INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

Electric Utility Deregulation: The Case of Stranded Costs

A Dissertation

SUBMITTED TO THE GRADUATE COLLLEGE FACULTY

In partial fulfillment of the requirements for the

Degree of

Doctor of Philosophy

By

Karen Nunez
Norman, Oklahoma
2002

UMI Number: 3038978

UMI Microform 3038978

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

Electric Utility Deregulation:
The Case of Stranded Costs

A Dissertation APPROVED FOR THE
MICHAEL F. PRICE COLLEGE OF BUSINESS

BY

Robert C. Lipe

ACKNOWLEDGMENTS

I express my sincere appreciation and gratitude to my committee chair, Professor Robert Lipe for his patience, encouragement, support and guidance. I would like to thank my committee members, Fran Ayres, Gary Emery, Jiandong Ju and Lee Willinger for their invaluable input and guidance. I am also appreciative for all the assistance and encouragement that I have received from the Accounting Faculty and The University of Oklahoma throughout my doctoral studies. A very special thank you is extended to my parents, Henry and Ernestine Granison, my daughter Jessica, and my very best friend Angela, for their love, support, encouragement and prayers throughout this process.

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF EXHIBITS

Exhibit

CHAPTER 1

INTRODUCTION

Traditionally, under rate-of-return regulation regulators set electric utility prices to cover operating costs plus an allowed return on investment. Nwaeze [1998] assesses the effectiveness of rate-of-return regulation and documents the alignment between the market value of equity and the book value of equity. However, recent federal and state deregulation has increased competition in the electricity generation industry. As a result, certain investments in plant and equipment have been rendered noncompetitive or obsolete, and certain deferred expenses may not provide future benefits. These "above-market" costs generally referred to as stranded costs, may have very low market value relative to their book value. The market's perception of the recoverability of stranded costs may affect the relation between market value and book value. This study will examine the relation between market value and book value over time, and will investigate the determinants of a utility's discretionary choice to write-off stranded costs. Results of this study may document whether deregulation has affected the alignment of market value with book value. Additionally, the results may provide evidence on timeliness and accuracy in accounting for impairment of long-lived assets, and it may identify factors that influence the discretionary choice to write-off stranded costs.

Teets [1992] asserts that regulation affects the relation between unexpected earnings and stock price changes because earnings changes are less permanent for rate-regulated firms. Teets finds the market response to earnings

information smaller on average for a sample of rate-regulated firms. Nwaeze [1998] demonstrates that over time, rate-of-return regulation for electric utilities is reasonably effective in aligning market value with book value because all reasonable costs are eventually recoverable. The Energy Policy Act of 1992 substantially altered the regulatory climate for electric utilities. Johnson, Niles and Suydam [1998] document significant negative effects of deregulation on market values. This study examines the market value-book value relation during the post-regulatory period first by comparing it to the regulatory period. Ros, Domagalski and O'Connor [1996] suggest that an increase in a utility's exposure to stranded costs is associated on average with a decrease in a utility's market-to-book ratio. Second, this study tests whether stranded costs are correlated with the difference between market value and book value.

Under the rate-of-return regulatory model, revenues are set to cover operating expenses plus the cost of capital. D'Souza [1998] asserts that this link between accounting expenses and cash flows for rate-regulated firms influences firms' discretionary accounting policy choices. Stranded cost write-offs could lead the utility's regulator to reduce rates leading to direct reductions in cash flows. Consequently, utilities will be reluctant to write-off stranded costs that are still recoverable in customer rates. This study considers whether various regulatory, competitive, and financial factors are associated with the timing of stranded cost write-offs.

The remainder of this paper is organized as follows. Chapter 2 contains background information on the electric utility industry. Chapter 3 describes the

hypothesis development and research methodology for the examination of the relation between the market value of equity and the book value of equity for electric utilities. Chapter 4 describes the hypothesis development and research methodology for the determinants of timing in the stranded cost write-off decision. Chapter 5 contains hypothesis testing, descriptive statistics, main results, additional analyses and sensitivity analyses for the market value-book value relation. Chapter 6 contains hypothesis testing, descriptive statistics, main results, and sensitivity analyses for the determinants of timing in the stranded cost write-off decision. Chapter 7 contains concluding remarks.

CHAPTER 2

BACKGROUND

2.1. Industry Overview

Regulation of the electric utility industry began early in the 20th century. Utilities were considered natural monopolies and were given the right to operate in defined geographical areas without competition. State regulatory commissions were established to ensure that customers received fair prices and good service. In most cases, rate-of-return regulation was used, and rates were based on operating costs plus an allowed return on the capital investment. However, under the regulatory process, utilities have few incentives to reduce costs and increase efficiency because all reasonable costs are recoverable and an allowed return is received on the investment base. Moreover, since the utility's profit is based on the capital base, too much emphasis is placed on capital investment. As a result, the utility industry over-invested in production facilities (generating capacity), and built large, expensive fossil fuel and nuclear power plants. In the process, the utilities lost their technological and cost advantages over independent non-utility energy companies.

In response to these shortcomings, policymakers began restructuring and deregulating the electric utility industry. Legislation initially targeted the wholesale power market where electricity is sold between electric utilities or other non-utility electricity providers. Congress began by allowing unregulated suppliers and buyers to access the transmission network, thereby opening the wholesale electricity market to competition. The Energy Policy Act of 1992 lead

to increased wholesale competition and eliminated the power-generation monopoly at the electric plant level. Next, state legislatures and regulatory commissions across the country began exploring direct retail access (referred to as retail wheeling[1]) for electricity consumers. More than 20 states have already introduced some form of retail wheeling.

As the power-generation monopoly was eliminated, some utilities were faced with excess capacity and the immediate prospect of competition that was expected to drive down prices for generated power and ultimately lower the market value of expensive, inefficient power plants. Accordingly, during the transition to a more competitive market, some capitalized costs are being rendered obsolete or uncompetitive and therefore unrecoverable. The net effect is that certain assets or portions of assets are left "stranded" relative to the market.

