swapping some of its debt for equity. But Exxon found itself unable to take
advantage of historically high interest rates by buying back its low-coupon bonds in the open market. Some of Exxon's largest bondholders were insurance companies who did not wish to sell their bonds because it would result in a loss on their books (Scherer 1982, 11). The opportunity to retire the bonds through in-substance defeasance enabled Exxon to eliminate the debt from its balance sheet without bidding up the price of its bonds in the open market.

Kellogg Corporation

Kellogg achieved similar results using a slightly different twist. Kellogg turned over to its trustee (Morgan Guaranty Trust) approximately $65 million in cash, together with $75 million in long-term debt. The trustee then turned over the cash to several other companies in return for their promise to pay off Kellogg's debt. In effect, the companies accepting the debt received the tax and cash-flow benefits of deep-discount bonds. The tax benefit included deductions for actual interest payments and amortization of the difference between the $75 million debt and the $65 million loan, enabling these firms "to deduct more in the early years as interest expense than their actual cash outlay" (Business Week 9 August 1982, 65).

For its part, Kellogg was able to eliminate the long-term debt from its balance sheet and record a gain of $5.7 million or seven cents per share. The gain increased
Kellogg's second quarter profits by more than ten percent. The transaction was reported to Kellogg shareholders in a footnote to the financial statements describing the deal as a "liability assumption."

SEC and FASB Reaction

Shortly after Kellogg announced its version of in-substance defeasance, the Securities and Exchange Commission (SEC) decided to ban future defeasance transactions until the Financial Accounting Standards Board (FASB) had a chance to consider the matter. One of the potential problems that troubled the SEC was the fact that debt defeasance might not absolve a corporation of all future liability. Suppose, for example, that a defeasing corporation subsequently files a bankruptcy petition. It is unclear whether the assets held in trust are beyond the reach of other creditors of the defeased firm. For this reason the SEC claimed that defeasance "doesn't really end a company's liabilities to its debt-security holders, and thus the balance sheet should continue to reflect existence of the debt" (The Wall Street Journal 20 August 1982, 7).

The FASB initially agreed with the SEC. During the course of its year-long deliberation on the matter, however, the Board reversed its position and in November 1983 issued Statement of Accounting Standards (SFAS) No. 76, Extinguishment of Debt. SFAS No. 76 permits in-
substance defeasance only if a number of criteria (discussed in the next section) are met by the defeasing firm. The SEC dropped its ban on defeasance transactions in early December 1983.

The SEC's implicit concurrence with the FASB ruling attracted the attention of the U.S. Congress. In a letter to the SEC Chairman, House Representative John Dingell charged that the SEC behaved "in rubber-stamp fashion" in regard to the defeasance ruling and other FASB rulings related to off-balance sheet financing (Dingell quoted in Calvert 1985, 28). Nonetheless, the popularity of SFAS No. 76 among corporate financial officers was enormous. Business Week estimated that as much as $5 billion dollars in long-term debt was defeased in only 4 months following the issuance of SFAS No. 76 (Business Week 2 April 1984, 96).

By April 1984 the FASB again found itself on the defensive when Morgan Guaranty Trust and other investment banking firms began touting the advantages of "instantaneous defeasance." This transaction exploits the fact that U.S. corporations with foreign subsidiaries can sometimes borrow money at rates lower than their host government. This creates an arbitrage opportunity under the provisions of SFAS No. 76. The transaction was dubbed "morning-to-midnight defeasance" by some members of the
financial community since new debt might be issued and defeased within the space of a single day (Friar 1984, 37). Pepsico, for example, completed an instantaneous defeasance in the first quarter of 1984 that increased its earnings by about $1.4 million dollars. The gain was generated "instantly" by issuing new debt (denominated in Deutschemarks) at about 7.7 percent and simultaneously applying the proceeds of the new debt toward the purchase of West German ten-year government securities yielding 8.35 percent. The government securities were immediately placed in trust so that no liability from the deal ever appeared on Pepsico's balance sheet.

Although instantaneous defeasance met the requirements of SFAS No. 76, the FASB acted quickly to prohibit such transactions. On February 16, 1984, the FASB issued a proposed technical bulletin stating that the provisions of SFAS No. 76 were not applicable to newly-issued debt. Unfortunately, the proposed bulletin offered no guidelines for distinguishing between "new" and "old" debt. Instead, Technical Bulletin 84-4 (issued in September 1984) states only that debt issued in contemplation of defeasance does not qualify for the accounting treatment outlined in SFAS No. 76.
Criteria for In-Substance Defeasance of Debt

The FASB issued SFAS No. 76 as an amendment to Accounting Principles Board (APB) Opinion No. 26, Early Extinction of Debt. According to SFAS No. 76 there are basically three ways to extinguish debt:

1. The debtor pays the creditor and is relieved of all obligations with respect to the debt. This includes the debtor's reacquisition of its own outstanding debt securities in the open market, regardless of whether the securities are cancelled or held as so-called treasury bonds.

2. The debtor is legally released from being the primary obligor under the debt either judicially or by the creditor and it is probable that the debtor will not be required to make future payments with respect to the debt under any guarantees.

3. The debtor irrevocably places cash or other assets in a trust to be used solely for satisfying scheduled payments of both interest and principal for a specific obligation and the possibility that the debtor will be required to make future payments with respect to the debt is remote. In this circumstance, debt is extinguished even though the debtor is not legally released from being the primary obligor under the debt obligation (FASB 1983, par. 3).

Debt extinguished under the third provision above is considered defeased "in substance." Before a corporation can remove debt from its balance sheet, however, it must meet some fairly stringent rules regarding the type of assets to be placed in the irrevocable trust. The trustee can accept only monetary assets in the currency in which the debt is payable. The assets must be essentially risk-
free. This means that for debt denominated in U.S. dollars, the assets are limited to 1) direct obligations of the U.S. government, 2) U.S. government guaranteed obligations, and 3) securities backed by U.S. government obligations as collateral under an arrangement whereby the interest and principal payments on the collateral immediately flow through to the holder of the security (FASB 1983, par. 4). Some government agency securities, such as Fannie Maes, do not meet these criteria. Convertible debt is also disallowed since the defeased debt must have fixed interest payments and a fixed maturity date.

Once qualified securities have been placed in trust, the corporation's debt is considered to be extinguished and may be removed from the balance sheet (together with those assets placed in trust). Gains or losses arising from debt defeasance must be included in current income (under the provisions of APB Opinion No. 26) and, if material, must be reported as an extraordinary item (under the provisions of SFAS No. 4, Reporting Gains and Losses from Extinguishment of Debt).

Footnote disclosures of in-substance defeasance transactions typically reveal few details. SFAS No. 76 requires only that "a general description of the transaction and the amount of debt that is considered
extinguished at the end of the period shall be disclosed so long as the debt remains outstanding" (FASB 1983, par. 6). Firms are not required to disclose specific information regarding the government securities placed in trust or the price paid for those securities.

**Implications of In-Substance Defeasance**

**Legal Considerations**

The SEC was among the first to express concern about the legal status of defeased debt if a corporation should declare bankruptcy. This remains a major unresolved issue with important implications for auditors, stockholders, nondefeased creditors, bond rating agencies, and many others. A key assumption underlying the accounting treatment for in-substance defeasance is the inviolability of the defeasance trust. That inviolability, however, has never been tested in a court of law.

In-substance defeasance gives rise to other legal questions as well. For example, if defeased bonds happen to be subordinate to other debt on a corporation's balance sheet, does the creation of a defeasance trust violate the seniority of claims against the corporation's assets (Peterson 1985, 66)? What happens if a corporation violates a provision contained in the bond indenture of the defeased debt? "For example, if the indenture requires the firm to maintain its net working capital above a certain
minimum, its failure to do so may have the same effect as bankruptcy" (Klein 1984, 25).

Bond rating agencies must also consider the possible fate of defeasance trusts subsequent to bankruptcy. It is conceivable that a defeasance trust might be subject to an automatic stay order by a bankruptcy judge. Such an order would trigger default on the defeased bonds as soon as the defeasance trustee failed to meet an interest or principal payment. The chairman of Standard & Poor's debt rating committee has said that his agency will not raise ratings on defeased debt unless attorneys provide assurance that the defeasance trust is inviolate--an assurance which lawyers have been unwilling to provide (Baker 1984, 22).

The legal implications of in-substance defeasance also concern bank regulators. U.S. banks immediately realized that in-substance defeasance provided an opportunity to improve capital and net worth ratios. Shortly after the release of SFAS No. 76 a bank in Rhode Island defeased a capitalized lease obligation on its new headquarters building, increasing the bank's annual income by 25 percent. This transaction caught the attention of the Comptroller of the Currency who issued a warning regarding the possible adverse effects of in-substance defeasance (Bisky 1984, 67). A member of the Comptroller's accounting division posed the following legal question:
Suppose a bank defeased subordinated debt and later failed—would the FDIC, as receiver, be able to open the trust and recover the assets? . . . And would insured depositors have to get in line behind any general creditors holding the defeased debt (Bisky 1984, 66)?

Auditors have also expressed concern about their legal liability in the event that trusteeed assets are challenged by nondefeased creditors or shareholders. Given that millions of dollars can disappear from a corporation's balance sheet without limiting the firm's legal liability, auditors may one day have to justify in court the manner in which a defeasance transaction is disclosed. Although the auditor may be satisfied that the disclosure is in accordance with generally accepted accounting principles (GAAP), the courts may not be satisfied with this criterion. Gaumnitz and Thompson argue that:

A defense based on conformity with a FASB statement might not hold up. The AICPA Code of Professional Ethics Rule 203—Accounting Principles requires adherence to a FASB statement only if doing so doesn't cause financial statements to be misleading. How the courts would resolve this issue is an open question (Gaumnitz and Thompson 1987, 105).

Any lawsuit directed at the auditing profession is certain to note the fact that the FASB reversed its initial position on in-substance defeasance and that the Board approved SFAS No. 76 by a vote of only four to three. The minority opinion of the Board presents a strong argument against in-substance defeasance:
Though dedicated to a single purpose, assets in the [defeasance] trust continue to be assets ... of the debtor until applied to payment. Likewise, the liability continues to be a liability of the original debtor until satisfied by payment or by agreement of the creditor that the debtor is no longer the primary obligor... For a debt to be satisfied, the creditor must be satisfied (FASB 1983, par. 12).

Financial and Economic Considerations

Analysis of the financial and economic consequences of defeasance has generally focused on two issues: 1) the potential transfer of wealth from shareholders and nondefeased debtholders to defeased creditors, and 2) the cash flow effects of defeasance on stock prices. Roman Weil, Professor of Accounting at the University of Chicago, was one of the first to recognize the possible economic consequences of SFAS No. 76 (Weil 1983). Weil believes that the extinguishment of debt by means of in-substance defeasance is entirely proper, but finds that shareholders are losers in such transactions:

Before the transaction, the bondholders would have claims only on the cash, earnings, and assets of ... [the defeasing firm], but afterward they'd have an additional claim on the distinctly less-risky cash flows provided by a U.S. Government security. That's the kind of wealth transfer I'd expect the financial markets to notice (Weil 1983, 76-77).

In effect, in-substance defeasance converts an unrealized holding gain (i.e., the difference between the carrying value of a bond and its current market value) into a smaller realized gain (equal to the difference between the carrying value of a bond and the cost of the government
security used to defease it). To use Weil's example, on November 14, 1983, the 9 percent bonds of Columbia Gas sold for 80.125 percent of par. Thus the shareholders of Columbia Gas enjoyed an unrealized gain of $198.75 ($1,000 par value minus $801.25 market value), assuming that the bonds were issued at par. If Columbia Gas wished to defease this debt, it might consider the 9 percent U.S. Government bonds of 1994. On the same date, the government bonds were selling for 85.16 percent of par. After defeasance, Columbia Gas would record a gain of $148.40 ($1000 minus $851.60), ignoring deferred taxes and transaction costs. In this example extinguishment of debt by in-substance defeasance would transfer approximately $50 (or 6 percent of the previously unrealized shareholder gain) to the defeased bondholder (Weil 1983, 76).

No empirical studies of actual wealth transfers have yet appeared in the literature. This may be due to the fact that firms are not required to reveal many details regarding in-substance defeasance transactions. If a transfer of 6 percent is typical, then Exxon's defeasance in 1982 cost its shareholders approximately $13 million (representing the amount of previously unrealized gain transferred from shareholders to defeased debtholders).

Roden (1987) has analyzed the effect of defeasance on stock prices using the capital asset pricing model.
According to financial theory, the price of a firm's stock is "the present value of its expected cash flows . . . capitalized at a rate reflecting the nondiversifiable risk of the cash flows" (Roden 1987, 82). The cash flow effects of in-substance defeasance on stock prices are generally negative. According to Roden:

Using cash to purchase a U.S. government security rather than investing in operating assets decreases the corporation's expected operating cash flow. It also decreases the corporation's liquidity, increasing its default risk. Finally, using cash to establish an irrevocable trust reduces the corporation's value and stock price by the after-tax fees paid to the investment banking firm for advice and the present value of the after-tax charges to service the trust. The asset pricing model suggests that the corporation's stock price should fall as a result of each of these influences (Roden 1987, 88).

The only factor that might serve to increase stock prices is an improvement in financial leverage as reflected in an improved debt-to-equity ratio. The stock price effect of changes in capital structure, however, cannot be determined with certainty. The effect depends, in part, on whether investors perceive the improvement in financial leverage as permanent or temporary.

In-substance defeasance has a capital structure impact on stock price depending on the perceptions of investors: If they perceive the change to be temporary, there will be no permanent impact. If, on the other hand, they perceive the change to be permanent, then in-substance defeasance should lead to a change in stock price . . . (Roden 1987, 88).

Critics of in-substance defeasance often point out that not a single penny is added to corporate coffers by
defeasance. In fact, the defeasance transaction usually begins with a major cash outlay for the purchase of U.S. government securities, followed by less significant cash outlays for advisory fees paid to investment bankers, service fees paid to defeasance trustees, and taxes paid on defeasance gains. Defeasance makes economic sense only if the discounted value of expected cash savings (resulting from the elimination of future interest and principal payments) exceeds the present value of expected cash outlays. Based on an analysis of six defeasance transactions for which sufficient information was disclosed, Mielke and Seifert found that the average rate of return on investment was 4.23 percent, with a range from 4.0 percent to 6.01 percent—suggesting that "defeasance is not a particularly good investment" (Mielke and Seifert 1987, 74). Agudelo and Harmon (1984, 63) estimated the return on Exxon's 1982 defeasance transaction at about 6.8 percent. Since Exxon's transaction was timed to take maximum advantage of market interest rates, Exxon's return may suggest an upper limit for most defeasance transactions.

In-substance defeasance offers a tax advantage over outright repurchase of outstanding debt. For tax purposes in-substance defeasance is a nonevent. The IRS regards the corporation as the owner of both the trusteed assets and the defeased debt. Taxes on gains from in-substance
defeasance are deferred until trusteeed funds are actually applied to the repayment of principal. If a corporation were to repurchase its debt in the open market, such gains would be taxed currently. Thus, assuming that debt retirement is a wise economic decision in the first place, in-substance defeasance may be the method of choice. From the shareholders' viewpoint the tax advantage of in-substance defeasance may, in fact, outweigh its cost (in the form of wealth transfers from shareholders to defeased debtholders). Lovata, Nichols, and Philipich (1987) have developed a model for choosing between methods of debt extinguishment based on an analysis of differential tax treatments.

Accounting Considerations

The major advantages of in-substance defeasance from an accounting perspective are twofold: (1) the opportunity to eliminate large amounts of debt from the balance sheet by a unilateral decision of corporate management, and (2) the opportunity to record gains on debt extinguishment whenever current interest rates exceed the coupon rate of defeasible debt. These changes in the financial statements can lead to significant improvements in key financial ratios such as the debt-to-equity ratio. Furthermore, management can extinguish debt even when corporate bondholders refuse to sell their bonds in the open market.
In-substance defeasance may help to solve a number of difficult problems for management. For example, managers can use in-substance defeasance to generate immediate gains to offset anticipated nonrecurring losses. An offer of defeasance may provide management with an opportunity to renegotiate restrictive debt covenant provisions that might limit management's ability to increase dividends or obtain new financing. A defeasance transaction can even be used to reduce the likelihood of a hostile takeover since large amounts of liquid assets can be placed in a defeasance trust, permanently removed from the reach of unwanted suitors. Finally, managers of firms with earnings-based management compensation plans may use defeasance to increase bonus payments.

SFAS No. 76 permits managers to generate instant profits and reshape the balance sheet without seeking the approval or permission of equity holders. This prerogative has caused some members of the accounting community to express concern over the possible use of defeasance as "window dressing" for the financial statements. According to John C. (Sandy) Burton, former chief accountant of the SEC: "Any time you get something that creates large discretionary increases in income, it raises questions about the credibility of the income statement" (Burton quoted in Grant, 22 January 1984, 3). Accountants worry
that defeasance may be used "as a smoke screen to hide poor earnings performance" (Chaney 1985, 54).