2.2. Stranded Costs

There are three major categories of stranded costs: regulatory assets[2], generating plants, and long-term purchase contracts. Regulatory assets are expenses that are deferred by state regulatory commissions to minimize the level and volatility of electricity rates. See table 1 for typical regulatory assets. Regulatory assets include large "one-time" expenses, however, the bulk of the value is in deferred federal taxes and pensions (Loxley, 1999). The large

[1] Retail wheeling – a transmission or distribution service by which utilities deliver electric power sold by a third party directly to retail customers. This would allow an individual retail customer to choose his or her electricity supplier, but still receive delivery using the power lines of the local utility (Edison Electric Institute, February 2000).

[2] Regulatory assets are deferred expenses capitalized in accordance with SFAS No. 71 (FASB 1982). Included are costs that have been incurred with the expectation that the regulator will allow for future recovery. In a non-regulated enterprise such costs are ordinarily charged against current income.

difference between book and tax depreciation on generating assets results in a deferred tax liability. The related tax expense, normally expensed under GAAP, is deferred and reported as a regulatory asset. Similarly, the accrual of pension benefits, normally expensed under GAAP, are deferred and reported as a regulatory asset.

Under rate-of-return regulation, regulators try to minimize price increases by allowing for cost recovery of generating plants slowly over long depreciable lives (30 to 40 years). As a result, these assets may have excessive book values. Consequently, some utilities may be unable to recover a large portion of their investment in generating plants, particularly nuclear power plants.

Nuclear power plants represent a significant portion of stranded costs from generating plants. Most of these plants suffer from poor operating performance resulting in high production costs. Studness [1995] suggests that most of the stranded nuclear power plants stem from the 34 nuclear power plants that were placed in service after 1984. These 34 units account for approximately 70 percent of the electric utility industry's investment in generating assets.

Nuclear power plants have long been considered the white elephants of the electricity generation industry, and a nuclear power plant has not been built in the U. S. in over 22 years. However, some utilities are updating their nuclear power plants with the latest technology and safety systems. Also, the current political administration has streamlined the building process and encouraged increased production at nuclear power plants. Additionally, the recent combination of higher prices for natural gas and petroleum, and the energy shortage in California

have created new interest in nuclear power. This sudden interest might increase the market value of nuclear power plants. However, estimates of stranded nuclear power plants used in this study predate the sudden interest in nuclear power.

Long-term contracts to purchase electricity from utility and nonutility generators were frequently encouraged or even mandated by state regulatory commissions to ensure supply and eliminate price risk. Most long-term purchase contracts were written prior to 1990 and are based on energy prices[3] that were in effect prior to deregulation of the wholesale market. In the early 1990's after deregulation of the wholesale market, fuel and power prices declined. As a result, some utilities were legally bound to purchase power at "above-market" rates. Under rate-of-return regulation, the cost of purchased power is considered a reasonable operating cost and therefore a regulated utility can pass on the above-market costs to its captive customers. In a competitive market, the excess of the contract price over the market price may not be recoverable in electricity rates.

Coal supplies have been abundant and prices have generally been favorable, but recently natural gas and petroleum supplies have fallen and prices have surged. As a result, some long-term purchase contracts may no longer be above market. However, estimates of above-market long-term purchase contracts used in this study are based on energy prices that were in effect in the early 1990's after deregulation of the wholesale market, and predate the recent changes in petroleum and natural gas prices.

[3]The electric utility industry relies on various fuel sources to generate electricity including coal, nuclear power, natural gas, petroleum and renewable sources.

Estimates of stranded costs are based on predictions of post-regulation prices, application of supply and demand, and cost-volume-profit analysis (Freemont et al., 1995). Moody's [1995] estimates stranded costs for 114 U.S. investor-owned utilities at $135 billion. In a study completed by Resource Data International[4] [1997], stranded costs are estimated at $202 billion for the electric utility industry (investor-owned utilities account for $147 billion; public utilities for $33 billion; and cooperatives for $22 billion). Their study includes a detailed, plant-by-plant analysis of stranded costs for every utility in the country. The estimated $202 billion includes the following components: $86 billion stranded generating assets, $(17) billion other generating assets with market value in excess of book value, $96 billion long-term above-market purchase contracts, $(12) billion long-term above-market sales contracts, and $49 billion regulatory assets.

[4] Resource Data International, Inc. is recognized as an independent industry leader in electric power market information in the United States.

CHAPTER 3

HYPOTHESIS DEVELOPMENT AND RESEARCH METHODOLOGY: MARKET VALUE - BOOK VALUE RELATION

3.1. Hypothesis Development

3.1.1. Literature Overview - Regulation

Under traditional rate-based regulation, state regulatory commissions set rates to cover both operating and capital costs. Operating cost changes and additional capital investment are considered when the commission reviews the existing rates in what is called a "rate case." Once the rates are revised, future cash flows revert to normal levels based on the target rate-of-return allowed by the regulatory commission. If rates were revised continuously, then revenues would equal operating costs plus a return on the investment base, and the market value of the utility would equal its book value. In practice, rates are only revised periodically leading to a 'regulatory lag' during which changes in earnings may persist for a short time. Hence, regulation causes earnings to have limited implications for changes in future cash flows.

Teets [1992] examines whether regulation can affect the cross-sectional market response to earnings. Teets compared a sample of regulated electric utility firms to non-regulated firms and found the market response to earnings information smaller on average for the sample of regulated firms. Teets asserts that regulation affects the relation between unexpected earnings and stock price changes because earnings changes are less permanent for regulated firms and therefore have limited implications for future cash flows. Teets concludes that

regulation 'buffers' or shelters utilities from changes in the operating environment.

Nwaeze [1998] extends Teets [1992] and assesses the effectiveness of rate-of-return regulation by examining the alignment between the market value of equity and the book value of equity. He finds that over time the difference between market values and book values for electric utilities is not statistically significant. However, the difference between market values and book values for non-regulated firms is statistically significant. He suggests that rate-of-return regulation is reasonably effective in aligning market value with book value.