Defeasance gains have been called "illusory" since they boost net income and earnings per share without boosting cash flows:

Think about this. The company hasn't received one cent in cash. It has, to be sure, saved money on a debt it owed. But the money has been saved over the next 30 years, and it gets an earnings boost that comes all at once, in the year of the transaction (Heins 10 October 1983, 67).

A professor of financial management at Wharton claims that in-substance defeasance is "just balance sheet manipulation. . . It's in the cosmetic category. It's more appearance than reality in that it does not have any significantly great effects on cash flow, and cash flow is what ultimately determines value" (Blumstein 12 January 1984, D1).

If in-substance defeasance improves reported earnings and the face of the balance sheet without improving cash flows, why do managers engage in such transactions? Numerous studies have shown that users of financial statements generally penetrate the veil of accounting cosmetics to analyze the cash flow effects of important transactions (see, for example, Ball 1972, Kaplan and Roll 1972, Abdel-khalik and McKeown 1978, Biddle and Lindahl 1982, and Ricks 1982). Corporate managers usually respond by citing the flexibility of in-substance defeasance as a
debt management tool and the economic benefits it provides (McGoldrick 1984, 76-77). A well-planned defeasance transaction will have a positive net present value, an internal rate of return higher than the firm's after-tax cost of capital, and a tax advantage over other forms of debt extinguishment. These economic benefits are all worthy of management consideration.

Nonetheless, defeasance transactions can lead to some difficult questions at the annual meeting of shareholders. For example, using available cash to purchase riskless government debt may not impress some shareholders as the most productive use of corporate assets. In fact, using cash in this way suggests that the firm lacks good investment opportunities in the area of continuing operations. Furthermore, shareholders could obtain the same returns by investing directly in U.S. government securities. How, then, can management justify receiving compensation (and perhaps even a bonus if the firm has an earnings-based bonus plan) for making such decisions? As one banker has asked: "Do the shareholders want Exxon to invest in government securities or in oil and gas properties" (Scherer 29 July 1982, 11)?

Exxon's defeasance made economic sense largely because the transaction occurred just as interest rates hit an historic peak. Thus Exxon could replace its defeased debt at lower interest rates if it wished. Firms that are not
as adept at timing a defeasance transaction, however, may find that renewed inflation and higher interest rates force them to replace cheap debt with far more expensive debt. Some shareholders may conclude that in-substance defeasance is nothing more than financial speculation that exposes shareholders to unnecessary risks.

Finally, there is at least a possibility that the economic benefits of defeasance cited by corporate managers are not the true motivation for defeasance transactions. A key question is this: If managers could not record an immediate gain and eliminate debt from the balance sheet, would they still engage in in-substance defeasance transactions? Are managers pursuing short-term financial statement benefits by buying U.S. government securities when they could be investing liquid assets more profitably elsewhere? Roman Weil warns users of financial statements to consider management's motivation for in-substance defeasance:

... if mere window dressing appears to be the motive, beware. After all, why would management think it worthwhile to transfer wealth from its shareholders to its bondholders merely to report higher accounting income (Weil 5 December 1983, 51)?

Research Question

In-substance defeasance has been aggressively promoted by the investment banking community since the issuance of SFAS No. 76, yet "most bankers report more interest in the
defeasance concept than actual deals" (Baker 29 February 1984, 22). The investment research department of Bear Stearns & Company, for example, drew up a list of 72 prospective corporate clients--i.e., firms that carried low-coupon debt on their balance sheets and adequate cash to complete an in-substance defeasance transaction (Calvert 1985, 24-25). To date, however, only 4 of these 72 firms have completed a defeasance transaction. A cautious attitude toward in-substance defeasance is also reflected in the results of a survey by Landrum and Posey (1986). They sent questionnaires to the top financial executives of 75 companies randomly selected from the Fortune 500 asking whether firms were presently considering the use of in-substance defeasance. Twenty-eight usable replies were received:

Surprisingly ... [the] data indicate that only 36 percent of the respondents anticipate use of defeasance in the future. By an almost two to one margin, respondents were not considering the use of defeasance in the future, suggesting limited utilization subsequently. It may be that potential users feel that the market would "see through" the numbers in accordance with the efficient markets hypothesis or for other reasons believe that the method is not in their best interests (Landrum and Posey 1986, 21).

Mielke and Seifert (1987) analyzed the effects of in-substance defeasance for 46 companies that defeased debt between January 1, 1982, and December 31, 1985. They found that the average improvement in the debt-to-equity ratio of
defeased firms was 2.42 percent, with a range of 0.01 percent to 21.58 percent. More significantly, the average increase in the total income reported by defeased firms was 8.32 percent, with one firm reporting a 72.5 percent increase from in-substance defeasance of debt. Mielke and Seifert were also surprised at the number of firms using in-substance defeasance to improve their current ratios:

This may indicate a new opportunity provided by the new accounting rules and may support Weil's (1983) and Chaney's (1985) claims that the accounting for defeasance encourages "window dressing." Companies might routinely accumulate funds in anticipation of satisfying maturing debt and invest those funds in short-term government securities. Prior to FASB Statement No. 76 there was no right of offset; that is, both the assets and liability would be shown on the balance sheet up to the maturity date. Now, however, the right of offset provides an opportunity due to the new accounting pronouncement. The immediately improved current ratio is a bonus for the results of a previously ordinary business function to secure funds for the payment of obligations (Mielke and Seifert 1987, 71).

Despite the obvious potential for window dressing the financial statements, in-substance defeasance is vigorously defended by investment bankers and others as "a sound method to pay off long-term debt" (Baker 1984, 22). The significance of the window-dressing motive is confounded by the fact that cash savings from in-substance defeasance typically generate a positive return on investment. As noted previously the average rate of return for a small sample of in-substance defeasance transactions was 4.23 percent (Mielke and Seifert 1987, 74). Whether an
investment in debt extinguishment that returns, on average, 4.23 percent is the best use of corporate assets or a prudent investment decision is highly problematic. It depends, in part, on the risks and returns of foregone opportunities. The issue that troubles many observers is whether corporations would irrevocably commit large amounts of liquid assets to an investment with such modest returns were it not for the immediate improvement in the financial statements that in-substance defeasance permits.

In the absence of management's explanation, it may be impossible to determine the factors that motivate a decision to engage in in-substance defeasance. Certainly no firm is likely to acknowledge window dressing as an important factor in its decision. The importance of the window dressing motive in general, however, might be evaluated by investigating the financial statement characteristics of firms that have defeased debt compared to firms that hold defeasible debt but that have chosen not to defease. The research question is: Can the window dressing hypothesis be used to identify statistically significant differences in the earnings trends and key financial ratios of defeased versus defeasible firms (i.e., firms that could benefit from the use of in-substance defeasance but choose not to do so)?

The window dressing hypothesis has a foundation in agency theory and contracting cost theory.
The economic theory of agency is used to predict and explain the behavior of parties involved with the firm. . . Agency theory seeks to understand organizational behavior by examining how parties to agency relationships within the firm maximize their own utility (Wolk, Francis, and Tearney 1984, 72).

According to Jensen and Meckling, firms are "legal fictions which serve as a nexus for a set of contracting relationships among individuals" (Jensen and Meckling 1976, 31).

Contracting cost theory helps explain the role of accounting information in the firm. Contracts governing firm activities often use accounting information to determine how the firm's wealth is divided among various parties (such as managers, stockholders, and debtholders). Since in-substance defeasance can have a dramatic impact on accounting information and related financial ratios, it is conceivable that management may engage in a defeasance transaction in order to influence the contractual distribution of wealth within the firm. In addition, management may realize nonpecuniary benefits from transactions which improve reported profits:

In a summary of the literature on managerial motivation, Williamson (1964, 30-32) reports that theorists largely agree on the fact that managers seem to pay great attention to their "security" and "reputation for excellence." It may be assumed that security and reputation are in some way dependent on reported profits. Consequently executives maximizing their own utility would pay some attention to the reporting methods their firm uses (Oagnon 1967, 192).

The choice of in-substance defeasance is not inconsistent with efficient market theory. It is not necessary to
assume that management believes that window dressing
transactions will influence stock prices. On the contrary,
management may be convinced that defeasance will have
little or no impact on stock prices and still be motivated
to pursue such transactions.

**Overview of the Methodology**

Defeased and defeasible firms were identified through
a search of the NAARS (National Automated Accounting
Research System) database in conjunction with AICPA
Financial Report Survey 32, "Illustrations of Accounting
for the In Substance Defeasance of Debt" (Goodman and
Lorensen 1986). The NAARS database contains the annual
reports of several thousand U.S. firms and provides full
text search capabilities. The database search covered the
period from January 1, 1982, through November 1, 1988.
Earnings trends and key financial ratios for each group
(i.e., defeased and defeasible firms) were compared using
both univariate and multivariate tests.

The Wilcoxon ranked-sum test was used to analyze
differences for individual variables. This is a
nonparametric test that is appropriate for comparing the
means of two independent samples when data are at least
ordinal. The Wilcoxon ranked-sum test is a nonparametric
alternative to the t-test and requires no assumptions
regarding the distributions of variables. This is an
important consideration for studies involving financial ratios since the distribution of financial ratio data is often nonnormal.

The Wilcoxon ranked-sum test is based upon a ranking of pooled data from two independent samples. The ranking is used to develop a test statistic (the T-statistic) with an approximately normal distribution. This statistic permits a test of the hypothesis that there is no difference between the means of the two populations from which the samples were drawn.

Since the variables pertaining to the window dressing hypothesis are interrelated, multivariate analysis was used to assess the simultaneous influence of all variables on the defeasance decision. Logistic regression analysis (logit) and probabilistic regression analysis (probit) are commonly used to analyze relationships involving a dichotomous dependent variable (such as the decision to defease debt). Both techniques overcome the difficulties associated with analysis of dichotomous dependent variables by using a curvilinear regression model. The major difference between the two methods is the shape of the curve used to develop each model. Logistic regression analysis is based on a logistic response function (the log of which is linear). Probabilistic regression analysis is based on the cumulative normal distribution function. Logistic regression analysis was used in the current study.
The dependent variable in the logistic regression model is interpreted as the probability that a given observation belongs to one of two groups (defeased or defeasible firms). The statistical significance of individual coefficients is assessed by means of chi-square tests. A chi-square test is also used to assess the goodness-of-fit of the overall model. Logistic and probabilistic regression models produce very similar results and have been used in several accounting choice studies including Elliott et al. (1984); Bowen, Noreen, and Lacey (1981); and Hagerman and Zmijewski (1979).

**Expected Contribution of the Study**

Currently there is much speculation in the literature regarding the use of in-substance defeasance as a window dressing technique. Since in-substance defeasance offers economic and tax advantages, the role of window dressing in management decision-making has been unclear. This study investigates the influence of the window dressing motive by examining the earnings trends and key financial ratios of defeased and defeasible firms prior to the defeasance decision. The evidence indicates that the window dressing motive cannot be ruled out as a factor in management's decision to engage in in-substance defeasance of debt.

Identifying potentially significant explanatory variables for unexplained phenomena can be a difficult
task. This is especially true in the social sciences since a wide variety of explanatory factors must be considered that are not subject to experimental control or manipulation. While this study does not prove that in-substance defeasance decisions are, in fact, motivated by management's desire to window dress the financial statements, it does provide evidence consistent with the window dressing hypothesis.

Summary

The extinguishment of debt by means of in-substance defeasance is a powerful debt management tool that enables firms to eliminate large amounts of debt from their balance sheets without consulting debtholders or shareholders. At the same time in-substance defeasance can increase current income significantly whenever market rates of interest exceed the coupon rate of defeased debt. Critics charge that in-substance defeasance transfers wealth from shareholders to defeased debtholders and produces illusory gains that do not increase cash flow.

This chapter reviews the legal, economic, and financial implications of in-substance defeasance, together with a brief history of FASB Statement No. 76, Extinguishment of Debt. An analysis of the accounting implications of in-substance defeasance suggests that corporate managers may be motivated to use defeasance
transactions as window dressing for the financial statements. A test of the window dressing hypothesis is described based on an analysis of differences in earnings trends and key financial ratios between defeased and defeasible firms.
CHAPTER 2
REVIEW OF THE LITERATURE

A review of the literature revealed two areas of research related to the current study:

1) Descriptive and analytical studies of in-substance defeasance of corporate debt, and

2) Studies of the determinant characteristics of firms making discretionary accounting choices.

This chapter contains a brief overview of research findings in both areas. The relevance of the current study to the literature is discussed at the end of this chapter.

Descriptive and Analytical Studies of In-Substance Defeasance of Corporate Debt

Mielke and Seifert

Mielke and Seifert (1987, 65) conducted a survey of firms engaging in defeasance transactions "to gain insight as to why companies might defease debt, to examine the impact of defeasance on the firm's financial characteristics, and to investigate the type of disclosure provided in the annual reports." Survey results are based on a total of 51 defeasance transactions reported between January 1, 1982, and December 31, 1985. Forty-six firms are
represented (5 of which defeased debt in 2 different fiscal periods). A wide variety of debt was defeased during the survey period including corporate debentures, first mortgage bonds, promissory notes, and capital leases.

The authors attempted to analyze the motivation for defeasance based on footnote disclosures. Defeasance gains appeared to be a motivating factor for a majority of firms (29 of 46). Twelve firms defeased debt maturing within the current period (thereby improving the current ratio).

The authors examined the effect of defeasance on firms' financial characteristics in 4 areas: (1) the average change in current ratio, (2) the average change in the debt-to-equity ratio, (3) defeasance gains as a percentage of reported income, and (4) average return on investment. As noted in the previous chapter, the average change in current ratio was 6.13 percent, with a range of 0.01 to 15.24 percent. The average improvement in the debt-to-equity ratio was 2.42 percent and ranged from 0.01 to 21.58 percent. The average increase in reported income was 8.32 percent for firms reporting a profit. Three firms in the survey reported losses. Loss reductions for these firms were 1.14 percent, 11.0 percent, and 19.76 percent. The average return on investment (based on an analysis of 6 firms in the survey for which adequate cash flow information was available) was 4.23 percent, with a range of 4.0 to 6.02 percent.
The survey revealed that many details of in-substance defeasance transactions are not disclosed. SFAS No. 76 does not require firms to identify the debt being defeased or the price paid for trusteed securities—information that creditors and other users of the financial statements must have in order to evaluate the merits of a defeasance transaction. The authors conclude that:

The most important finding may be the lack of disclosure information that is provided, beyond that required by the FASB, to help investors and creditors evaluate the impacts of these transactions on their risk and return (Mielke and Seifert 1987, 76).

Landrum and Posey

Landrum and Posey (1986, 16) conducted a survey to gather information "about the acceptability and use of defeasance as perceived by some of the major financial statement preparers affected by SFAS No. 76." Questionnaires were sent to the chief financial officers of 75 firms randomly selected from the Fortune 500 for 1983. Twenty-eight usable responses were received. Each subject was asked to answer 7 questions regarding past and expected future use of defeasance. Only 2 of the 28 respondents said they had used defeasance prior to the SEC moratorium (August 1982). Ten firms (36 percent) said they were considering future use of defeasance. Only two firms expressed disapproval of the FASB ruling on defeasance, and 6 firms (21 percent) felt that the financial reporting
treatment of in-substance defeasance does not reflect its "real economic impact" (Landrum and Posey 1986, 23). In response to an open-ended question on the drawbacks of defeasance, 8 respondents said they were concerned that defeasance produces "artificial income" (Landrum and Posey 1986, 24). The major advantages cited by respondents pertained to the additional discretionary power given management: "It permits the company to disclose its true debt position" and provides greater flexibility in managing the company's capital structure (Landrum and Posey 1986, 24-25).

Roden

Roden (1987) analyzed the financial implications of in-substance defeasance in the framework of the capital asset pricing model (CAPM). Roden (1987, 84) argues that the cash used to purchase trusteeed securities "may move the corporation beyond the optimal liquidity range, affecting stockholders' returns and stock price." Lower cash balances increase the corporation's default risk and signal investors that "operating prospects have deteriorated" (Roden 1987, 85). Since investors are led to expect a reduction in future operating cash flows, stock prices should fall based on the CAPM. An improvement in the debt-to-equity ratio, on the other hand, could have a favorable impact on stock prices. As discussed in the previous
chapter, the effect of a change in capital structure on stock prices depends on the perceptions of investors. The author concludes that in-substance defeasance of debt may not be in the best interests of stockholders "when done principally to obtain an accounting gain" (Roden 1987, 88).

Studies of the Determinant Characteristics of Firms Making Discretionary Accounting Choices

A number of studies have investigated the relationship between a firm's financial and operating characteristics and its discretionary accounting choices. Examples of such choices (some of which are no longer available) include the choice of successful efforts or full cost accounting by oil and gas producers, the capitalization or expensing of research and development costs, the use of straight-line or accelerated depreciation methods, and the choice of early or late adoption of accounting standards that provide flexible implementation provisions. All of these studies have used financial ratios based on accounting data to operationalize discriminating variables such as firm size or capital structure.

Deakin

Deakin (1979) was one of the first to investigate firm characteristics influencing the choice between full cost and successful efforts accounting by oil and gas producers.
SFAS No. 19 (FASB 1977) mandated the successful efforts method of accounting for unproductive drilling costs ("dry holes"). Successful efforts firms capitalize only the cost of successful wells; dry holes are expensed immediately. Firms using full cost accounting capitalize (and gradually amortize) all drilling costs. Compared to successful efforts accounting, the full cost method generally results in higher income, higher asset values, and higher levels of shareholders' equity (Sunder 1976 and Myers 1974).

Opponents of SFAS No. 19 claimed that a uniform accounting standard for drilling costs ignores important differences between firms. Specifically, opponents argued that full cost firms were generally (1) more aggressive in exploration, (2) newer, and (3) in greater need of external financing than successful efforts firms (Deakin 1979, 722). Mandating successful efforts accounting for all firms, it was claimed, would weaken the financial statements of full cost firms and make it more difficult for them to obtain the financing needed for aggressive exploration.

Deakin (1979, 726) operationalized the firm characteristics cited by opponents of SFAS No. 19 by identifying one or more discriminating variables for each characteristic (see Figure 2-1). He also included a variable for firm size. Deakin gathered data on each of these variables for 53 firms (28 successful efforts firms and 25 full cost firms). A multiple discriminant analysis (MDA) model using
Indicators of aggressiveness of exploration:
   Average depth of exploratory wells
   Number of exploratory wells / revenue
   Development wells / total wells

Indicators of need for external capital:
   Debt / revenue
   Capital expenditures / revenue

Size indicator:
   Revenue

Maturity or age variable:
   Age of company in years

Figure 2-1. Discriminating Variables for Successful Efforts Versus Full Cost Accounting.

All 7 discriminating variables listed in Figure 2-1 was found to be significant at the 0.01 level based on a chi-square statistic of 18.2. The full MDA model correctly classified 71.7 percent of all firms in the sample. Deakin found, however, that a model using only the debt and capital expenditure ratios "gave results that were equally significant and had equal total correct classification rates" (Deakin 1979, 730).

A separate dichotomous classification test revealed that one variable alone (the ratio of debt to revenue) could correctly classify 73.6 percent of all firms—an overall correct classification rate higher than the MDA models. Deakin concluded that the debt to revenue ratio
provides the greatest ability to discriminate between full
cost and successful efforts firms, and that differentiation
on the basis of size, age, or aggressiveness in exploration
cannot be supported.

Deakin's analysis suffers from a failure to test the
statistical assumptions underlying MDA—viz., multivariate
normality and the equality of variance-covariance matrices
across groups. Deakin's classification rates may also be
overstated since they are based on the same sample data
used to develop the MDA model rather than a holdout sample.
Estimation of classification rates for small samples (such
as Deakin's) can be improved by using the Lachenbruch U
Method described by Eisenbeis (1977).

Dhaliwal

Dhaliwal (1980) investigated the effect of a single
variable, capital structure, on a firm's decision to use
full cost or successful efforts accounting. As noted
above, firms that use full cost accounting tend to report
higher earnings with less volatility (due to gradual
amortization of all drilling costs). Dhaliwal hypothesized
that highly-levered firms would be more likely to choose
full cost accounting because highly-levered firms are
generally closer to debt covenant provisions that restrict
management's ability to acquire new financing or increase
dividends payouts. By choosing a method (such as full cost
accounting) that increases reported earnings and reduces the risk of sharp earnings declines, management can reduce the risk of technical default and enjoy greater flexibility in planning future financing and dividends.

Dhalwal compared the average debt-to-equity ratios of 33 pairs of firms matched according to sales revenue to control for firm size. He found a statistically significant difference (at the 0.09 level) using a matched-pairs t-test. Comparable results were obtained using the nonparametric Wilcoxon matched-pairs signed-ranks test (which does not require the assumption that data are normally distributed).

Lilien and Pastena

Lilien and Pastena (1982) used 4 discriminating variables (see Figure 2-2) in their investigation of (1) the choice between successful efforts and full cost accounting, and (2) the choice of specific procedures

- Revenue (size variable)
- Age (consistency variable)
- Dry wells/Total wells (exploratory risk)
- Debt/Shareholders' equity (leverage)

Figure 2-2. Discriminating Variables for Inter- and Intra-Method Accounting Choices.
within each accounting method that affect the amount of reported earnings. The latter accounting choice stems from the fact that SFAS No. 19 permitted considerable flexibility in application. "For example, the areas of procedural flexibility included tests of impairments of producing properties, tax allocation treatment, and determination of recoverable reserves for computing amortization" (Lilien and Pastena 1982, 146). Thus, firms could influence reported earnings a little or a lot depending on their choice of specific procedures within each accounting method.

An unusual opportunity to assess the earnings variation between firms using either full cost or successful efforts accounting was provided by the SEC when it overturned SFAS No. 19 and narrowed the procedures allowable under both methods. In addition, the SEC mandated a retroactive adjustment of retained earnings under each method to reflect what earnings would have been if the prescribed procedures had been followed from the start.

Lilien and Pastena predicted that large firms would be more likely to use successful efforts accounting because it tends to minimize reported earnings. This is based on an argument advanced by Watts and Zimmerman (1978, 115) that large firms generally avoid discretionary increases in reported earnings so as not to attract the attention of
regulatory authorities. Lilien and Pastena hypothesized that full cost firms would tend to be smaller, more highly levered, and engage in more exploratory drilling. Since the full cost method permits higher reported earnings, it reduces the risk of technical default for highly levered firms and makes it easier for them to acquire new financing.

Lilien and Pastena obtained data on 102 oil and gas producers for the period 1978-79. A probit model based on the 4 variables listed in Figure 2-2 correctly classified 72 percent of the sample firms with regard to their choice of full cost or successful efforts accounting. This model was found to be significant at the 0.001 level based on a chi-square value of 21.1. This means that the probit model is significantly better in classifying firms by accounting choice than a naive model that randomly assigns accounting choice based on relative frequencies. Furthermore, the sign of each coefficient in the model was correctly predicted. A separate probit analysis of procedural choices within each accounting method produced comparable results. The probit model for procedural choices correctly classified 59 percent of the firms in the sample. Each coefficient in the procedural choices model carried the predicted sign and was significant at the 0.02 level or better.
Bowen, Noreen, and Lacey (1981) studied several possible determinants of management's decision to capitalize interest costs related to assets under construction. Interest capitalization was a discretionary accounting choice prior to an SEC-imposed moratorium in 1974 and the subsequent ruling of the FASB (1979) that interest costs must be capitalized for self-constructed assets (SFAS No. 34). Since interest capitalization results in higher reported earnings Bowen, Noreen, and Lacey hypothesized that firms with earnings-based bonus plans would be more likely to capitalize interest. Firms constrained by bond covenant provisions might also be expected to choose interest capitalization.

Bowen, Noreen, and Lacey looked at 3 variables as measures of potential bond covenant constraints: (1) dividends paid/unrestricted retained earnings, (2) income/interest expense (i.e., the firm's interest coverage ratio), and (3) net tangible assets/long-term debt (a measure of leverage). In addition, the authors analyzed the impact of firm size on the interest capitalization decision. The impact of the size variable was evaluated across all industry groups and separately for firms in the oil and gas industry--since regulatory pressures for this industry were especially strong during the Arab oil embargo of the early 1970s.
Data were collected for 91 pairs of firms matched on the basis of their four-digit Standard Industrial Classification (SIC). Using both the Sign test and the Wilcoxon matched-pairs signed-ranks test, all 3 debt variables were found to be significant at a level of 0.057 or better. The presence of an earnings-based bonus plan was found to have no effect on the decision to capitalize interest. The size variable (based on sales) was significant for firms in the oil and gas industry as predicted. A t-test of the difference between average sales of capitalizing and noncapitalizing firms was significant at the 0.01 level. For all industrial groups as a whole, however, the size variable was found to be significant in the wrong direction—i.e., large firms were more, not less, likely to capitalize interest. Multivariate (probit) analysis confirmed the results of the univariate tests. In summarizing their conclusions Bowen, Noreen, and Lacey (1981, 151) state that size was not a significant factor in the decision to capitalize interest for firms "other than the largest firms in the 'politically sensitive' petroleum industry."

Daley and Vigeland

Daley and Vigeland (1983) investigated the factors suspected of influencing management's decision to capitalize or expense research and development (R&D) costs
before SFAS No. 2 (FASB 1974) required firms to expense R&D. They considered 5 variables in their analysis, including separate variables for firms holding public debt versus privately-placed debt (see Figure 2-3). Since public debt is presumed to be more difficult and more costly to renegotiate, the authors hypothesized that firms with more public debt would have greater incentive to capitalize R&D costs than firms with private debt.

\[
\begin{align*}
\text{NPLEV} & = \frac{\text{Total long-term debt} - \text{Public long-term debt} - \text{Capitalized leases}}{\text{Total tangible assets}} \\
\text{PLEV} & = \frac{\text{Public long-term debt}}{\text{Total tangible assets}} \\
\text{DIVURE} & = \frac{\text{Cash dividends}}{\text{Unrestricted retained earnings}} \\
\text{INTCOV} & = \frac{\text{Income before extraordinary items}}{\text{Interest expense}} \\
\text{SIZE} & = \text{Sales}
\end{align*}
\]

Figure 2-3. Discriminating Variables for Decision to Capitalize or expense R&D Costs.

Daley and Vigeland performed univariate tests on a sample of 111 pairs of firms matched on the basis of their two-digit SIC codes. The authors predicted that firms capitalizing R&D costs would (1) be more heavily levered, (2) have lower interest coverage ratios, (3) have higher dividend/unrestricted retained earnings ratios, (4) have more public debt, and (5) tend to be smaller firms. All of
the variables carried the predicted sign and all but one were significant at the 0.005 level or better based on the Mann-Whitney U-test. The dividends/unrestricted retained earnings ratio was not a significant variable in the decision to capitalize R&D costs.

The authors subjected the same matched-pair data to multivariate analysis using the generalized jackknife procedure developed by Quenouille (1956). This is an ordinary least squares regression technique for binary dependent variables that "develops multiple estimates of the regression coefficients (pseudo coefficients) via repetitive estimation of the model, while systematically leaving out a new observation at each repetition" (Daley and Vigeland 1983, 202). Although all variables carried the predicted sign, only the leverage variables (PLEV and NPLEV) were found to be significant. The authors conclude that "the results confirm previous findings by Bowen, Noreen, and Lacey (1981) . . . with respect to the relationship between accounting principle choice and leverage" (Daley and Vigeland 1983, 209).

Dhaliwal, Salamon, and Smith

Dhaliwal, Salamon, and Smith (1982) investigated the effect of ownership control on management's choice of straight-line or accelerated depreciation methods for financial reporting purposes. The authors hypothesize that
management controlled firms will tend to choose straight-line depreciation (producing higher reported earnings in the current period) for two reasons: (1) to reduce the likelihood of takeover attempts by outsiders, and (2) to take advantage of earnings-based bonus plans. A management controlled firm is one in which no single party owns more than 5 percent of the voting stock. A firm is classified as owner controlled when one party owns at least 20 percent of the firm's outstanding voting stock, or when one party owns at least 10 percent of the firm's voting stock and is represented on the board of directors. Since ownership is more diffuse in management controlled firms, the authors argue that owners are less likely to monitor management directly and more likely to rely on indirect monitoring via earnings-based compensation plans.

In addition to the ownership variable, Dhaliwal et al. consider the impact of firm size (as measured by total assets) and leverage (as measured by the debt-to-equity ratio) on the depreciation decision. The authors use probit analysis for a sample consisting of 42 management controlled firms and 41 owner controlled firms. The probit model was found to be significant at the 0.01 level based on a chi-square value of 13.3. The ownership control variable (designated as 1 for management controlled firms and 0 for owner controlled firms) and the debt-to-equity
variable were significant at the 0.03 and 0.01 levels respectively. The size variable was not significant. The authors conclude that:

... management controlled [MC] firms are more likely than owner controlled [OC] firms to adopt accounting methods which result in increased or early reported earnings. This prediction contrasts with one developed by Fama (1980). Fama theorizes that the market for managerial talent is such that there will be no difference in behavior between managers of MC and OC firms (Dhaliwal, Salamon, and Smith 1982, 52).

Hagerman and Zmijewski

Hagerman and Zmijewski (1979) examined the impact of 5 economic variables (plus a sixth variable applicable only to the choice of inventory accounting method, see Figure 2-4) on 4 separate discretionary accounting choices: depreciation, inventory, investment tax credit, and pension costs. The dichotomous dependent variable for each accounting choice model was designated 1 for an accounting policy that increased reported income and 0 for an income-reducing policy. The expected effect of the size and risk variables has been discussed previously—viz., large firms with volatile earnings are expected to choose income-reducing accounting methods to avert unwanted regulatory attention and to reduce the likelihood of violating restrictive debt covenant provisions. The authors also hypothesized that capital intensive firms would choose income-reducing accounting methods because such firms do not record the opportunity cost of capital and therefore
Size:
Total assets
Net sales

Risk:
Beta of accounting earnings (as a proxy for the variability of accounting earnings)

Capital intensity:
Gross fixed assets / sales

Competition:
Concentration ratio = percent of total industry sales made by 8 largest firms in the industry

Incentive plans:
1 if firm has management profit-sharing plan
0 if firm has no profit-sharing plan

Effective tax rate:
(Used only in model of inventory accounting choice to control for tax effects of choice.)

Figure 2-4. Discriminating Variables for the Economic Determinants of Accounting Policy Choice.

tend to report higher earnings than firms in labor intensive industries. Furthermore, the authors assume that highly concentrated industries (i.e., industries with limited competition) will choose income-reducing accounting methods because they fear possible anti-trust actions or entry by new firms. Hagerman and Zmijewski summarize the predicted effect of all 5 economic variables as follows:

In sum, we have argued that firms that are large, risky, capital intensive or have monopoly rents have incentive to select accounting alternatives which
reduce reported income. This incentive is due to the greater probability that these firms will be subject to political forces that will reduce their wealth. In addition, it appears that firms with market power will have similar incentives because of anti-trust activity and potential entry [by competitors]. Finally, the existence of management incentive compensation plans may induce the choice of accounting principles that increase reported income (Hagerman and Zmijewski 1979, 145-146)

Data were collected on a sample of 300 firms drawn from 1975 annual reports and 10-Ks. The authors develop 4 separate probit models (one for each accounting policy choice) using net sales as a measure of firm size. A second set of models is based on total assets as a measure of size. The accounting choice models for depreciation (accelerated versus straight-line) and inventory (LIFO versus FIFO) were found to be significant at the 0.01 and 0.05 levels respectively. The models for investment tax credit (flow-through versus deferral) and the amortization of past service pension costs were not significant at the 0.05 level. Within accounting choice models the statistical significance of individual independent variables varied greatly across accounting choices. The authors conclude:

Our results are broadly consistent with our hypotheses since two of our four models are statistically significant. However, the important explanatory variables tend to be different for each accounting principle tested. This fact suggests that management may act as if they use different variables to make each decision (Hagerman and Zmijewski 1979, 157).
In an extension of their 1979 study (Zmijewski and Hagerman 1981) the authors consider the possibility that management may rely on a "portfolio" of accounting choices to achieve a given strategy for reported income. The results of models based on accounting choice portfolios were found to be much stronger than the separate choice models developed in the 1979 study. A portfolio approach to defeasance decisions, however, appears inappropriate. Since the financial statement effect of a decision to use in-substance defeasance is generally confined to a single reporting period, its use as part of a portfolio of accounting choices is necessarily limited. A firm's ability to generate increases in reported income ends when the firm exhausts its supply of low-interest debt. In fact, the usefulness of in-substance defeasance as a potential window dressing device depends, in part, on its ability to provide a "quick fix" for temporary problems without requiring a change in the firm's ongoing portfolio of accounting policies.

Ayres

Ayres (1986) investigated the determinants of early versus late adoption of SFAS No. 52, Foreign Currency Translation (FASB 1981). SFAS No. 52 permits firms to exclude gains and losses related to foreign currency translation from the determination of net income (reversing
the accounting treatment previously prescribed under SFAS No. 8). The FASB issued SFAS No. 52 in December 1981 and encouraged immediate adoption. Firms with fiscal years beginning on or after December 15, 1982, were required to adopt the new standard. Ayres investigated 5 firm characteristics expected to discriminate between early (1981) and late (1982 or 1983) adopters (see Figure 2-5).