3.1.2. Literature Overview - Deregulation

The Energy Policy Act of 1992 substantially altered the regulatory climate for electric utilities. The law was designed to encourage efficiency in production and distribution while increasing competition in the generation and transmission of wholesale electric power. Johnson, Niles and Suydam [1998] consider the market reaction to electric utility deregulation and the effect on shareholder wealth during the legislative period, 1991-1992. The legislative period includes introduction of deregulation legislation in the federal legislature, and the enactment into law of the Energy Policy Act of 1992. They conclude that deregulation had significantly negative effects on stock values for investor-owned electric utilities. They find a significant negative market reaction to legislative events leading up to and including the enactment of the Energy Policy Act of 1992. Moreover, they find that firms with a higher percentage of assets

associated with nuclear facilities experienced a more negative reaction to deregulation.

Besanko, D'Souza and Thiagarajan [2001] also analyze electric utility stock price reactions to events preceding the passage of the Energy Policy Act of 1992. Contrary to Johnson et al., [1998] they find a neutral stock price reaction to events leading up to the passage of the Energy Policy Act of 1992. Moreover, they find utilities with low marginal costs experience a more favorable stock price reaction than utilities with high marginal costs. Their analysis differs from Johnson et al., [1998] in several ways. They use a larger sample size than Johnson et al., [1998] and their study controls for the effect of firm-specific characteristics. Also, Besanko et al., [2001] use a methodology that controls for clustering by industry and time, instead of the standard event-study methodology used by Johnson et al., [1998].

The Energy Policy Act of 1992 mandated Federal Energy Regulatory Commission (FERC) Order No. 888, issued in April 1996, which addressed transmission service and stranded costs. Order No. 888 requires all public utilities to provide transmission service for wholesale transactions on an open, nondiscriminatory basis, and allows for full recovery of prudently incurred wholesale market stranded costs from wholesale customers. Although Order No. 888 was widely expected and merely standardized changes in the electric utility industry that were already in effect, on a voluntary basis in many parts of the country, the initial response was positive (Journal of Commerce, 1996). In fact, Pagach and Peace [2000] find that utilities with stranded costs experienced a

significant positive market reaction to issuance of Order No. 888. Pagach and Peace [2000] suggest that Order No. 888 reduced the uncertainty surrounding recoverability of wholesale market stranded costs. However, Order No. 888 does not provide for recovery of retail market stranded costs. The individual states must determine recoverability of retail market stranded costs. After issuance of FERC Order No. 888, Moody's [1996] reported that state regulators would only provide for partial recovery of retail market stranded costs, and suggested that there was little change in total potential stranded costs.

3.1.3. Literature Overview – Stranded Costs

Ros, Domagalski and O'Connor [1996] consider the effect of electric utility stranded costs on the relation between market values and book values. Using Moody's [1995] and Standard and Poor's [1995] stranded cost estimates, they explain approximately 20% of the variability in 1995 year-end market-to-book ratios. They suggest that utilities most exposed to stranded generating assets had lower ratios than utilities with less exposure. They assert that deregulation affects the market's perception of recoverability of stranded costs, and they demonstrate that stranded generating assets explain a significant amount of the cross-firm differences in the 1995 year-end market-to-book ratios.

Blacconiere, Johnson and Johnson [1997] consider the usefulness of financial statement information in explaining analysts' estimates of stranded costs, and the effect of increased competition on the relation between market value and book value. Overall, their evidence suggests that historical-cost-based financial statements are useful for estimating stranded costs and for assessing the

effect of deregulation on electric utilities. Additionally, they provide some evidence that cross-firm differences between market values and book values are related to cost competitiveness and regulatory environment.

3.1.4. Hypotheses

While Nwaeze [1998] has documented the alignment of market value and book value during the regulatory period, the post-regulatory results are mixed. Johnson et al., [1998] find significantly negative effects on stock values, however, Besanko et al., [2001] find a neutral stock price reaction. Johnson et al., [1998] and Besanko et al., [2001] are both event studies that estimate abnormal returns and use short event-windows (5 and 3 days, respectively). Hence, these studies provide evidence concerning electric utility stock returns over a few days and relative to the general market, but they cannot address whether the market values of utilities are above or below book values in the post-regulatory period.

Given the potentially negative effects of deregulation, hypothesis 1 predicts that the level of market value has declined such that market value and book value are no longer aligned. Hypothesis 1 examines the market value-book value relation during the post-regulatory period, 1993-1997, and compares it to the regulatory period, 1970-1990. Hence, hypothesis 1 (stated in the alternative):

> H1: The firm-specific mean of the market-to-book ratio during the post-regulatory period, 1993-1997, is less than the firm-specific mean during the regulatory period, 1970-1990.

Johnson et al., [1998] and Ros et al., [1996] have documented that declines in firm-specific market value are associated with potentially stranded

generating assets. Thus, it is reasonable to expect that changes in the firm-specific mean market value-book value relation should be related to firm-specific total stranded costs. Thus, hypothesis 2a predicts that firm-specific total stranded costs are related to the change in the market value-book value relation across periods: the regulatory period, 1970-1990 vs. the post-regulatory period, 1993-1997. Hence, hypothesis 2a (stated in the alternative):

> H2a: The change in the firm-specific mean of the market-to-book ratio (the regulatory period vs. the post-regulatory period) is negatively related to firm-specific total stranded costs.

Loudder, Khurana and Boatsman [1996] find that the state regulatory environment affects a utility's ability to recover costs. Their results indicate that investors' valuation of regulatory assets depends on the state regulatory environment in which the utility is operating. Thus, hypothesis 2b predicts that the decline in the market value-book value relation across periods should be greater in unfavorable state regulatory environments than in favorable environments. Hypothesis 2c predicts that the state regulatory environment will condition the relation between the level of stranded costs and the change in the market value–book value relation across periods. Specifically, the decline in the market value–book value relation across periods should be greater for firms with more stranded costs in unfavorable state regulatory environments than in favorable state regulatory environments. Hypotheses 2b and 2c (stated in the alternative):

> H2b: The decline in the firm-specific mean of the market-to-book ratio (the regulatory period vs. the post-regulatory period) should be greater in unfavorable state regulatory environments.