CEPS = Percentage change in primary earnings per share from 1980 to 1981 (excluding extraordinary items, discontinued operations, and the per share effect of 1981 adoption of SFAS No. 52). This variable was coded 0 for late adopters since the earnings effect was indeterminant.

COVINT = (Income before extraordinary items, discontinued operations, and the income effect of early adoption of SFAS No. 52) / Interest expense

DIVure = (Preferred dividends + common dividends) / unrestricted retained earnings x 100

SIZE = Total assets (in millions)

DO = Percentage of stock held by directors and officers as a group

Figure 2-5. Discriminating Variables for Early Versus Late Adopters of SFAS No. 52.

Since the U.S. dollar strengthened against most major currencies during 1981, early adopters could show higher earnings under SFAS No. 52 (because translation losses would not be charged to current income). Based on the
assumption that early adoption increases reported earnings, Ayres hypothesized that early adopters (1) would tend to be management controlled (see discussion of Dhaliwal 1980 above), (2) would tend to be smaller, (3) would tend to have a smaller percentage growth in pre-adoption earnings, (4) would tend have lower interest coverage ratios, and (5) would tend to have higher ratios of dividends to unrestricted retained earnings. The author predicted smaller pre-adoption earnings growth for early adopters based on the belief that managers of firms with low earnings growth would choose to increase earnings in order to increase earnings-based bonus payments. The rationale for each of the remaining hypotheses has already been described in connection with accounting choice studies cited earlier.

Ayres collected data on a sample consisting of 103 early adopters and 129 late adopters. Differences between early and late adopters carried the predicted sign for all variables. Univariate analysis (based on the Mann-Whitney U-test) indicated that 4 of the 5 variables were significant at the 0.05 level or better. The management control variable (DO) did not differ significantly between the two groups. Multivariate analysis based on a logistic (logit) model produced coefficients with the predicted sign for all variables. In addition, all of the variables were significant at the 0.05 level or better. The overall model
was found to be significant at the 0.0001 level based on a chi-square value of 51.14. Ayres concluded that "the results are consistent with previous research which suggests that systematic differences exist between firms that choose alternative accounting policies" (1986, 156).

Relevance of the Current Study to the Literature

The current study extends research in the area of voluntary accounting choices and is the first to collect and analyze empirical data on the determinants of management's decision to engage in in-substance defeasance of debt. All of the empirical data published to date have been descriptive or analytical in nature and none has reported on defeasance transactions subsequent to 1985. The current study updates the literature based on available annual reports and 10-K statements through November 1, 1988.

The current study also fills a void in the literature regarding the potential use of accounting methods for window dressing the financial statements. Although many members of the accounting community have voiced concern over the use of SFAS No. 76 as a window dressing technique, accounting researchers have virtually ignored the possibility that accounting choices may be used to influence user perceptions of financial statement
disclosures. This indifference may be the result of early market studies of the impact of accounting methods on stock prices (Ball 1972, Kaplan and Roll 1972, and many others). These studies found that investors were not misled by changes in accounting methods. This does not mean, however, that managers will ignore window dressing opportunities—particularly during the 1980s when financial statements are scrutinized for signs of inept or inefficient management by those who specialize in corporate takeovers. The results of efficient market studies should not be interpreted to mean that intelligent managers will ignore the effect of accounting choices on the perceptions of financial statement users. As noted by Dhaliwal, Salamon, and Smith (1982, 43), even if management cannot influence stock prices by its choice of accounting methods, it is still reasonable to assume "that the accounting methods chosen by management can convince some of the firm's shareholders that management is doing a creditable job and thus make these shareholders unwilling to support a takeover."
CHAPTER 3
METHODOLOGY

The purpose of this chapter is to outline the methodology used in this study. The first section presents the research question and related hypotheses. Sections 2 and 3 describe, respectively, the data collection procedures and statistical tests performed. Section 4 provides an explanation of the logistic regression model and its relevance to the current study. The final section describes the limitations of the study.

Research Question and Hypotheses

This study represents an initial test of the assertion that in-substance defeasance is chosen by firms as a tool for window dressing the financial statements. The major research question is: Can the window dressing hypothesis be used to identify statistically significant differences in the financial statement characteristics of defeased and defeasible firms? A defeasible firm is one that could record a gain by engaging in an in-substance defeasance transaction but chooses not to do so. Specifically, a defeasible firm has low-interest debt relative to prevailing yields on risk-free (government) securities. As
mentioned in Chapter 1, the investment research department of Bear Stearns & Company compiled a list of 72 defeasible firms (Calvert 1985, 24-25). To date only 4 of those firms have completed an in-substance defeasance transaction. The fact that many defeasible firms refrain from in-substance defeasance suggests that the opportunity to improve debt ratios and record a gain in current income does not have the same motivating influence for all firms. The question is whether the earnings growth and applicable financial ratios of defeasing firms are systematically different from the earnings growth and financial ratios of defeasible firms. If such systematic differences exist, then the window dressing hypothesis cannot be ruled out as a motivating factor affecting management's use of in-substance defeasance.

Research Hypotheses

If window dressing is a motivating factor in management's decision to defease debt, it follows that management is seeking to improve one or more aspects of its financial statements. The areas that are directly affected by an in-substance defeasance transaction include (1) reported income (and earnings per share), and (2) debt-related financial ratios. Since the ability to generate defeasance gains is limited by the amount of defeasible debt on a firm's balance sheet, it is hypothesized that managers are
more likely to use defeasance to alleviate temporary rather than long-term deficiencies—such as temporary declines in earnings growth or anticipated nonrecurring losses. Stated in the alternative form, it is hypothesized that:

H1: Defeasing firms have a smaller percentage growth in earnings (exclusive of defeasance gains) than defeasible firms.

H2: Defeasing firms have a higher amount of pre-defeasance nonrecurring loss (as a percentage of total assets) than defeasible firms.

Improvement in debt-related financial ratios depends on the type of debt defeased (i.e., current or noncurrent). As noted in Chapter 1, Mielke and Seifert (1987, 71) found improvement in the current ratios of many defeasing firms. SFAS No. 76 enables firms to dispose of maturing debt as soon as funds are available to make repayment. The firm can thereby eliminate maturing debt from the current liabilities section of its balance sheet in advance of the actual repayment date. Defeasance of long-term debt, on the other hand, permits improvement in leverage ratios such as the debt-to-total-assets ratio. Stated in the alternative form, it is hypothesized that:

H3: Firms defeasing current debt have a lower pre-defeasance current ratio than defeasible firms.

H4: Firms defeasing long-term debt have a higher pre-defeasance debt-to-total-assets ratio than defeasible firms.

Management may also be motivated to use in-substance defeasance to reduce large cash balances on the balance
sheet, reducing the firm's attractiveness to potential suitors and ensuring that excess cash balances are unavailable to those seeking to acquire the firm. In this case defeasance might be used as window dressing aimed at a specific target audience—viz., unwanted suitors. Stated in the alternative form, it is hypothesized that:

H5: Defeasing firms have a higher level of pre-defeasance liquid assets (as a percentage of total assets) than defeasible firms.

Operational definitions for the discriminating variables used in these hypotheses are summarized in Figure 3-1.

Data Collection

The initial sample of defeased firms was drawn from the National Automated Accounting Research System (NAARS) database. This database is the product of a joint effort between the American Institute of Certified Public Accountants (AICPA) and Mead Data Central. The database contains the full text of more than 4,000 annual reports for firms traded on the New York and American Stock Exchanges and the Over-the-Counter market for each year maintained in the NAARS library.

NAARS can be searched using standard search logic similar to that used by BRS Information Technologies and the IQuest database network offered by CompuServe. In addition, NAARS provides numerous search descriptors (labels for segments of annual reports) which permit
GEPS = Growth in earnings per share

= (EPS current year - EPS prior year) / EPS prior year, where EPS = primary earnings per share excluding extraordinary items, discontinued operations, and defeasance gains or losses (when not already included in extraordinary items)

NRL = Nonrecurring losses as a percentage of total assets

= (Extraordinary losses + Losses from discontinued operations + Unusual, nonrecurring or one-time charges) / (Total assets + Amount placed in defeasance trust)

CR = Current ratio

= (Current assets + Amount placed in defeasance trust) / (Current liabilities + Current debt defeased)

LEV = Leverage ratio

= (Total liabilities + Long-term debt defeased) / (Total assets + Amount placed in defeasance trust)

LIQ = Liquid assets as a percentage of total assets

= (Cash + Cash equivalents + Marketable Securities + Amount placed in defeasance trust) / (Total assets + Amount placed in defeasance trust)

Figure 3-1. Discriminating Variables for Defeasance Decisions Based on the Window Dressing Hypothesis.

researchers to scan specific sections of annual reports such as footnotes or extraordinary items. Full text search capability ensures that most, if not all, instances of in-
substance defeasance will be identified. Nonetheless, the sample is limited by (1) the firms chosen by the AICPA for inclusion in the NAARS database, and (2) the adequacy of the search strategy. Regarding the latter limitation, a search strategy may be too narrowly defined or fail to consider atypical disclosures. For example, a search of the full text of all footnotes for references to "in-substance defeasance" or "irrevocable trust" (whether these terms appear together or separately) would fail to identify a defeased firm that described the defeasance transaction as "debt eliminated from the balance sheet."

All annual reports for the period January 1, 1982, through November 1, 1988, were included in the search population. Since annual reports are generally available on-line within 30 days of issuance, all NAARS firms reporting 1987 results are included in the sample. Defeased firms were identified on the basis of key terms (e.g., "defeasance" or "irrevocable trust") appearing in the footnote section of the annual report.

The search strategy used to select defeasible firms was more complex. The sample was selected from the population of all firms reporting low-interest debt in The Dow Jones Investor's Handbook for the years 1982 through 1987. Defeasible firms were selected on a year-by-year basis using the average annual yield on 10-year Treasury bonds as the benchmark rate. The 10-year Treasury
bond is an intermediate-term security that yields a return between short-term T-bills and long-term (30-year) Treasury bonds. This yield provides a reasonable standard for identifying low-interest (i.e., defeasible) corporate debt. Results of search procedures for defeased and defeasible firms were compared against published reports—such as the Goodman and Lorensen (1986) survey of defeased firms and the Bear Stearns (Calvert 1985, 24-25) listing of defeasible firms—to test the thoroughness of the search strategy and the comprehensiveness of the NAARS database.

The Bear Stearns listing identified defeasible firms on the basis of 1) low-interest debt and 2) sufficient liquid assets to permit the establishment of a defeasance trust. The latter criterion was not used in this study since a preliminary review of defeased firms indicated that some firms defease only a portion of a debt obligation. Thus it is possible for a firm to engage in in-substance defeasance of debt by using whatever level of liquid assets may be available. Furthermore, a firm interested in recording a gain from in-substance defeasance might decide to borrow the funds needed to obtain government securities for a defeasance trust. Such an arrangement would permit a firm to record a gain on defeasance without affecting debt ratios (since the borrowed funds would replace the defeased low-coupon debt on the firm's balance sheet).
Statistical Analysis

Univariate Tests

The mean and standard deviation of each of the 5 variables listed in Figure 3-1 was computed for both sample groups (i.e., defased and defeasible firms). Differences in sample means were tested using the Wilcoxon ranked-sum test (equivalent to the Mann-Whitney U-test). This is a nonparametric univariate test that is appropriate for comparing the means of two independent samples. The advantage of this test over comparable parametric tests (such as the t-test) is that it requires no assumptions about the distributions of variables. This is especially important when financial ratios are among the variables being analyzed. As noted by Foster (1986, 102-103) many financial ratios are nonnormal:

Some financial ratios have technical limits that prevent a normal distribution from being a literal description; for example, the current ratio has a technical lower limit of zero, whereas the normal distribution will include negative values. A similar example is the total debt-to-total assets ratio, which has both a technical lower limit of zero and a technical upper limit of one.

The Wilcoxon ranked-sum test determines whether 2 samples have been drawn from populations with equal means and variances. The technique is based on ranking each variable in the combined sample--assigning the rank of 1 to the largest value, 2 to the next largest value, etc. The ranks are then summed for each group and a statistic
designated as T is calculated. The T-statistic has an approximately normal distribution so that calculated values of the T-statistic can be compared to a table of critical values to determine the statistical significance of differences between group means. Since the direction of the difference in means is specified for each hypothesis (H1 through H5), one-tailed tests of significance are appropriate.

A second set of univariate tests was performed on the same set of data in a matched-pairs design. Deceased and defeasible firms were matched on the basis of their two-digit SIC codes to control for the effect of industry membership on leverage ratios. Bowen, Daley, and Huber (1982) found empirical evidence suggesting that leverage ratios vary systematically across industries. DeAngelo and Masulis (1980) theorized that optimal leverage ratios may be related to differences in non-cash tax deductions (such as depreciation) across industries. For example, capital-intensive industries may have leverage ratios that are consistently higher than labor-intensive industries. A matched-pairs design helps control for such cross-sectional variation and permits a more powerful test of the leverage variable. This added power for leverage, however, was partially offset by a reduction in total sample size. Since unmatched observations were omitted in the matched-pairs design, the total sample size was smaller, thereby
reducing the power of the test. The appropriate nonparametric procedure for analyzing differences in means for matched samples is the Wilcoxon matched-pairs signed-ranks test. Like the Wilcoxon ranked-sum test, the procedure uses a T-statistic to determine the significance of differences in sample means.

Since the hypothesized window dressing effects of in-substance defeasance are conceptually related and interdependent, correlation analysis was done to test for linear dependencies (multicollinearity) among variables and to assess the potential usefulness of multivariate analysis. Multivariate analysis is the appropriate method for analyzing the simultaneous effect of all variables on the defeasance decision. Two multivariate techniques--logistic regression analysis (logit) and probabilistic regression analysis (probit)--are commonly used for cases involving qualitative dependent variables. The logistic regression technique was used in this study as described in the next section.

**Multivariate Analysis**

Multivariate analysis of qualitative decision variables (such as the decision to engage in in-substance defeasance of debt) is complicated by the fact that qualitative variables generally lead to violations of the key assumptions underlying many multivariate techniques.
For example, when multiple regression is used to fit a line to data for which the dependent variable is dichotomous, regression coefficients estimated by the ordinary least squares (OLS) method are no longer optimal (Neter, Wasserman, and Kutner 1985, 356). Although such estimates are unbiased, they are not BLUE (i.e., the Best Linear Unbiased Estimators).

Regression analysis is based on the assumption that error terms are normally distributed and have constant variance across all levels of the independent variable(s). These assumptions are not valid for regression involving dichotomous dependent variables. In such cases the error terms can assume only 2 values for any given level of the independent variable. Furthermore, the variance of the error terms will differ across different levels of the independent variable (Neter, Wasserman, and Kutner 1985, 356). In fact, the OLS estimates of regression coefficients have unequal error term variances that vary systematically with the values of independent variables. This affects estimates of sampling variances and, in turn, hypothesis tests based on those sampling variances. "Thus, even in the best of circumstances, OLS regression estimates of a dichotomous dependent variable are, although unbiased, not very desirable" (Aldrich and Nelson 1984, 14).

The problem of unequal variances for error terms can be resolved by using a weighted least squares approach. In
addition, OLS estimators are asymptotically normal when samples sizes are large (Neter, Wasserman, and Kutner 1985, 357). Problems arise, however, when regression of a qualitative variable is based on a linear model. For example, predicted values for a dichotomous variable based on a linear model may turn out to be greater than one or less than zero. Since the value predicted for a dichotomous dependent variable is interpreted as the probability that a given outcome will occur (based on given levels of the independent variables), such results are meaningless and cast doubt on the suitability of the linear model itself. There are no a priori reasons for assuming that the probability of a given decision outcome should behave as a linear response function. If the true probability function is curvilinear, the inappropriate use of a linear model can create a number of problems:

... [T]he incorrect assumption of linearity will lead to least squares estimates which (1) have no known distributional properties, (2) are sensitive to the range of the data, (3) may grossly underestimate the magnitude of the true effects, (4) systematically yield probability predictions outside the range of 0 to 1, and (5) get worse as standard statistical practices for improving the estimates are employed (Aldrich and Nelson 1984, 30).

Nonlinear Probability Models

Numerous curvilinear models have been developed to estimate the behavior of a dichotomous dependent variable that is bounded between values of 0 and 1. Most of these
models are S-shaped curves that asymptotically approach the boundary values. The two models that have received the most attention are logistic regression analysis and probabilistic regression analysis. Logistic regression analysis is based on a logistic response function. The natural log transformation of the logistic curve is a linear response function. Probabilistic regression analysis is based on a cumulative normal probability distribution. Except for slight differences in the tails, the curves for both models are almost identical:

The logistic and [cumulative] normal curves are so similar as to yield essentially identical results. In practice they yield estimated choice probabilities that differ by less than .02 and which can be distinguished, in the sense of statistical significance, only with very large samples. The choice between them, therefore, revolves around practical concerns such as the availability and flexibility of computer programs and personal preferences and experience (Aldrich and Nelson 1984, 34).