H2c: The decline in the firm-specific mean of the market-to-book ratio (the regulatory period vs. the post-regulatory period) is negatively related to the interaction of the level of stranded costs and the state regulatory environment.

3.2. Research Methodology

3.2.1. Sample and data sources

The initial sample consists of the investor-owned utilities included in Standard Industrial Classifications [SICs] 4911 and 4931, that are included in both Compustat and The Value Line Investment Survey. Market values and financial statement data were obtained from Compustat. Book value data and state regulatory environment rankings were obtained from the Value Line Investment Survey. Value Line's book value data contains adjustments for regulatory assets recognized under SFAS No. 71. Resource Data International, Inc.'s stranded cost estimates[5] were used. Descriptive statistics for the sample are shown in Table 2.

3.2.2. Research design

Alignment of market value and book value during the regulatory period (Nwaeze, 1998) will be demonstrated by testing the cross-sectional mean of the market-to-book ratio during the regulatory period (1970-1990). The mean should not be statistically different from one. The firm-specific mean of the market-to-book ratio during the regulatory period (1970-1990) will also be tested.

---

[5] I am grateful to Don Pagach and Bob Peace for making available their Resource Data International Inc. data for this study.

Hypothesis 1 examines whether firms' average market value-book value relation during the post-regulatory period, 1993-1997, has changed such that the market-to-book ratio is less than the market-to-book ratio during the regulatory period, 1970-1990. To test Hypothesis 1, the difference between the firms' average post-regulatory (1993-1997) and regulatory (1970-1990) market-to-book ratios will be tested.

Given the positive market reaction to Order No. 888, the post-regulatory period (1993-1997) will be partitioned into two periods: a before Order No. 888 post-regulatory period (1993-1995), and an after Order No. 888 post-regulatory period (1996-1997). Hypothesis 1 will be tested using the two post-regulatory period partitions.

To test hypotheses 2a, 2b and 2c, stranded costs are measured using Resource Data International's detailed, plant-by-plant estimate of stranded costs. The most recent detailed estimates of stranded costs are available only for 1997. To examine the impact of the state regulatory environment on a utility's ability to recover stranded costs, the stranded cost variable will be interacted with a state regulatory environment variable. The Value Line Investment Survey rates the nature of state regulatory environments in which utilities operate. The periodic ratings are related to the favorableness of state regulatory commission rulings. Some utilities operate in more than one jurisdiction, therefore, a weighted average (weighted by stranded cost estimate) of relevant state ratings will be used to compute firm-specific regulatory ratings. State regulatory environments are rated below average, average and above average. Two dummy variables will

be used to capture unfavorable state regulatory environment ratings: REGHI and REGMD. REGHI equals 1 for below average ratings and REGMD equals 1 for average ratings.

Johnson et al., [1998] document increases in firm-specific and market risk during the legislative period, and suggest that negative market returns may be explained in part by increases in risk. However, they do not test for an association between increased risk and negative market returns. Prior research (Kothari and Zimmerman, 1995; Nelson, 1996; and Beaver, Eger, Ryan and Wolfson, 1989) indicates that important determinants of variation in market-to-book ratios are conventional valuation variables such as systematic risk and return on equity. Overall, the prior research suggests that risk should be included as a control variable in the market value-book value relation. Johnson et al., [1998] use beta to measure risk, however, there is evidence that beta is not significantly related to risk (Fama and French, 1992 and Gebhardt, Lee and Swaminathan, 2000). Fama and French, [1992] document a positive relation between market leverage and ex post mean stock returns. Gebhardt et al., [2000] find that a market leverage measure (debt-to-market value of equity) exhibits a significant positive correlation with risk. To control for risk, a risk variable, RISK, measures the change across periods (the post-regulatory period vs. the regulatory period) in the ratio of total long-term debt to the market value of equity. To preclude an omitted variables bias, return on equity (ROE) is included as a control variable.

The following equation is estimated to test hypotheses 2a, 2b and 2c:

$$(MV/BV)_{i,pr} - (MV/BV)_{i,r} = a_0 + a_1 SC_{i,pr} + a_2 REGHI_{i,pr}$$
$$(-) \qquad (-)$$

$$+ a_3 REGMD_{i,pr} + a_4 SC_{i,pr} * REGHI_{i,pr}$$
$$(-) \qquad (-)$$

$$+ a_5 SC_{i,pr} * REGMD_{i,pr} + a_6 RISK_i + a_7 ROE_{i,pr} + \varepsilon_i \qquad (1)$$
$$(-)$$

where the variables are defined as:

$(MV/BV)_{i,pr}$ = Market-to-book ratio, firm *i*, post-regulatory 5 yr average, 1993-1997;

$(MV/BV)_{i,r}$ = Market-to-book ratio, firm *i*, regulatory 5 yr average, 1986-1990;

$SC_{i,pr}$ = Total stranded costs, firm *i*, in 1997;

$REGHI_{i,pr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is below average, and 0 otherwise in 1997;

$REGMD_{i,pr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is average, and 0 otherwise in 1997;

$RISK_i$ = Total long-term debt to market value of equity, post regulatory 5 yr average (1993-1997) minus regulatory 5 yr average (1986-1990), firm *i*;

$ROE_{i,pr}$ = Return on equity, firm *i*, in 1997;

ε_i = A random error term.

Stranded costs are estimated for 1997 using Resource Data International's plant-by-plant estimates, and were scaled by the book value of equity to mitigate spurious correlation related to size. Resource Data International's stranded cost estimates include a low estimate for long-term purchase contracts i.e., input prices are 15% lower, and a high estimate for long-term purchase contracts i.e., input

prices are 15% higher. Equation (1) is also estimated using Resource Data International's low and high estimates for long-term purchase contracts.

3.2.3. Sensitivity Analysis

State legislatures and regulatory commissions began exploring industry restructuring shortly after the Energy Policy Act of 1992 was enacted. States began enacting restructuring legislation in 1996. Some state legislation addressed stranded cost recovery, however, some states deferred detailed decisions regarding stranded cost recovery to later legislative sessions. Enacted legislation may affect investors' valuation of stranded cost exposure. Hence, enacted legislation may condition the relation between the level of stranded costs and the change in the market value-book value relation across periods. As a sensitivity, a legislative indicator variable (LEG) will be added to equation (1) to examine the impact of legislation on investors' valuation of stranded cost exposure. LEG equals 1 if the utility operates in a jurisdiction that has enacted restructuring legislation during the post-regulatory period (1993-1997), and 0 otherwise. LEG was interacted with the stranded cost variable.

Recent price changes in natural gas and petroleum have highlighted the effect of fuel source price volatility on electricity rates. Accordingly, price volatility may affect the value of long-term purchase contracts. Hence, price volatility faced by a utility may condition the relation between its market value and the level of its stranded long-term purchase contracts. A volatility indicator variable (VOL) will be added to equation (1) to examine the impact of volatility on investors' valuation of stranded cost exposure. Volatility in pricing is

measured by calculating the average variance in 1997 daily electricity spot prices by region. VOL equals 1 if the utility operates in a region that has high volatility (above the mean variance) and 0 otherwise. To determine if price volatility will condition the relation between the level of stranded costs and the change in the market value-book value relation, VOL will be interacted with the stranded cost variable.

CHAPTER 4

HYPOTHESIS DEVELOPMENT AND RESEARCH METHODOLOGY: DETERMINANTS OF TIMING IN THE STRANDED COST WRITE-OFF DECISION

4.1. Hypothesis Development

4.1.1. Financial Accounting (GAAP) – Stranded Cost Write-offs

The Federal Energy Regulatory Commission (FERC) has endorsed the principle of full recovery of prudently incurred wholesale market stranded costs from wholesale customers (FERC Order No. 888). However, under Order No. 888, individual states must determine recoverability of retail market stranded costs. Some state policymakers have expressed unwillingness to allow recovery of stranded costs believing that it will be extremely difficult to reconcile full recovery of such costs with meaningful reductions of electricity rates (Standard & Poor's, 2000; Johnson et al., 1998; Blacconiere et al., 1997). For example, the Arizona public utility commission will allow the Arizona Public Service Company to recover only $350 million of its estimated $533 million in stranded costs. While state regulatory commissions and legislatures are structuring the transition to competition and assigning the responsibility for stranded cost recovery, the Financial Accounting Standards Board has provided guidance for financial reporting.

SFAS 121 provides authoritative guidance for impairment of generating assets. Under SFAS 121, an estimate of future cash flows from the asset must be compared to its book value. The amount by which the book value exceeds the

present value of estimated future cash flows is the impairment loss. Such a loss should be reported in the income statement under other expenses and losses.

SFAS 71 allows electric utilities to capitalize certain deferred expenses as regulatory assets while SFAS 101 requires that if the criteria in SFAS 71 cease to be met, then the regulatory assets capitalized in accordance with SFAS 71 must be written off immediately as extraordinary losses. The Emerging Issues Task Force issued EITF 97-4 to provide additional guidance on when and how to apply SFAS 101. However, utilities still have a significant amount of discretion in the amount and timing of stranded cost write-offs. According to EITF 97-4, firms are supposed to use their best judgment in applying SFAS 101. Firms are required to review the details of approved state-specific legislation and determine how the deregulation transition plan will affect its business. The result is that utilities must consider the immediate as well as future effects of the deregulation legislation and assess the recoverability of stranded costs. Any regulatory assets deemed unrecoverable and/or impaired, must be immediately written-off as extraordinary losses. For example, in a December 1997 Pennsylvania public utility commission order, PECO was granted recovery of only $5.26 billion of its $8.36 billion in stranded costs. In January 1998, PECO recognized an extraordinary loss of $3.1 billion (before taxes) for unrecoverable stranded costs.

Long-term purchase contracts are legally binding contractual obligations. However, they are executory in nature and therefore no asset or liability is recognized when the contracts are initially signed. Contract details should be disclosed in the utility's footnotes if the contract is material. If the utility expects

a loss because the contract price exceeds the market price, Accounting Research Bulletin No. 43 requires immediate recognition of the loss. Such a loss should be reported in the income statement under other expenses and losses.

4.1.2. Regulatory Accounting - Stranded Cost Write-offs

Some state utility commissions and legislatures will not allow full recovery of stranded costs. When recovery is disallowed, the undepreciated amounts are removed from the regulatory accounting books and the loss is excluded from operating expenses (Arnold and Cheng, 2000). Most deregulation legislation allows state utility commissions to set rates based on normal costs plus a return, plus any recoverable stranded costs. Normal costs include operating expenses, depreciation and taxes (Loudder et al., 1996). In most deregulation plans, state utility commissions freeze customer rates at the beginning of a transition period. At the end of the transition period, the market determines the customer rates.

Transition rates may or may not allow for full recovery of stranded costs. Utilities can reduce their normal costs during the transition, and recover some or all of their stranded costs. Any stranded costs that remain after the transition period ends are in essence disallowed.[6]

4.1.3. Economic Consequences - Stranded Cost Write-offs

Stranded costs that are explicitly disallowed should be written-off for both regulatory and financial accounting purposes. Utilities must use their discretion in assessing recoverability of other stranded costs. Any stranded costs considered

[6]Some deregulation orders allow certain stranded costs to be recovered after competition begins by assessing a surcharge on all electricity consumed in the utility's traditional geographic area.

unrecoverable should be written-off for financial accounting purposes. However, the outcome of this assessment could change the distribution of firms' expected cash flows. If a utility writes-off stranded costs for financial accounting purposes prior to final disallowance of cost recovery for regulatory accounting, then the regulator may refuse to allow recovery of assets which "disappeared" from the financial statements (Loudder et al., 1996). If regulators refuse recovery, the rate will be reduced, leading to a direct reduction in cash flows. This link between financial accounting write-offs and cash flows may influence the timing of stranded cost write-offs. This study considers the utility's choice to write-off stranded costs at the start of the transition period versus deferring stranded cost write-offs until the end of the transition period.