The logistic regression procedure was used in this study since it was readily available in the SAS computer package (Harrell 1986, 269).

The assumptions underlying logistic regression analysis are generally analogous to the assumptions underlying the standard regression model (Aldrich and Nelson 1984, 48-49):

1. \( Y \) depends on \( k \) observable variables \( (X) \),

2. the relationship between \( Y \) and \( X \) is approximated by the logistic regression model

\[
E(Y) = \frac{\exp(\sum b_k x_k)}{1 + \exp(\sum b_k x_k)}
\]
(3) observations on $Y$ are statistically independent (i.e., no serial correlation), and

(4) no linear dependencies exist across independent variables (i.e., no multicollinearity).

The log transformation of the logistic function specified under assumption (2) above is the linear function $Y' = \Sigma b_k X_k$. The dependent variable, $E(Y)$, in the original logistic regression model represents the probability, $p$, of a given decision outcome (e.g., in-substance debt defeasance). The dependent variable in the transformed logistic regression model represents the log of the odds favoring a decision outcome, i.e., $\log[p/(1-p)]$. The logistic regression model for the current study is:

$$Y' = b_0 + b_1 GEPS + b_2 NRL + b_3 CR + b_4 LEV + b_5 LIQ.$$  

Definitions of the independent variables used in the model are summarized in Figure 3-1. The dependent variable in the model is designated 1 if the firm has defeased debt and 0 if the firm has not defeased.

Interpreting the Results of Logistic Regression

For purposes of illustration Figure 3-2 presents an abbreviated version of the results of Ayres' (1986, 155) study of the choice between early and late adoption of SFAS No. 52 (see Chapter 2). Shown in Figure 3-2 are (1) the logistic regression coefficients for each independent variable, (2) tests of the significance of each coefficient,
and (3) tests of the goodness-of-fit for the overall model. Descriptions of the discriminating variables used in Ayres' study were presented in Figure 2-5.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Constant</th>
<th>CEPS</th>
<th>COVINT</th>
<th>DIVURE</th>
<th>SIZE/100</th>
<th>DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Sign</td>
<td>?</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coefficient</td>
<td>0.308</td>
<td>-1.24</td>
<td>-0.219</td>
<td>0.030</td>
<td>-0.019</td>
<td>-0.028</td>
</tr>
<tr>
<td>t-value</td>
<td>0.91</td>
<td>-2.92</td>
<td>-1.63</td>
<td>2.57</td>
<td>-3.24</td>
<td>-1.99</td>
</tr>
<tr>
<td>Significance (one-tailed)</td>
<td>(0.182)</td>
<td>(0.002)</td>
<td>(0.051)</td>
<td>(0.005)</td>
<td>(0.001)</td>
<td>(0.023)</td>
</tr>
</tbody>
</table>

Percentage correctly classified: 69.0%
Value of chi-squared statistic for model: 52.14, d.f. = 6
Probability under H0 < 0.0001
Dependent variable = 1 if adoption date is 1981, N = 103
= 0 if adoption date is 1982 or 1983, N = 129

Figure 3-2. Logistic Model of SFAS No. 52 Adoption Year Decision.

The interpretation of logistic regression coefficients is not as straightforward as the interpretation of standard regression coefficients. The impact of X on Y is constant for standard regression models. Since logistic regression is based on a curvilinear model, "the effect of increasing X by a unit varies for the logistic model according to the location of the starting point on the X scale" (Neter,
Wasserman, and Kutner 1985, 365). The t-test for logistic regression coefficients has the usual meaning—it tests the null hypothesis that a given coefficient is 0 (i.e., has no effect on Y). A chi-square test is used to test logistic regression coefficients in the SAS procedure.

In standard regression analysis a model's goodness-of-fit is assessed by the F statistic. The F statistic tests the joint hypothesis that all regression coefficients (except the intercept) are zero. Logistic regression (using the maximum likelihood estimation method) tests goodness-of-fit based on the chi-square statistic. Ayres was able to reject the null hypothesis (that all coefficients are zero) at the 0.0001 level based on a chi-square statistic of 52.14. This means that the logistic regression model is significantly better in classifying firms by decision outcome than a naive model that randomly assigns firms to decision outcomes based on relative frequencies. Another indication of the model's goodness-of-fit is the percentage of decision outcomes correctly predicted by the model.

Limitations of the Study

The research design used in this study is exploratory and nonexperimental. Nonexperimental research is subject to two important limitations: (1) the inability to randomize (i.e., the inability to assign subjects to groups
at random or assign treatments to groups at random), and 
(2) the inability to manipulate independent variables. 
Sample firms in the current study are "self-selected"—
i.e., firms that have defeased debt select themselves into 
one group and firms holding defeasible debt select 
themselves into another group. The danger, of course, is 
that variables other than those pertaining to window 
dressing may systematically distinguish these two groups. 
For example, an important variable omitted from the current 
study is the economic effect of defeasance transactions. 

An experimental study could be designed in which the 
independent variables considered in this study are 
systematically manipulated in the context of hypothetical 
financial statements. These hypothetical financial 
statements could then be evaluated by a representative 
sample of corporate financial officers who would be asked 
to make a decision regarding in-substance defeasance of 
debt. The major advantage of such a design is the ability 
to control non-window-dressing variables (such as the 
economic impact of defeasance) either directly or through 
randomization. But experimental research designs also have 
serious limitations. Manipulating window dressing 
variables in hypothetical situations can easily produce 
artificial results that cannot be generalized beyond the 
experimental setting itself. Furthermore, it is unlikely
that an experimental approach could resolve the research question addressed in this study--i.e., whether window dressing can be ruled out as a motivating factor in in-substance defeasance decisions. Data collected in an experimental study of in-substance defeasance may not be a faithful representation of the actual behavior of managers with regard to window dressing--particularly when the motivation being investigated is generally condemned. Financial managers who may have actually used in-substance defeasance as a window dressing tool would be unlikely to display such behavior in a hypothetical situation when individual self-interest is not at stake.

The interpretation of nonexperimental research findings is also subject to limitations. No causal inferences can be drawn regarding window dressing and defeasance. Nor is it appropriate to draw conclusions about the importance of window dressing in relation to other potential determinants of defeasance. Conclusions drawn from the data collected in this study must be confined to the primary research issue--ruling out the window dressing motive. Questions concerning the relative importance of the window dressing motive and its possible interaction with other variables are left for future investigations. The present study facilitates future research by identifying those aspects of window dressing that appear most important to defeasing firms.
Although nonexperimental research designs do not permit causal inferences, it should not be assumed that nonexperimental research is inferior to experimental research. Many important research questions in accounting and economics do not lend themselves to experimental research. Regarding the limitations of nonexperimental research designs in the social sciences Kerlinger (1986, 358) states:

It is easy to say that experimental research is "better" than nonexperimental research, or that experimental research tends to be "trivial," or that nonexperimental research is "merely correlational." Such statements, in and of themselves, are oversimplifications. What the student of research needs is a balanced understanding of the strengths and weaknesses of both kinds of research. To be committed unequivocally to experimentation or to nonexperimental research may be shortsighted.
CHAPTER 4
DATA ANALYSIS

This chapter reports the results of statistical tests and logistic regression of data obtained from samples of defeased and defeasible firms. The purpose is to assess the role of the window dressing hypothesis in decisions to engage in in-substance defeasance of debt. Section 1 describes the data collection procedure and the reported timing of defeasance transactions. Sections 2 and 3 present the results of univariate tests of each of the 5 hypotheses outlined in Chapter 3 and an analysis of the effect of industry as an omitted variable. Section 4 presents the results of logistic regression analysis. The last section provides a brief summary of empirical findings.

Data Collection
Sample of Defeased Firms

Data for defeased firms were drawn from the NAARS database described in Chapter 3. A variety of search terms and combinations of terms was used to identify firms that have engaged in debt defeasance. The initial search was made on the phrase "defeas! or irrevocable trust." The
exclamation point at the end of "defeas!" results in the identification of all annual reports that use any form of the root word "defease"—for example, defeasance, defeased, defeasing, etc. The connector "or" is used to search for annual reports that contain either of the two terms specified, but not necessarily both terms.

Results of Initial Search Strategy

The initial search produced a sample of 312 firms for the period beginning January 1, 1982, and ending December 31, 1987. A preliminary review of these annual reports revealed that many firms had not engaged in in-substance defeasance of debt. For example, firms with pension and profit-sharing plans often used the term "irrevocable trust" in footnotes to the financial statements. All of these firms were included in the initial selection of 312 firms. In addition, not all firms that defeased debt engaged in in-substance defeasance. The term "defease" may refer to legal or in-substance defeasance. In the legal sense, defeasance refers to the early extinguishment of debt in accordance with specific written requirements contained in a debt covenant. The term "defease" may also be used generically to indicate any extinguishment of debt or any termination of a property interest in accordance with stipulated conditions.
Results of Modified Search Strategy

The initial selection of firms was screened a second time by adding the phrase "and in-substance or insubstance or in substance" to the original search criteria. This modification produced a selection of only those firms in the original group that also used some form of the term "in-substance." The modified search strategy reduced the size of the preliminary sample, but also excluded firms that had, in fact, engaged in in-substance defeasance of debt. Consider, for example, the following footnote reported by Midwest Energy Company in its 1984 annual report:

On December 28, 1984 IPS [Iowa Public Service] defeased the $10,000,000 4-1/4% First Mortgage bonds due March 1988 by irrevocably placing in trust direct obligations of the United States of America sufficient to satisfy the semiannual interest payments and the redemption requirements. The Bonds are considered to be extinguished for financial reporting presentation and are excluded from the Consolidated Balance Sheet.

This footnote was selected under the initial search strategy because it contained a form of the word "defease." It was excluded from firms selected under the modified search strategy, however, because it failed to mention the additional term "in-substance." Furthermore, some firms that did not use in-substance defeasance were retained under the modified search strategy simply because the common phrase "in substance" was used somewhere within the
annual report. This problem was corrected by specifying the proximity of the terms "defeas!" and "in-substance." The NAARS database permits the user to specify the number of words separating search terms.

**Description of Final Sample of Defeased Firms**

Based on a variety of search strategies, the final sample consisted of 93 defeasance transactions by 88 different firms (5 firms defeased debt in 2 separate years). Since observations on each of the 5 variables analyzed in this study are unique whether the variables pertain to separate firms or separate years for the same firm, data analysis was done on the basis of 93 unique cases or "firm/years."

The firms included in the final sample have been checked against a list of 40 defeased firms generated in a similar NAARS search conducted in 1986 and published by the AICPA (Goodman and Lorensen 1986, 3). All of the firms identified in the 1986 AICPA Financial Report Survey are included in the final sample of 93 firm/years. See Appendix A for a listing of defeased firms.

Another test of the completeness of the final sample of defeased firms was obtained by comparing the NAARS database selections against search results from another, independent database containing firms that report to the SEC. The Exchange Service offered by Mead Data Central and available under the AICPA Total program contains extracted
information from SEC filings and annual reports on more than 10,300 companies and full-text 10-Q and 10-K reports for more than 1,500 firms. A search and comparison of selections from the Exchange Service provided additional assurance that the final sample of 93 firm/years is reasonably complete.

Before data analysis was begun, a follow-up search of the NAARS database was undertaken to identify cases of in-substance defeasance occurring after December 31, 1987. The follow-up search was conducted in November 1988 and identified 2 additional firms that engaged in in-substance defeasance transactions during fiscal years ending in January 1988. Both of these firms were included in the final sample of 93 firm/years. Since both firms were reporting on 1987 operating results, they were grouped with 1987 firms for purposes of data analysis.

Data Summary Sheets

For each defeased firm a data summary sheet was prepared to summarize information needed for the computation of each of the 5 variables defined in Chapter 3 (see Figure 3-1, page 60). In addition, the data summary sheet was used to identify:

1) the amount of debt defeased,
2) the amount of funds placed in trust,
3) the amount of gain (or loss) resulting from in-substance defeasance,
4) a brief description of the type of debt defeased (including its classification as short-term or long-term), and

5) the timing of the defeasance transaction as cited in the annual report.

Although the timing of the defeasance transaction is not a direct factor in the research hypotheses, the window dressing hypothesis suggests that the transaction might be used as a last minute device for strengthening the appearance of the financial statements. For this reason, the calculation of growth in earnings per share (GEPS) for defeased and defeasible firms has been confined to a one-year comparison, rather than focusing on long-term trends in earnings growth.

An analysis of the timing of defeasance transactions supports a short-term approach toward the analysis of earnings growth. Of the 93 firm/years included in the final sample, 47 cases (51 percent) make reference to a specific day, month, or quarter for the in-substance defeasance transaction. Of these 47, two-thirds (31 cases) defeased in the last quarter of the reporting period. Of the 31 cases that defeased in the fourth quarter of the reporting period, 16 defeased in the final month and 8 reported a defeasance transaction occurring within the last 5 days of the final quarter. Table 4-1 provides a breakdown of the timing of in-substance defeasance transactions.
TABLE 4-1
REPORTED TIMING OF IN-SUBSTANCE DEFEASANCE TRANSACTION

<table>
<thead>
<tr>
<th>Quarter of Reporting Period</th>
<th>Number of Firm/Years</th>
<th>Percentage Firm/Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Quarter of Reporting Period</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td>Second Quarter of Reporting Period</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Third Quarter of Reporting Period</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Fourth Quarter of Reporting Period</td>
<td>31</td>
<td>65.9</td>
</tr>
</tbody>
</table>

Subtotal: Cases specifying quarter: 47 100.0
Cases specifying year only: 46
Total firm/year: 93

Sample of Defeasible Firms

The NAARS database could not be used to select a sample of defeasible firms due to its limited capacity for searching numerical information contained within the text of annual reports. In order to select a sample of defeasible firms it was necessary to identify all firms that carry low-interest debt on their balance sheets. As described in Chapter 3, "low-interest debt" is defined by reference to available yields on U.S. Treasury securities.
A firm was deemed a potential candidate for in-substance defeasance if it carried debt with a stated rate of interest less than the average annual yield on 10-year Treasury bonds. The average annual yield on Treasury bonds was computed on the basis of reported yields on the first trading day of each quarter during the research period (see Table 4-2). Since funds placed in a defeasance trust by U.S. firms are limited to direct obligations of the U.S. government (or securities guaranteed or collateralized by U.S. government obligations), the 10-year treasury bond provides a conservative benchmark of available yields on U.S. government securities.

The first step in the selection of a sample of defeasible firms was the identification of all firms listed on the New York Stock Exchange, American Stock Exchange, and Over-the-Counter market that carry low-coupon debt. These firms were identified by comparing the coupon rate reported in The Dow Jones Investor's Handbook for the years 1982 through 1987 to the benchmark rates summarized in Table 4-2. The Dow Jones Investor's Handbook is an annual publication listing the description, trading volume, and price ranges of all stocks and bonds trading on major U.S. and foreign exchanges during the prior year.

Systematic Random Selection of Defeasible Firms

After the population of potential in-substance defeasance candidates was determined for a given year,
# TABLE 4-2

**AVERAGE ANNUAL YIELD ON 10-YEAR TREASURY BONDS**

<table>
<thead>
<tr>
<th></th>
<th>Reported Yield*</th>
<th>Average Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982:</td>
<td></td>
<td>.1326</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.1396</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.1424</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.1343</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.1142</td>
<td></td>
</tr>
<tr>
<td>1983:</td>
<td></td>
<td>.1073</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.1017</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.1060</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.1089</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.1127</td>
<td></td>
</tr>
<tr>
<td>1984:</td>
<td></td>
<td>.1255</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.1168</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.1245</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.1382</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.1224</td>
<td></td>
</tr>
<tr>
<td>1985:</td>
<td></td>
<td>.1090</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.1144</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.1158</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.1023</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.1036</td>
<td></td>
</tr>
<tr>
<td>1986:</td>
<td></td>
<td>.0780</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.0908</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.0737</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.0733</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.0741</td>
<td></td>
</tr>
<tr>
<td>1987:</td>
<td></td>
<td>.0817</td>
</tr>
<tr>
<td>First Quarter</td>
<td>.0722</td>
<td></td>
</tr>
<tr>
<td>Second Quarter</td>
<td>.0749</td>
<td></td>
</tr>
<tr>
<td>Third Quarter</td>
<td>.0837</td>
<td></td>
</tr>
<tr>
<td>Fourth Quarter</td>
<td>.0958</td>
<td></td>
</tr>
</tbody>
</table>

firms that had engaged in in-substance defeasance transactions were eliminated and a systematic random sample of the remaining firms was drawn to produce a sample comparable in size to the number of defeased firms for that year. For example, 2,102 firms qualified as potential candidates for in-substance defeasance transactions in 1984. Of these firms, 35 were selected to produce a sample of defeasible firms for 1984 comparable in size to the number of defeased firms for 1984. A systematic random sample is drawn by obtaining a random start (selected from a random numbers table) and selecting every kth item—where k equals the population size (2,102 for the year 1984) divided by the desired sample size (35). This procedure was repeated for each year in the research period to produce a total sample of 93 defeasible firm/years (83 defeasible firms). Some defeasible firms qualified as potential defeasance candidates in more than one year, just as some firms actually defeased in more than one year. Table 4-3 provides a summary of defeasance transactions by year. See Appendix B for a listing of defeasible firms.