The economic consequences research suggests that cash flow consequences can be used to explain firms' accounting policy choices. The economic consequences of accounting choices result from causal links between firms' cash flows and reported accounting numbers (Holthausen and Leftwich, 1983). A substantial body of economic consequences research (Ball and Smith, 1992; Burgstahler and Dichev, 1997; DeAngelo et al., 1994; Hand and Skantz, 1997; Ayres, 1986; Healy, 1985; Soo, 1999) has focused on explaining firms' discretionary accounting policy choices. Industry-specific research (Jones, 1991; Cahan, 1992; Kim and Kross, 1998; and D'Souza, 1998) shows that regulation influences firms' discretionary choices. Jones [1991] and Cahan [1992] find that managers make more income decreasing accruals during import relief investigation periods and antitrust investigation periods. Kim and Kross [1998]

find that bank managers' discretionary accruals are influenced by regulatory changes.

D'Souza [1998] considers electric utilities and the effects of an expense-increasing accounting standard (SFAS 106). SFAS 106 (Employers' accounting for postretirement benefits other than pensions) requires that postretirement employee benefits other than pensions be accounted for on an accrual basis instead of a cash basis. Regulators have traditionally permitted electric utilities to recover all cash-based employee-related expenses in current rates. In the wake of SFAS 106, most state utility commissions now allow utilities to recover their accrued postretirement employee benefits.[7] Accrued SFAS 106 expenses are significantly higher than the corresponding cash expense (D'Souza, 2000). However, under the rate-based regulatory model, the regulator increases cash revenues to cover increased accrued expenses. Hence, the increased accrued expenses result in greater cash inflows, but do not affect net income.

D'Souza [1998] finds competitively weaker electric utilities are more likely to assume medical trend rates that increase accrued costs reported under SFAS 106. The medical trend choice significantly affects accrued cost computations. Rate-regulated electric utilities benefit from higher accrued expenses because current cash revenues increase, whereas the cash expense occurs much later. D'Souza concludes that the link between accounting expenses

[7] A few state utility commissions continue to allow recovery of cash expenses only, and any excess accruals are deferred and recorded as regulatory assets.

and cash flows for rate-regulated firms influences their discretionary accounting policy choices.

4.1.4. Hypotheses

Financial accounting standards require immediate write-offs of stranded costs deemed unrecoverable. However, since most deregulation plans permit the recovery of some stranded costs during a transition period, judgment is required in assessing recoverability. It is likely that some utilities will defer stranded cost write-offs because of the potential negative economic consequences (e.g., regulator explicitly disallows a cost once it is written off for financial accounting purposes). This study assumes utilities are faced with a dichotomous choice: write-off stranded costs at the start of the transition period, or defer stranded cost write-offs until the end of the transition period. Based on prior research on the economic consequences of accounting choices, certain firm-specific factors may be associated with the timing of stranded cost write-offs.

Regulatory Environment

Loudder et al., [1996] find that the state regulatory environment affects a utility's ability to recover capitalized costs in future rates. Writing off stranded costs in an unfavorable state regulatory environment may weaken a utility's position and result in regulators refusing to allow recovery of assets which "disappeared" from the financial statements in prior years (Loudder et al., 1996). Loxley [1999] also suggests that utilities face the 'regulatory risk' of a disallowance of cost recovery should a future commission decide against it.

Therefore, utilities operating in unfavorable state regulatory environments are more likely to defer stranded cost write-offs. The third hypothesis (stated in the alternative):

> H3: Utilities that operate in more unfavorable regulatory environments are more likely to defer stranded cost write-offs.

Competitive Factors

Competitive position is likely to be a determinant in the stranded cost write-off decision. D'Souza [1998] finds competitively weaker utilities are more likely to make accounting choices that have positive cash flow consequences. Furthermore, the capital-intensive nature of the electric utilities industry has resulted in very high debt levels. As a result, interest on long-term debt is the most significant nonoperating expense. Stranded cost write-offs change reported capital structure and might create debt covenant violations. Prior research (Daley and Vigeland, 1983; Bowen et al., 1981; Holthausen and Leftwich, 1983; Kalay, 1982; and Smith and Warner, 1979) suggests that firms that are closer to debt constraints have incentives to choose accounting methods that reduce the probability of violating debt covenants. Firms facing covenants pertaining to leverage and interest coverage, are expected to choose income-increasing accounting methods. Kalay [1982] finds that firms with higher debt-to-equity ratios tend to be closer to covenant constraints and to have less cash available for dividends.

Bowen et al., [1981] and Daley and Vigeland [1983], suggest that firms with lower interest coverage ratios are more likely to be closer to default on debt covenants and thus are more likely to choose income-increasing accounting

methods in order to ease the constraints. Ayres [1986] argues that even if firms are not in violation of existing covenants, low levels of interest coverage may make obtaining additional debt financing more difficult and/or affect a firms' bond rating.

Resource Data International Inc.'s Competitive Exposure Index (CEI) is a comprehensive ranking of electric utility companies. The CEI compares each company with all others within their North American Electric Reliability Council (NERC) region. Competitively weak firms have higher CEI values. The key factors included in the CEI are fixed costs, operational efficiency, financial structure and stranded costs. Fixed costs refers to the ratio of the fixed cost of power supply to the total power supply costs. Operational efficiency refers to the relative magnitude of the total cost for electric service. Financial structure captures the debt-to-equity, interest coverage and payout ratios. Stranded costs includes total stranded costs as a percentage of total proprietary capital.

The preceding discussion suggests that competitively weak utilities that have high fixed costs, are close to covenant constraints and have cash flow problems, are more likely to defer stranded cost write-offs to minimize negative economic consequences. Hence, the fourth hypothesis (stated in the alternative):

H4: Utilities with higher CEI values are more likely to defer stranded cost write-offs.

Financial Factors

The current year's financial performance may also influence the timing of write-offs (Francis et al., 1996). If pre-write-off ROE exceeds the prior year ROE, utilities may have an incentive to lower ROE. This is consistent with the

"income smoothing" argument. On the other hand, if pre-write-off ROE is less than the prior year ROE, utilities may have an incentive to write-off stranded costs in the current period. This is consistent with the "big bath" argument. To distinguish between these two effects, separate variables will be used to measure when current ROE performance is greater than or less than the prior year. Hence, the following two part hypothesis (stated in the alternative):

H5a: Utilities with unexpected increases in current pre-write off ROE are more likely to write-off stranded costs initially.

H5b: Utilities with unexpected decreases in current pre-write off ROE are more likely to write-off stranded costs initially.

Control Factors

There are several other factors that may be related to the timing of stranded cost write-offs. However, these factors are probably not influenced by the economic consequences of stranded cost write-offs. Hence, the following factors will be introduced as control variables: firm size, change in top management, and firm reorganization/restructuring.

Watts and Zimmerman [1978] suggest that firms' preferences for an accounting method depend on the income effect of the method and the size of the firm. They assert that because of political exposure, large firms tend to adopt income reducing accounting methods. Support for this hypothesized relationship was found by Watts and Zimmerman [1978], Hagerman and Zmijewski [1979] and Zmijewski and Hagerman [1981]. Thus, larger utilities are more likely to write-off stranded costs soon after passage of deregulation orders, and small utilities are more likely to defer stranded cost write-offs.

Francis et al., [1996] suggest that a recent change in top management may lead to discretionary asset write-offs because new management may have an incentive to "clear the deck" of impaired assets to improve investors' perception of future financial performance, or because new management changes the strategic focus of the firm. Francis et al., [1996] find marginal support for more frequent and larger asset write-offs when there has been a recent change in top management. Moore [1973] and Strong and Meyer [1987], also find discretionary asset write-offs are often associated with management changes. Thus, utilities that have experienced a recent change in top management may be more likely to write-off stranded costs.

Elliott and Shaw [1988] assert that managements' preferences affect the magnitude and timing of write-offs related to reorganizations and restructurings in a more significant and direct way than in most accounting disclosures. A major reorganization or restructuring may prompt greater scrutiny of the value of existing assets. This suggests that utilities reorganizing or restructuring may be more likely to write-off stranded costs.

4.2. Research Methodology

4.2.1. Sample and data sources

The initial sample consists of the 32 investor-owned utilities operating in states that have passed deregulation orders that allow for partial or no recovery of stranded costs. These utilities are included in Standard Industrial Classifications [SICs] 4911 and 4931. The necessary data was obtained from Compustat, The Value Line Investment Survey, Lexis-Nexis Academic Universe, The Department

of Energy-Energy Information Administration, Disclosure's SEC Database, and Edgar Online Filings. The final sample consists of 28 firms that have financial data available. Of the 28 firms, 13 reported write-offs related to stranded costs and 15 firms did not report write-offs. One of the firms reporting a write-off has estimated stranded benefits according to Research Data Inc. Three of the firms that did not report write-offs have estimated stranded benefits according to Research Data Inc. Descriptive statistics for the sample are shown in Table 3.

4.2.2. Research design

The regulatory environment variable (REG) is described in Section 3.2.2. The Competitive Exposure Index (CEI) reflects the relative competitive position. Lower CEI values indicate a stronger competitive position. The ROE performance variables (ROEUP and ROEDOWN) reflect the difference between the pre-write-off ROE and the prior-year ROE. One of the most commonly used measures of size in the electric utility industry is total assets (Kihm, 1992). Thus, the SIZE variable is measured using the natural logarithm of total assets. The change in management variable (ΔMGT) indicates whether any of the top-three executive positions (Chairman of the Board, Chief executive officer, or president) changed hands (Francis et al.,1996) in the year following passage of the deregulation order. The reorganization/restructuring variable (REORG) indicates a major reorganization or restructuring in the year following passage of the deregulation order. Following is a summary of all variables:

REG = State regulatory environment rating, 1=below average, 2= average, 3=above average;

CEI = Competitive Exposure Index. Lower values indicate a more competitive position;

ROEUP =(Current year operating income before taxes and write-offs / current year average common equity) – (prior year operating income before taxes / prior year average common equity) if > 0, otherwise 0;

ROEDOWN =(Current year operating income before taxes and write-offs / current year average common equity) – (prior year operating income before taxes / prior year average common equity) if < 0, otherwise 0;

SIZE = natural logarithm of total assets (in millions);

ΔMGT =Indicates changes in key management (chairman of the board, chief executive officer or president) in the year following passage of the state deregulation order;

REORG =Indicates a major reorganization or restructuring in the year following passage of the state deregulation order.

Descriptive statistics will be calculated for the variables and univariate tests will be conducted to see if the mean differences between the groups (deferred write-off firms versus initial write-off firms) are in the hypothesized directions. Additionally, a multivariate analysis will be used to consider the simultaneous effect of the variables on the timing of the stranded cost write-off decision. The dichotomous choice (defer stranded cost write-offs versus initial stranded cost write-offs) requires a dichotomous dependent variable for multivariate testing. The logistic model uses the independent variables to predict the probability that an observation is in one of the two groups. The logistic model uses a maximum likelihood method instead of a least-squared deviations criterion

for the best fit. The maximum likelihood method maximizes the probability of getting the observed results given the fitted regression coefficients.