Stratification of the sample of defeasible firms in direct proportion to defeased firms ensures that the economic environment for both defeased and defeasible firms is comparable for both samples throughout the 6-year research period. Since Treasury bond yields generally
Table 4-3
Summary of defeasance transactions by year of occurrence

<table>
<thead>
<tr>
<th>Year of Occurrence</th>
<th>Number of Firms Engaging in In-Substance Defeasance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>1</td>
</tr>
<tr>
<td>1983</td>
<td>16</td>
</tr>
<tr>
<td>1984</td>
<td>35</td>
</tr>
<tr>
<td>1985</td>
<td>20</td>
</tr>
<tr>
<td>1986</td>
<td>9</td>
</tr>
<tr>
<td>1987</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
</tr>
</tbody>
</table>

decreased during the period 1982 through 1987, it would be inappropriate to select an unrestricted random sample from the period as a whole. That would imply that in-substance defeasance is equally likely in each year of the research period, regardless of the prevailing yields on U.S. government securities needed for defeasance trusts. It is more reasonable to expect that both the number of defeased firms and the number of defeasible candidates expands and contracts with changing economic factors, particularly the level of U.S. government security yields.
Results of Univariate Tests

Descriptive Statistics

Table 4-4 is a summary of descriptive statistics for each of the 5 independent variables defined in Chapter 3.

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEPS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeased Firms</td>
<td>-0.0173</td>
<td>0.6714</td>
<td>-3.1304</td>
<td>1.6861</td>
</tr>
<tr>
<td>Defeasible Firms</td>
<td>0.3123</td>
<td>0.9422</td>
<td>-0.9413</td>
<td>4.0171</td>
</tr>
<tr>
<td>NRL:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeased Firms</td>
<td>0.0112</td>
<td>0.0443</td>
<td>0.0000</td>
<td>0.3866</td>
</tr>
<tr>
<td>Defeasible Firms</td>
<td>0.0060</td>
<td>0.0206</td>
<td>0.0000</td>
<td>0.1513</td>
</tr>
<tr>
<td>CR:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeased Firms</td>
<td>1.6878</td>
<td>0.8202</td>
<td>0.4400</td>
<td>4.7100</td>
</tr>
<tr>
<td>Defeasible Firms</td>
<td>1.6377</td>
<td>0.6426</td>
<td>0.5400</td>
<td>3.5100</td>
</tr>
<tr>
<td>LEV:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeased Firms</td>
<td>0.6555</td>
<td>0.1879</td>
<td>0.1725</td>
<td>0.9774</td>
</tr>
<tr>
<td>Defeasible Firms</td>
<td>0.5680</td>
<td>0.1050</td>
<td>0.3636</td>
<td>0.9081</td>
</tr>
<tr>
<td>LIQ:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeased Firms</td>
<td>0.0981</td>
<td>0.0928</td>
<td>0.0127</td>
<td>0.4868</td>
</tr>
<tr>
<td>Defeasible Firms</td>
<td>0.0426</td>
<td>0.0467</td>
<td>0.0007</td>
<td>0.1868</td>
</tr>
</tbody>
</table>

* GEPS = Growth in Earnings Per Share
NRL = Nonrecurring Losses
CR = Current Ratio
LEV = Leverage
LIQ = Liquidity

See Figure 3-1 (page 60) for operational definition of variables.
Even before a formal test of differences, it is apparent that the average growth in earnings per share (GEPS) is markedly higher for defeasible firms—a growth rate of 31.23 percent for defeasible firms compared to a decline of 1.73 percent for defeased firms. Furthermore, the (pre-defeasance) liquidity ratio (LIQ) for defeased firms is more than twice that reported by defeasible firms—9.81 percent for defeased firms versus 4.26 percent for defeasible firms.

Hypothesis 1:
Growth in Earnings Per Share

If window dressing is an important factor in management's decision to engage in in-substance defeasance of debt, one of the areas subject to management manipulation is earnings per share. Substantial gains can be generated by management's decision to defease low-coupon debt whenever the yield on U.S. government securities is higher than the coupon rate of corporate debt. Since the amount of earnings increase that can be obtained through defeasance is limited by the amount of defeasible debt held by a firm, it is reasonable to expect that the defeasance transaction is more likely to be invoked by firms experiencing an unexpected reduction in earnings growth. The first research hypothesis states that defeasing firms will have a smaller percentage growth in earnings.
(exclusive of defeasance gains) compared to defeasible firms.

Table 4-5 presents the results of the Wilcoxon ranked-sum test of the difference in the growth of earnings per share for defeased and defeasible firms. Defeasible firms experienced an average rate of growth more than 32 percentage points higher than defeased firms (31.23 percent for defeasible firms compared to -1.73 percent for defeased firms. This difference is significant at the 0.05 level (p = 0.0118). The null form of the first hypothesis is rejected based on the univariate test of mean ranks.

Hypothesis 2: Nonrecurring Losses

Hypothesis 2 provides another possible explanation for the use of in-substance defeasance as a window-dressing technique. Since management can implement the defeasance
transaction on very short notice, it is hypothesized that gains from in-substance defeasance transactions may be used to mask unexpected nonrecurring losses. To test this hypothesis all such losses—including losses on discontinued operations, extraordinary items, and special charges—were summed and expressed as a percentage of total assets for both defeased and defeasible firms. Table 4-6 indicates that the difference in nonrecurring losses between the 2 groups is not significant. The null form of hypothesis 2 cannot be rejected.

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeated Firm</td>
<td>93</td>
<td>0.0112</td>
<td>96.44</td>
<td>0.9398</td>
<td>0.1737</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>0.0060</td>
<td>90.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>186</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypotheses 3: Current Ratio

Mielke and Seifert (1987, 71) found improvement in the current ratios of several defeasing firms. SFAS No. 76 permits firms to dispose of currently maturing debt as soon
as funds are available for the establishment of a defeasance trust to cover future principal and interest payments. The third hypothesis states that defeasing firms will have lower (pre-defeasance) current ratios than defeasible firms. Table 4-7 indicates that the current ratios of defeased and defeasible firms are not significantly different. The upper half of Table 4-7 tests

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeased Firm</td>
<td>15</td>
<td>1.4807</td>
<td>50.30</td>
<td>-0.5553</td>
<td>0.2894</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>1.6377</td>
<td>55.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test of all firms

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeased Firm</td>
<td>93</td>
<td>1.6878</td>
<td>92.22</td>
<td>-0.3242</td>
<td>0.3724</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>1.6377</td>
<td>94.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
those firms that defeased short-term debt only; the bottom half of Table 4-7 tests the difference in current ratios for all firms. The null form of hypothesis 3 cannot be rejected based on a univariate test of mean ranks.

Hypothesis 4: Leverage

Hypothesis 4 states that firms defeasing long-term debt will have higher (pre-defeasance) debt-to-total-assets ratios than defeasible firms. If the window dressing hypothesis affects the decision to engage in in-substance defeasance, management may be motivated to reduce excessive debt ratios in order to present a stronger balance sheet or increase debt levels subsequent to the defeasance transaction without increasing the existing leverage ratio. Table 4-8 provides evidence consistent with the window dressing hypothesis. The upper half of Table 4-8 presents results for 78 firms defeasing long-term debt. The bottom half of Table 4-8 compares the leverage ratios of all firms in both samples. The difference in leverage ratios is significant in both comparisons. The null form of hypothesis 4 is rejected at the 0.01 level of significance.

As discussed in Chapter 3, Bowen, Daley, and Huber (1982) found empirical evidence suggesting that leverage ratios vary systematically across industries. DeAngelo and Masulis (1980) theorized that leverage ratios may vary according to specific differences in non-cash tax
### TABLE 4-8

WILCOXON RANKED-SUM TEST OF LEVERAGE RATIOS

Test of firms defeasing long-term debt only

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeased Firm</td>
<td>78</td>
<td>0.6643</td>
<td>101.05</td>
<td>3.6393</td>
<td>0.0002</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>0.5680</td>
<td>73.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test of all firms

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeased Firm</td>
<td>93</td>
<td>0.6555</td>
<td>107.06</td>
<td>3.4348</td>
<td>0.0003</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>0.5680</td>
<td>79.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deductions (such as depreciation) according to industry type. If such systematic variation exists, it could explain all or part of the difference found in the leverage ratios of defeased and defeasible firms (see Table 4-8). For example, if most defeased firms are engaged in capital-intensive industries while most defeasible firms are devoted to service-oriented activities, then defeased firms
might be more likely to have higher leverage ratios since capital-intensive industries generally require higher levels of debt to finance expenditures for plant and equipment.

To control for the effect of industry on leverage ratios, a second univariate test was performed in which defeased and defeasible firms were matched on the basis of two-digit Standard Industrial Classification (SIC) codes. Of the 93 firm/years in each sample, 51 pairs were formed on the basis of industry. Firms that could not be matched were dropped from the sample. Table 4-9 lists pairs of firms/years included in the final sample according to industry type.

The appropriate nonparametric procedure for analyzing differences in mean leverage for matched samples is the Wilcoxon matched-pairs signed-ranks test. The Wilcoxon test takes into account both the magnitude and the direction of differences in leverage ratios between defeased and defeasible firms. When the number of pairs is large (greater than 15) the Wilcoxon T-statistic is approximately normally distributed (Kenkel 1984, 745). Table 4-10 presents the results of the Wilcoxon matched-pairs signed-ranks test for the leverage variable. The difference in mean leverage ratios between defeased and defeasible firms remains significant at the 0.01 level when
TABLE 4-9
PAIRS OF DEFEASED AND DEFEASIBLE FIRMS BY INDUSTRY TYPE

<table>
<thead>
<tr>
<th>Two-digit SIC Code</th>
<th>Type of Industry</th>
<th>Number of Pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Oil/gas field services</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>Meat products</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>Apparel</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>Publishing and printing</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>Basic chemicals</td>
<td>2</td>
</tr>
<tr>
<td>29</td>
<td>Petroleum refining</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td>Rubber and plastics</td>
<td>2</td>
</tr>
<tr>
<td>31</td>
<td>Leather tanning/finishing</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>Glass products</td>
<td>2</td>
</tr>
<tr>
<td>33</td>
<td>Iron and steel</td>
<td>4</td>
</tr>
<tr>
<td>34</td>
<td>Nonferrous metals</td>
<td>3</td>
</tr>
<tr>
<td>35</td>
<td>Engines and turbines</td>
<td>4</td>
</tr>
<tr>
<td>36</td>
<td>Communications</td>
<td>3</td>
</tr>
<tr>
<td>38</td>
<td>Scientific instruments</td>
<td>1</td>
</tr>
<tr>
<td>49</td>
<td>Gas and electric</td>
<td>9</td>
</tr>
<tr>
<td>50</td>
<td>Wholesale - Automotive</td>
<td>2</td>
</tr>
<tr>
<td>53</td>
<td>Retail - Department Stores</td>
<td>1</td>
</tr>
<tr>
<td>58</td>
<td>Retail - Restaurants</td>
<td>1</td>
</tr>
<tr>
<td>67</td>
<td>Financial institutions</td>
<td>7</td>
</tr>
<tr>
<td>70</td>
<td>Hotels and motels</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>Medical and health services</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Number of Pairs 51

Samples are controlled for industry type. This result eliminates industrial classification as a significant explanatory variable with regard to differences in leverage ratios between defeased and defeasible firms.
TABLE 4-10
WILCOXON MATCHED-PAIRS SIGNED-RANKS TEST
OF LEVERAGE VARIABLE

Defeated and defeasible firms matched by two-digit SIC code

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Deceased Firms with Higher Number of (pre-defeasance) Leverage Pairs</th>
<th>Wilcoxon T-Statistic</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage (LEV)</td>
<td>51</td>
<td>35 (68.6%)</td>
<td>411.0</td>
</tr>
<tr>
<td></td>
<td>* p &lt; 0.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Figure 3-1 (page 60) for operational definition of variable.

Hypotheses 5: Liquidity

The fifth hypothesis states that defeasing firms will have a higher level of (pre-defeasance) liquid assets (as a percentage of total assets) than defeasible firms. Liquid assets include cash, cash equivalents, and short-term investments. Excessive amounts of liquid assets can present a problem for management by attracting the interest of unwanted suitors or by attracting the attention of stockholders who may criticize management for ineffective utilization of company resources. In-substance defeasance provides management with an opportunity to dispose of large
amounts of liquid assets in a voluntary transaction that can also enhance earnings. Table 4-11 presents the results of a univariate test of the difference in mean liquidity for defeased and defeasible firms. On average, defeased

---

**TABLE 4-11**

WILCOXON RANKED-SUM TEST OF LIQUIDITY RATIOS

<table>
<thead>
<tr>
<th>Level</th>
<th>Cases</th>
<th>Mean Value</th>
<th>Mean Rank</th>
<th>Z</th>
<th>One-Tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defeased Firm</td>
<td>93</td>
<td>0.0981</td>
<td>118.55</td>
<td>6.3453</td>
<td>&gt;0.0001</td>
</tr>
<tr>
<td>Defeasible Firm</td>
<td>93</td>
<td>0.0426</td>
<td>68.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

firms (prior to defeasance) carry a level of liquid assets more than double the amount carried by defeasible firms (9.81 percent versus 4.26 percent). The null form of hypothesis 5 is rejected at the 0.0001 level of significance.

Results of Multivariate Analysis

Correlation Analysis

Financial ratios are often assumed to be closely correlated. When explanatory variables in a regression model do not vary independently, interpretation of
regression coefficients becomes very difficult. Logistic regression, like ordinary linear regression, is not meaningful if significant linear dependencies (multicollinearity) exist among independent variables used in the regression model. The two most common tests of correlation are the Pearson product-moment correlation coefficient and Spearman's rank order correlation coefficient (also called Spearman's rho). Spearman's rank order correlation coefficient is the appropriate nonparametric technique for data that do not meet the assumption of bivariate normality (Conover 1980, 251).

Table 4-12 shows the Spearman rank order correlation coefficients for all 5 variables. Not surprisingly, leverage (LEV) and current ratio (CR) display the highest measure of correlation (-0.39958, p = 0.0001). Since both ratios measure relative levels of debt, it is reasonable to expect the current ratio to decline as the debt-to-total-assets ratio increases. Although statistically significant, a correlation of -0.39958 is not considered a high degree of correlation with regard to the problem of linear dependency between variables. Correlations must be 0.70 or higher to be regarded as a threat to regression analysis (Downing and Clark 1985, 365). The only other correlations in Table 4-12 that are statistically significant at the 0.05 level are nonrecurring losses (NRL) paired with growth in earnings per share (GEPS) and current ratio
TABLE 4-12
SPEARMAN'S RANK ORDER CORRELATION COEFFICIENTS AND ASSOCIATED SIGNIFICANCE PROBABILITIES
Combined Firm/Years (N = 186)

<table>
<thead>
<tr>
<th></th>
<th>EPS</th>
<th>NRL</th>
<th>CR</th>
<th>LEV</th>
<th>LIQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS</td>
<td>1.00000</td>
<td>-0.28450</td>
<td>0.03748</td>
<td>-0.03243</td>
<td>-0.02479</td>
</tr>
<tr>
<td>NRL</td>
<td>1.00000</td>
<td>0.05192</td>
<td>0.07877</td>
<td>0.11350</td>
<td></td>
</tr>
<tr>
<td>CR</td>
<td>1.00000</td>
<td>-0.39958</td>
<td>0.16870</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>1.00000</td>
<td>0.04787</td>
<td></td>
<td>0.5164</td>
<td></td>
</tr>
<tr>
<td>LIQ</td>
<td>1.00000</td>
<td></td>
<td></td>
<td></td>
<td>0.0000</td>
</tr>
</tbody>
</table>

(CR) paired with liquidity (LIQ)—showing correlations of -0.2845 and 0.1687, respectively. All correlation values listed in Table 4-12 are judged to be moderate or low.

Each of the statistically significant correlations in Table 4-12 involves one of two variables—current ratio (CR) or nonrecurring losses (NRL). The univariate tests discussed in the previous section revealed no significant difference in mean ranks for these two variables between defeased and defeasible firms. In addition, as
demonstrated in the next section, neither of these two variables qualifies for inclusion in the final logistic regression equation.

Results of Logistic Regression Procedure

A logistic regression model (logit) was used to assess the joint significance of all 5 variables on the decision to engage in in-substance defeasance of debt. The logistic regression model is based on the assumption that the dependent variable can be used to estimate the probability that a given observation belongs to one of two groups—i.e., defeased firms or nondefeased firms. In the logistic regression model the logarithm of the odds of belonging to one group is a linear function of the variables used for classification. Table 4-13 presents a preliminary logistic regression model based on all 5 variables, together with a classification table of actual versus predicted outcomes.

The preliminary logistic regression model supports the results obtained in univariate tests of individual variables presented in the previous section. The same 3 variables that were consistent with the window dressing hypothesis based on univariate analysis are also significant in the preliminary logistic regression model. These 3 variables are:

1) growth in earnings per share (GEPS),
2) the leverage ratio (LEV), and
3) liquidity (LIQ).
**TABLE 4-13**

**PRELIMINARY LOGISTIC REGRESSION MODEL FOR DEFEASANCE DECISION**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Constant</th>
<th>GEPS</th>
<th>NRL</th>
<th>CR</th>
<th>LEV</th>
<th>LIQ</th>
</tr>
</thead>
</table>

| Expected Sign | ? | - | + | - | + | + |
| Coefficient   | -3.677 | -0.745 | -0.055 | 0.148 | 4.237 | 16.032 |
| Standard Error| 1.025 | 0.263 | 5.400 | 0.260 | 1.336 | 3.842 |
| Chi-square    | 12.87 | 8.00 | 0.00 | 0.32 | 10.05 | 17.41 |
| Significance  | 0.0003 | 0.0047 | 0.9919 | 0.5687 | 0.0015 | <0.0001 |

Value of chi-squared statistic for model: 52.79 d.f.=5
Probability under HO < 0.0001
R = 0.407

Dependent variable = 1 if defeased firm
= 0 if nondefeased firm, N = 186

**Classification Table**

<table>
<thead>
<tr>
<th>Predicted</th>
<th>Negative</th>
<th>Positive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>71</td>
<td>22</td>
<td>93</td>
</tr>
<tr>
<td>Positive</td>
<td>32</td>
<td>61</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>83</td>
<td>186</td>
</tr>
</tbody>
</table>

Percentage correctly predicted: 71.0%
False positive rate: 26.5%
False negative rate: 31.1%
All 3 variables are significant at the 0.01 level or better in the preliminary model. In addition, regression coefficients for all 3 variables carry the predicted sign. The remaining two variables—nonrecurring losses (NRL) and current ratio (CR)—are not statistically significant and carry a sign opposite to that predicted.

The SAS LOGIST procedure (Harrell 1986, 269) was used to develop the preliminary logistic regression model. The SAS procedure calculates a maximum-likelihood estimate (MLE) for each regression coefficient. MLE estimators are those with the highest probability or likelihood of having produced the observed values of the dependent variable. A chi-square statistic is used to test individual regression coefficients and the joint hypothesis that all coefficients (except the intercept) are zero. The chi-square statistic for a logistic regression model has the same interpretation as the overall F-statistic for an ordinary linear regression model. It is an indication of the "goodness-of-fit" of the regression model. The chi-square statistic for the preliminary logistic regression model is highly significant (p < 0.0001).

The multiple regression coefficient (R-squared) is another measure of goodness-of-fit for ordinary linear regression models using the least squares method. The multiple regression coefficient is interpreted as the percentage variation in a dependent variable that can be
explained by variations in the independent variables included in the regression model. Although there is no statistic in logistic regression analysis with a comparable interpretation, the $R$ statistic computed by the SAS LOGIST program serves a similar purpose. It measures the predictive ability of the logistic regression equation. The $R$ statistic also includes a correction factor for the number of parameters being estimated to ensure that the predictive power of the model does automatically increase when new variables are added to the model. If the correction factor is ignored, the value of the $R$ statistic ranges from a minimum value of zero (indicating that the model has no predictive ability) to a maximum value of 1.0 (indicating that the model predicts perfectly). The $R$ statistic obtained for the preliminary logistic regression model is 0.407, suggesting moderate predictive ability. The $R$ statistic should not be interpreted as an indication of causality between dependent and independent variables.

The classification table at the bottom of Table 4-13 shows the ability of the logistic regression model to distinguish between defaced and nondefaced firms when the regression equation is applied to the original data observations. In this application logistic regression is an alternative to linear discriminant analysis. Logistic regression analysis is required for financial ratio data since multivariate normality cannot be assumed. The
preliminary logistic regression model correctly predicted 71.0 percent of all decision outcomes. This represents a moderate improvement over the 50.0 percent rate obtainable with a naive prediction model that assigns firms randomly to defeased and nondefeased categories. It should not be assumed, however, that the preliminary logistic regression model will achieve a comparable prediction rate when applied to new data.

The preliminary logistic regression model has been presented to provide complete information on the contribution and significance of all 5 variables tested in the current study. The value of the model can be improved, however, by eliminating those variables that do not contribute explanatory power. A widely used method for selecting variables for inclusion in a regression model is the stepwise procedure. This method adds variables to the regression model on the basis of predetermined criteria such as the maximum reduction in the error sum of squares or, in the case of a logistic regression model, the highest likelihood of having obtained the observed decision outcomes. Table 4-14 presents the results of the final logistic regression model generated by the stepwise option of SAS LOGIST. To enter and remain in the model an added variable must have a level of significance less than 0.05.

Elimination of nonsignificant variables using the stepwise regression procedure improved model results in
**TABLE 4-14**

**FINAL LOGISTIC REGRESSION MODEL FOR DEFEASANCE DECISION**

(Stepwise Procedure)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Constant</th>
<th>LIQ</th>
<th>LEV</th>
<th>GEPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Sign</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Coefficient</td>
<td>-3.330</td>
<td>16.537</td>
<td>4.020</td>
<td>-0.749</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.815</td>
<td>3.749</td>
<td>1.268</td>
<td>0.259</td>
</tr>
<tr>
<td>Chi-square</td>
<td>16.68</td>
<td>19.45</td>
<td>10.05</td>
<td>8.39</td>
</tr>
<tr>
<td>Significance</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.0015</td>
<td>0.0038</td>
</tr>
</tbody>
</table>

Value of chi-squared statistic for model: 52.46 d.f.=3
Probability under HO < 0.0001
R = 0.424

Dependent variable = 1 if defeased firm
= 0 if nondefeased firm, N = 186

**Classification Table**

<table>
<thead>
<tr>
<th></th>
<th>Predicted</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
<td>Positive</td>
<td>Total</td>
</tr>
<tr>
<td>Actual</td>
<td>72</td>
<td>21</td>
<td>93</td>
</tr>
<tr>
<td>Negative</td>
<td>31</td>
<td>62</td>
<td>93</td>
</tr>
<tr>
<td>Positive</td>
<td>103</td>
<td>83</td>
<td>186</td>
</tr>
</tbody>
</table>

Percentage correctly predicted: 72.0%
False positive rate: 25.3%
False negative rate: 30.1%
nearly all respects. The 3 variables included in the final model carry the predicted sign and each of the regression coefficients is highly significant (p < .01 for all 3 variables). The chi-square statistic (which tests the joint significance of all 3 variables) is comparable to the value obtained in the preliminary model, and the R statistic has increased from 0.407 to 0.424. In addition, decision outcomes correctly predicted by the final logistic regression model have increased from 71 percent to 72 percent.

Summary of Results

A sample of 93 defeased firms was selected by searching 2 independent computer database services for the period January 1, 1982, through November 1, 1988, and comparing search results to published information on firms that have engaged in in-substance defeasance of debt. A second sample of potential defeasance candidates was drawn from the population of all firms listed in The Dow Jones Investor's Handbook that carried debt with a stated rate of interest less than the average annual yield on 10-year U.S. Treasury bonds. Values for 5 variables were computed and compared for the combined sample of 186 firm/years:

1) growth in (pre-defeasance) earnings per share,
2) nonrecurring losses as a percentage of total assets,
3) current ratio,
4) leverage (debt-to-total-assets ratio), and

5) liquidity (cash and short-term investments as a percentage of total assets).

The major research question of this study is based on the window dressing hypothesis. Specifically, can the window dressing hypothesis be used to identify statistically significant differences in the financial statement characteristics of defeased and defeasible firms?

Five research hypotheses were developed to investigate the major research question. A summary of the results of univariate tests (the Wilcoxon ranked-sum test) of each hypothesis appears in Table 4-15. In addition, the overall significance of all 5 variables was analyzed using a logistic regression model. Summary results of the final regression model are presented in Table 4-16.

Three variables were found to be statistically significant in both univariate and multivariate analyses. Liquidity (LIQ) as measured by the ratio of cash and short-term investments to total assets was found to be the most significant variable in the defeasance decision. The mean liquidity ratio for defeased firms was more than double the ratio for nondefeased firms (9.8 percent for defeased firms compared to 4.3 percent for nondefeased firms). Liquidity was also the most significant explanatory variable in both the preliminary and final logistic regression models.
<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Outcome and Level of Significance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: The (pre-defeasance) earnings growth of defeased firms is at least as great as that of defeasible firms.</td>
<td>Rejected p &lt; 0.05</td>
</tr>
<tr>
<td>H2: The amount of (pre-defeasance) non-recurring loss reported by defeased firms is no greater than that of defeasible firms.</td>
<td>Fail to reject</td>
</tr>
<tr>
<td>H3: The (pre-defeasance) current ratio of firms defeasing current debt is at least as great as that of defeasible firms.</td>
<td>Fail to reject</td>
</tr>
<tr>
<td>H4: The (pre-defeasance) debt-to-total-assets ratio of firms defeasing long-term debt is no greater than that of defeasible firms.</td>
<td>Rejected** p &lt; 0.01</td>
</tr>
<tr>
<td>H5: The (pre-defeasance) liquidity ratio of defeased firms is no greater than that of defeasible firms.</td>
<td>Rejected p &lt; 0.0001</td>
</tr>
</tbody>
</table>

* Based on the Wilcoxon ranked-sum test. 

** Also rejected using the Wilcoxon matched-pairs, signed-ranks test (p < 0.01). Pairs were matched on the basis of 2-digit Standard Industrial Classification (SIC) codes.
### TABLE 4-16
SUMMARY OF LOGISTIC REGRESSION MODEL FOR DEFEASANCE DECISION
(Stepwise Procedure)

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Constant</th>
<th>LIQ</th>
<th>LEV</th>
<th>GEPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-3.330</td>
<td>16.537</td>
<td>4.020</td>
<td>-0.749</td>
</tr>
<tr>
<td>Significance</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.0015</td>
<td>0.0038</td>
</tr>
</tbody>
</table>

Value of chi-squared statistic for model: 52.46  d.f.=3
Probability under HO < 0.0001
R = 0.424

Percentage correctly predicted: 72.0%

Dependent variable = 1 if defeased firm
= 0 if nondefeased firm, N = 186

* GEPS = Growth in Earnings Per Share
LEV = Leverage
LIQ = Liquidity

See Figure 3-1 (page 60) for operational definition of variables.

The leverage (LEV) ratio and growth in earnings per share (GEPS) ranked second and third in importance, respectively, in both univariate and multivariate analyses. The mean leverage ratio for defeased firms was almost 9.
percent higher than that for nondefeased firms (65.6 percent for defeased firms versus 56.8 percent for nondefeased firms). The difference in mean leverage ratios between defeased and defeasible firms was also significant when firm/years were matched on the basis of 2-digit Standard Industrial Classification (SIC) codes. Defeased firms carried a higher leverage ratio in 35 of 51 matched firm/year pairs (68.6 percent). The difference in leverage ratios for matched pairs remained significant at the 0.01 level.

Growth in earnings per share for nondefeased firms was more than 32 percentage points higher than defeased firms. The average growth in earnings per share for nondefeased firms was 31.2 percent, compared to an average decline of 1.7 percent for defeased firms. Univariate tests of the remaining two variables—nonrecurring losses (NRL) and current ratio (CR)—revealed no significant difference between defeased and nondefeased firms. Both variables were eliminated from the final logistic regression model using the stepwise regression technique.
CHAPTER 5
SUMMARY AND CONCLUSIONS

The purpose of this study was to examine the financial characteristics of firms engaging in in-substance defeasance of debt to determine whether the window dressing motive can be ruled out as a significant factor in the defeasance decision. The first section of this chapter presents a summary of empirical findings and their implications. The remaining two sections deal with the limitations of this study and suggestions for future research.

Summary and Implications

Origin of Research Question

In one of the earliest articles appearing in the financial press on the use of in-substance defeasance by corporations, the issue of "window dressing" was raised. Professor Roman Weil declared, "It's the season for window dressing," in an article for Barron's published shortly before Christmas in 1983 (Weil 1983, 76). He was referring to the FASB's late-November approval of corporate in-substance defeasance. Since then, in-substance defeasance has been variously described as "cosmetic accounting"
Blumstein 1984, D1) and "something that creates large discretionary increases in income" (John C. Burton quoted in Grant 1984, 3). Some have urged the FASB to ban in-substance defeasance before auditors are forced to defend the practice in a court of law by plaintiffs claiming that the provisions of SFAS No. 76 produce misleading, perhaps fraudulent, financial statements (Gaumnitz and Thompson 1987, 105).

Despite the concerns of many in the accounting community, very little research has been done on the effects of in-substance defeasance on corporate financial statements. Furthermore, there has been no empirical investigation of the charge that corporate managers use in-substance defeasance as a window dressing technique. The purpose of this study was to determine whether the charge of window dressing can be ruled out as a significant factor in decisions involving in-substance defeasance of debt.

Testing the Window Dressing Hypothesis

A direct test of the window dressing hypothesis would be difficult, if not impossible. It would require a knowledge and understanding of the inner motives and intentions of corporate managers who make defeasance decisions. The goal of this study, therefore, is limited to an investigation of indirect evidence regarding the window dressing hypothesis. For example, one of the most
common charges made against in-substance defeasance is that it permits corporate managers to window dress the income statement by including large discretionary gains in reported earnings per share.

In the absence of the window dressing motive, it is reasonable to expect that firms engaging in in-substance defeasance of debt, and firms with the potential to engage in in-substance defeasance of debt, would show comparable growth in (pre-defeasance) earnings per share for years in which defeasance transactions occur. On the other hand, if defeasance transactions are used primarily as a window dressing technique to bolster sagging profits, it might be expected that firms engaging in in-substance defeasance of debt would have lower earnings growth compared to defeasible firms in the year of defeasance.

Summary of Empirical Evidence

Earnings Growth

Empirical evidence shows that the window dressing motive cannot be ruled out as a significant factor in the defeasance decision with regard to the manipulation of earnings. An analysis of 93 in-substance defeasance transactions during the period 1982 through 1987 revealed that firms engaging in in-substance defeasance experienced earnings growth rates substantially lower (after eliminating the effect of defeasance) than a random sample
of potential defeasance candidates. In fact, defeased firms showed an average decline of 1.7 percent in earnings per share compared to an average increase of 31.2 percent for defeasible firms—a difference that is statistically significant at the 0.05 level.

This finding gives credence to those who oppose SFAS No. 76 on the grounds that in-substance defeasance of debt may be used to manipulate reported earnings per share. An informal analysis of the timing of defeasance transactions is consistent with this conclusion. Of those firms that specified the time of year in which the defeasance transaction occurred, nearly two-thirds reported debt defeasance in the final quarter of the reporting period. If the defeasance transaction is being used solely for its economic or financial benefits, why should those benefits appear more compelling in the final quarter of a firm's reporting period in nearly 2 out of 3 cases?

**Leverage Ratio**

Another research hypothesis related to the window dressing motive concerns the use of in-substance defeasance as a device for reducing long-term debt on the balance sheet, thereby reducing important leverage ratios such as the debt-to-total-assets ratio. Firms with lower-than-average leverage ratios are commonly perceived by investors and analysts as financially stronger and more likely to survive an economic downturn. Managers of highly levered
firms, on the other hand, may find it difficult to obtain new financing in both credit and equity markets. Since corporate management can move large amounts of debt from the balance sheet to a footnote by in-substance defeasance, managers may be motivated to use the transaction to window dress the balance sheet.

If window dressing has no effect on the defeasance decision, the leverage ratios of defeased firms should not be significantly greater than those of defeasible firms. Empirical evidence regarding this hypothesis shows, however, that the (pre-defeasance) leverage ratios of defeased firms are significantly higher than those of defeasible firms. The average leverage ratio of a firm engaging in in-substance defeasance during the six-year period from 1982 through 1987 was 65.6 percent, compared to an average ratio of 56.8 percent for defeasible firms. This difference is significant at the 0.01 level even when firms are matched to control for industry type.

**Liquidity**

A third hypothesis concerns the liquidity of defeased and defeasible firms. In-substance defeasance requires the establishment of an irrevocable trust for the future payment of interest and principal on defeased debt. Substantial amounts of liquid assets may be placed in such trusts, permanently removed from the face of the balance sheet. Since excessive balances in liquid asset accounts
can provoke criticism from shareholders, management may be sensitive to the amount of liquid assets reported on the balance sheet. Furthermore, liquid assets may be an important factor in hostile takeovers since the liquid assets of acquired firms can be used to pay off loans obtained to finance the acquisition. Corporate managers can solve both of these problems by depositing excess liquid assets in a defeasance trust. Manipulation of this kind might be described as window dressing for specific target audiences.

If window dressing has no effect on the defeasance decision, the liquidity levels of defeased and defeasible firms should be comparable. On the other hand, if in-substance defeasance is being used to remove excess liquidity from the balance sheet, the liquidity ratios of defeased firms (prior to defeasance) should be systematically higher than those of defeasible firms. Based on empirical evidence, defeased firms carried an average level of liquid assets more than twice as high as defeasible firms during the period 1982 through 1987 (9.8 percent for defeased firms compared to 4.3 percent for defeasible firms). This difference is statistically significant at the 0.0001 level.

Current Ratio and Nonrecurring Losses

Two other hypotheses dealing with differences in current ratios and nonrecurring losses were not confirmed.
There was no evidence to indicate that firms defeased current debt obligations to window dress the balance sheet by increasing the current ratio. Nor was there any evidence to suggest that defeasance gains were used to mask unexpected nonrecurring losses.

Each of the 3 variables for which significant differences were found (liquidity, leverage, and growth in earnings per share) were also analyzed jointly in a logistic regression model. Regression coefficients for all 3 variables were significant at the 0.01 level and a chi-square test of the overall model was significant at the 0.0001 level. Applying the model to data collected in the original sample resulted in correct prediction of defeasance outcomes in 72 percent of all cases. This result suggests that the 3 variables identified in this study might be used to identify those firms most likely to engage in in-substance defeasance of debt. Such information would be useful to investment bankers seeking defeasance clients as well as analysts and investors trying to predict a firm's future financing activities.

Major Conclusion

The major conclusion of this study is that the window dressing hypothesis cannot be ruled out as a significant factor influencing the decision to engage in in-substance defeasance of debt. Empirical evidence shows that firms
with higher-than-average liquidity and leverage ratios, and lower-than-average growth in earnings per share, are more likely to engage in in-substance defeasance of debt than firms holding defeasible debt, but without those financial characteristics. Although the inner motivation of corporate managers who make in-substance defeasance decisions remains unknown, the results of this study show that the window dressing motive is consistent with defeasance decisions made between 1982 and 1987.

This conclusion has important implications for the FASB, as well as those who audit, analyze, or invest in firms engaging in in-substance defeasance of debt. The FASB is currently reconsidering the provisions of SFAS No. 76 as part of its long-term special project dealing with financial instruments and off-balance-sheet financing. The findings of this study suggest that the provisions of SFAS No. 76 may warrant separate and immediate review. The FASB cannot afford to ignore an accounting practice that provides an opportunity for manipulating financial results in ways that are potentially misleading. This is especially true when the FASB itself is directly responsible for granting that opportunity.

While waiting for the FASB to complete its review, auditors of defeased firms may wish to consider ways to improve the disclosure and financial statement presentation
of in-substance defeasance transactions—including, perhaps, a caption on the face of the balance sheet regarding the amount of debt defeased. By providing more detailed information on in-substance defeasance transactions, auditors can help to discourage possible window dressing applications. While the results of this study do not show that in-substance defeasance causes financial statements to be misleading, they do show that the window dressing motive cannot be safely ignored in evaluating the effects of in-substance defeasance on financial statement presentation. Corporate management makes the final decision to engage in in-substance defeasance of debt, but the independent auditor must make the final judgment regarding the motives and rationale underlying this transaction to ensure fair presentation of the financial statements.

The factors identified in this study—excessive liquidity, high leverage, and declining earning growth—are also very important to financial analysts and investors. Each of these characteristics requires careful consideration of both current causes and future implications. When firms exhibiting these characteristics also engage in in-substance defeasance of debt, an added measure of concern may be warranted. Careful review of the factors identified in this study may help auditors,
analysts, and investors identify those firms that are most likely to be influenced by the window dressing motive.

Limitations of the Study

Limitations Related to Methodology

Several limitations of this study were discussed in Chapter 3 with regard to methodology. The most important of these are the limitations inherent in all nonexperimental research designs. Such designs are characterized by an inability to manipulate independent variables or randomly assign subjects to treatment and control groups. The effect of these limitations is felt in the interpretation of research results. Despite significant empirical findings, it is not possible to infer causality between dependent and independent variables in a nonexperimental research design. The strongest conclusion that can be drawn based on the evidence gathered in this study is that the window dressing motive cannot be eliminated as a significant factor in the defeasance decision.

It is not appropriate to conclude that in-substance defeasance transactions are, in fact, caused or motivated by management's desire to window dress the financial statements. Nor is possible to assess the relative importance of the window dressing motive compared to other possible motivating factors. Nonetheless, the results of this study should not be dismissed as trivial or
unimportant. Every research investigation must begin with an identification of those variables which theory and common sense have identified as potential contributors to an unexplained phenomenon. The task of identifying significant explanatory variables for complex phenomena such as those commonly found in accounting and other social sciences should not be underestimated. The research process usually begins with attempts to rule out potentially significant variables. This study represents an initial effort to identify the explanatory variables underlying the decision to engage in in-substance defeasance of debt.

Another limitation of this study concerns the nature of debt defeased during the six-year period from 1982 through 1987. Firms engaging in in-substance defeasance did not confine the transaction to low-coupon corporate bonds. The types of debt defeased during this period include notes, mortgages, revolving credit agreements, capitalized leases, and industrial revenue bonds. All of these debt obligations are represented in the sample of 93 defeasance transactions collected for this study. The defeasible sample, on the other hand, was drawn from a population of firms having low-coupon corporate debt trading on major U.S. exchanges during the same period of time. Firms with other types of debt are not directly represented in the sample of defeasible firms, although many of the firms that carried low-interest bonds also
carried other forms of defeasible debt. Nonetheless, the results of this study are valid only to the extent that the financial characteristics of firms included in the defeasible sample are representative of firms holding other types of defeasible debt besides low-interest bonds.

Limitations Related to the Disclosure of In-Substance Defeasance Transactions

There are also several limitations related to the nature of in-substance defeasance disclosures. The amount of information disclosed about the defeasance transaction varies among firms. Some firms did not identify the specific obligations defeased or the exact amount of gain or loss realized. SFAS No. 76 requires only that firms provide a general description of the defeasance transaction and the amount of debt considered extinguished. Firms are not required to disclose the exact amount of defeasance gain or loss.

In those cases where no gain or loss was mentioned, the amount was assumed to be zero. The same assumption was applied to a number of cases in which firms stated that "there was no significant effect on earnings" as a result of the defeasance transaction. This assumption may have introduced a bias into the computation of one of the variables used in the study (growth in earnings per share). Since all variables were adjusted to eliminate the effects
of defeasance, the assumption of zero gain for cases in which no information was available may have caused an overestimation of growth in (pre-defeasance) earnings per share for defeased firms. This assumption provides, however, a stronger test of the difference in mean earnings growth between defeased and defeasible firms.

The flexibility of disclosure permitted by SFAS No. 76 also created problems in identifying the sample of defeased firms. As described in Chapter 4, a variety of search techniques was used to identify those firms that engaged in in-substance defeasance of debt from 1982 through 1987. Nonetheless, there is no assurance that all NAARS firms engaging in in-substance defeasance during the research period have been included in the sample of defeased firms. Furthermore, the sample of defeased firms is limited to those firms with annual reports appearing in the NAARS database.

**Suggestions for Future Research**

Since it is now known that the window dressing motive cannot be eliminated as a significant factor in the defeasance decision, additional research is needed to determine how much improvement in the financial statements results from this transaction. The variables used in this study were adjusted to eliminate the effect of in-substance defeasance to ensure a valid comparison of the financial
statement characteristics facing corporate managers when considering the defeasance transaction. Now that significant differences in firm characteristics have been found, it would be helpful to know whether any significant reduction of these differences occurs as a result of the defeasance transaction.

Another interesting area of research concerns the selection of debt to be defeased and the timing of the defeasance transaction. When firms carry several different types of defeasible debt such as notes, bonds, and capital leases, what criteria do managers use to select among them? Also, what criteria are used in timing the defeasance transaction? Why do most in-substance defeasance decisions occur late in the reporting period?

A related research question concerns possible capital reorganization of firms defeasing low-coupon bonds. Several firms included in the sample of defeased firms reported significant increases in leverage in the year following the year of defeasance. This suggests that another motive for in-substance defeasance may be a desire to reorganize the capital structure of the firm.

Finally, additional exploratory research is required to identify other explanatory factors underlying the defeasance decision. One way to identify such variables is to focus on those defeased firms that do not display the characteristics found to be significant in this study.
(i.e., reduced earnings growth, high leverage, or excessive liquidity). A number of firms in the defeased sample, for example, reported no significant gain from the defeasance transaction. In addition, several firms reported losses on defeasance. It may be that these firms have such high levels of leverage or liquidity that management is willing to use in-substance defeasance with or without a gain on the transaction. Additional research is needed to determine why corporate managers engage in in-substance defeasance when there is no significant improvement in the financial characteristics considered in this study. In summary, a number of difficult research questions must be answered before any final conclusions may be formed regarding the factors underlying the defeasance decision.
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and Winston.


APPENDIX A

DEFEASED FIRMS
Alphabetical Listing of Defeased Firms

<table>
<thead>
<tr>
<th>Company Name</th>
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<tbody>
<tr>
<td>AFG Industries</td>
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<tr>
<td>Ampco</td>
</tr>
<tr>
<td>American Maize-Products</td>
</tr>
<tr>
<td>American Western Corporation</td>
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<tr>
<td>Atlantic Richfield</td>
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<tr>
<td>Banco de Ponce</td>
</tr>
<tr>
<td>Bank South Corporation</td>
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<tr>
<td>Baxter Travenol Laboratories</td>
</tr>
<tr>
<td>Bear Stearns Co.</td>
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<tr>
<td>Beverly Enterprises</td>
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<tr>
<td>Black and Decker</td>
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<tr>
<td>Borden, Inc.</td>
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<td>Buckhorn, Inc.</td>
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<tr>
<td>Burlington Industries</td>
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<tr>
<td>Cameron Iron Works</td>
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<tr>
<td>Carter Hawley Hale</td>
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<tr>
<td>CBI Industries</td>
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<tr>
<td>CBS, Inc.</td>
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<tr>
<td>Chicago and North Western Transportation</td>
</tr>
<tr>
<td>Cincinnati Gas &amp; Electric</td>
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<tr>
<td>Citizens Savings Financial Corporation</td>
</tr>
<tr>
<td>Cluett, Peabody &amp; Company</td>
</tr>
<tr>
<td>Colt Industries</td>
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<tr>
<td>Crane Company</td>
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<tr>
<td>Dayco Corporation</td>
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<tr>
<td>Dayton Hudson Corporation</td>
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<tr>
<td>DeKalb Agresearch, Inc.</td>
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<tr>
<td>Deposit Guaranty Corporation</td>
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<tr>
<td>Duke Power Company</td>
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<tr>
<td>E'Town Corporation</td>
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<tr>
<td>Eastern Utilities Associates</td>
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<tr>
<td>E. I. DuPont de Nemours</td>
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<tr>
<td>Enterra Corporation</td>
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<tr>
<td>Equibank</td>
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<tr>
<td>Equitable Bancorporation</td>
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<tr>
<td>Exxon Corporation</td>
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<tr>
<td>First Indiana Federal Savings Bank</td>
</tr>
<tr>
<td>First Mutual Savings Assoc. of Florida</td>
</tr>
<tr>
<td>Florida Progress Corporation</td>
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<tr>
<td>Fluor Corporation</td>
</tr>
<tr>
<td>Fremont General Corporation</td>
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<tr>
<td>Gelco Corporation</td>
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<tr>
<td>General Host Corporation</td>
</tr>
<tr>
<td>General Mills, Inc.</td>
</tr>
<tr>
<td>General Public Utilities</td>
</tr>
</tbody>
</table>
Genesco, Inc.
Great American First Savings Bank
Hospital Corporation of America
Houston Natural Gas
Idaho Power Company
Imperial Corporation of America
Kaiser Steel
Marine Midland Banks
McGraw Edison
Meditrust
Merck
Merrill Lynch & Company
Midwest Energy Company
Montana Power Company
Morrison Incorporated
Morton Thiokol
National Intergroup
Overseas Shipholding Group
Palm Beach, Inc.
Penn Virginia Corporation
Pepsico
Phelps Dodge
Piedmont Natural Gas
Pillsbury Company
Puerto Rican Cement Company
Reading & Bates Corporation
Reynolds Metals
Ruddick Corporation
Safeway Stores
Shell Oil
Soo Line Corporation
Southdown, Inc.
Stanley Works
Sterling Drug
UAL, Inc.
United Foods
United States Steel
URS Corporation
Van Dorn Company
Virginia Beach Federal Savings Bank
Waxman Industries
Western Company of North America
York Financial Corporation
APPENDIX B

DEFEASIBLE FIRMS
Alphabetical Listing of Defeasible Firms

Aluminum Company of America
American Express
Anheuser-Busch
Armco, Inc.
Baltimore Gas & Electric
Beneficial Corporation
Bemis Company
Bethlehem Steel
Boise Cascade
Brown Group
Caesars World
Carolina Freight
Caterpillar, Inc.
Cleveland Electric
Columbia Gas
Commonwealth Edison
Consolidated Edison
Consolidated Natural Gas
Corning Glass Works
Crown Cork
Deere & Company
Detroit Edison
Dow Chemical
Dresser Industries
Duquesne Light
Equitable Resources
Farah, Inc.
Ford Motor Company
FPL Group
General Electric
General Motors
Genrad
Georgia Pacific
Goodyear Tire
Gulf & Western
Gulf States Utilities
Halliburton Company
Harris Corporation
Harsco Corporation
Honeywell, Inc.
Humana, Inc.
Illinois Power
Inland Steel
Jim Walter
Kraft, Inc.
Lear Siegler
Loral Corporation
LTV Corporation
McDonald's Corporation
Mercantile Stores
New York State Electric & Gas
North American Philips
Northern States Power
Oklahoma Gas & Electric
Owens-Corning
Orion Pictures
Pacific Gas & Electric
Petrie Stores
Petro-Lewis
Philadelphia Electric
Philip Morris
Pittston
Proctor & Gamble
PSI Holdings, Inc.
Public Service Colorado
Quaker State Corporation
RCA Corporation
Rexnord, Inc.
Rockwell International
Ryan Homes
Southwestern Bell
Sun Company
Teledyne, Inc.
Texas Instruments
Texas Oil & Gas
Textron, Inc.
Trinity Industries
Union Electric
Unocal Corporation
USG Corporation
Utah Power & Light
Witco Corporation
Weyerhaeuser Company
VITA

RAYMOND JEFFORDS, JR.

Department of Accounting and Finance
The University of Tennessee at Chattanooga
615 McCallie Avenue
Chattanooga, Tennessee 37403

(615) 755-4156

EDUCATION AND CERTIFICATION

Ph.D., Louisiana State University, May 1989, with Major in Accounting and Minor in Economics.

M.B.A., University of Massachusetts, September 1974, with Major in Accounting.

B.B.A., University of Massachusetts, September 1971, with Major in Accounting.

B.A., University of Chicago, June 1966, with Major in Psychology.

Certified Public Accountant (Commonwealth of Massachusetts).

TEACHING EXPERIENCE

Assistant Professor, The University of Tennessee at Chattanooga, August 1988 to present.

Teaching Assistant, Louisiana State University, Baton Rouge, Louisiana, August 1985 to May 1986.

Assistant Professor, St. John Fisher College, Rochester, New York, September 1975 to August 1980.

PROFESSIONAL ACCOUNTING EXPERIENCE

Accountant (Private Practice), Redondo Beach, California, October 1982 to July 1985.

Accountant, City of Long Beach, Long Beach, California, September 1980 to August 1981.

Accountant, Deloitte, Haskins and Sells, October 1971 to April 1975.

AWARDS AND ACHIEVEMENTS

Louisiana State University representative at 1987 Doctoral Consortium sponsored by the American Accounting Association, Cincinnati, Ohio, August 1987.


MEMBERSHIPS

American Institute of Certified Public Accountants.
Tennessee Society of Certified Public Accountants.
American Accounting Association.
Institute of Internal Auditors.

PUBLICATIONS


Candidate: Raymond Jeffords, Jr.

Major Field: Accounting

Title of Dissertation: An Empirical Investigation of the Financial Statement Characteristics of Firms Engaging in In-Substance Defeasance of Debt

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Robert M. Harper

[Signature]

[Signature]

[Signature]

[Signature]

Date of Examination:

March 6, 1989