The following equation is estimated to assess the extent to which the variation across firms in the timing of stranded cost write-offs is explained by the variables that proxy for the incentives to minimize the economic consequences:

$$\begin{aligned}\textbf{Stranded Cost Write-offs}_{i,t} = {} & b_0 + b_1 \underset{(+)}{\text{REG}_{i,t}} + b_2 \underset{(-)}{\text{CEI}_{i,t}} \\ & + b_3 \underset{(+)}{\text{ROEUP}_{i,t}} + b_4 \underset{(-)}{\text{ROEDOWN}_{i,t}} + b_5 \underset{(+)}{\text{SIZE}_{i,t}} \\ & + b_6 \underset{(+)}{\Delta\text{MGMT}_{i,t}} + b_7 \underset{(+)}{\text{REORG}_{i,t}} + \mu_{i,t} \end{aligned} \quad (2)$$

where:

Stranded Cost Write-offs $_{i,t}$ =1 if stranded costs are written-off initially (i.e., within the first year of passage of the state deregulation order);

=0 if stranded costs are *not* written-off initially (i.e., deferred write-offs);

$\mu_{i,t}$ = a random error term.

All other variables as previously defined.

Note: all variables are measured for the year following passage of the respective state deregulation order.

For testing hypotheses 3-5, the overall significance of the model will be assessed as well as the individual significance of b_1 - b_4.

4.2.3. Sensitivity Analysis

The multivariate analysis includes a tobit model. The tobit model is a censored regression model that provides a single coefficient for each independent

variable despite two distinct types of dependent variables (uncensored and censored). In this case, the tobit model estimates the importance of the independent variables in explaining both the timing of the write-off, and the amount of the write-off. The dependent variable measures the amount of the stranded cost write-off for utilities that write-off initially (uncensored), and no write-off, or zero, for utilities that defer write-offs (censored). The following tobit model is estimated to assess the importance of the independent variables in the stranded cost write-off decision:

$$\text{Stranded Cost Write-off amount}_{i,t} = c_0 + c_1 \underset{(+)}{\text{REG}_{i,t}} + c_2 \underset{(-)}{\text{CEI}_{i,t}}$$

$$+ c_3 \underset{(+)}{\text{ROEUP}_{i,t}} + c_4 \underset{(-)}{\text{ROEDOWN}_{i,t}} + c_5 \underset{(+)}{\text{SIZE}_{i,t}}$$

$$+ c_6 \underset{(+)}{\Delta\text{MGMT}_{i,t}} + c_7 \underset{(+)}{\text{REORG}_{i,t}} + \mu_{i,t} \qquad (3)$$

where:

Stranded Cost Write-off amount $_{i,t}$ =reported amount for firms writing-off stranded costs initially (i.e., within the first year of passage of the state deregulation order), deflated by total assets at the end of year *t-1*, and 0 for non-write-off firms;

all other variables as defined in equation (2).

For testing hypotheses 3-5, the overall significance of the model will be assessed as well as the individual significance of c_1- c_4.

CHAPTER 5

HYPOTHESIS TESTING: MARKET VALUE-BOOK VALUE RELATION

5.1. Hypothesis 1

This study begins by demonstrating the alignment of market value and book value during the regulatory period (1970-1990). Consistent with Nwaeze [1998], the cross-sectional mean market-to-book ratio during the regulatory period is not statistically different from 1. Also, the firm-specific mean market-to-book ratio during the regulatory period is not statistically different from one.

Hypothesis 1 predicts that the market value has declined such that market value and book value are no longer aligned in the post regulatory period (1993-1997). Firm-specific, paired T-tests provide a direct test of hypothesis 1. The post-regulatory period (1993-1997) firm-specific mean market-to-book ratio (1.572) is greater than the regulatory period (1970-1990) market-to-book ratio (0.965). Given the positive market reaction to FERC Order No. 888, the post-regulatory period was partitioned into two periods: before (1993-1995) and after (1996-1997) FERC Order No. 888. However, under both partitions, the market-to-book ratio is greater than the regulatory market-to-book ratio. Furthermore, the market-to-book ratio during the legislative period (1991-1992) is greater than the regulatory market-to-book ratio. Thus, all tests indicate that hypothesis 1 is not supported. The results are summarized in Table 4. Partitioning the sample into firms that have net stranded costs and firms that have net stranded benefits leads to similar results.

5.2. Hypothesis 2a, b, and c

Hypothesis 2a predicts that firm-specific total stranded costs are related to the change in the market value-book value relation across periods: the regulatory period versus the post-regulatory period. Hypothesis 2b predicts that the decline in the market value-book value relation across periods should be greater in unfavorable state regulatory environments. Hypothesis 2c predicts that the decline in the market value-book value relation across periods should be greater for firms with more stranded costs in unfavorable state regulatory environments.

Equation (1) provides a direct test of hypotheses 2a, 2b and 2c. Table 5 presents results for tests of hypotheses 2a, 2b, and 2c. The correlations among independent variables are presented in Table 6. The stranded costs coefficient (a_1) is negative as predicted, but insignificant. Thus, H2a is not supported. The state regulatory environment coefficients (a_2 and a_3) are both negative as predicted, but only the average state regulatory environment is significant. Thus, H2b is only marginally supported. The interaction coefficients (a_4 and a_5) are not directionally consistent with the predictions, and are insignificant. Hence, H2c is not supported.[8]

Equation (1) was also estimated using Resource Data International's low and high estimates for long-term purchase contracts. The results shown in Models B and C, respectively of Table 5 are consistent with the base case results reported in Model A. Models D and E of Table 5 reveal the results of partitioning

[8] Research Data Inc.'s estimates for the individual stranded cost components (generating assets, regulatory assets and purchase contracts) were substituted for the total stranded cost estimates in equation (1). In this specification, only H2b is marginally supported.

the sample into firms with stranded costs and firms with stranded benefits. Model E shows that none of the hypotheses are supported for firms with stranded benefits. However, Model D demonstrates that H2a is supported and H2b and H2c are marginally supported for firms with stranded costs.

5.3. Additional Analyses and Sensitivity Tests

5.3.1. Hypothesis 1

Contrary to the predictions in section 3.1.4, the results presented in Section 5.1 clearly demonstrate an increase in the market-to-book ratio during the post-regulatory period. Exhibit 1 shows the electric utility industry market-to-book ratio increasing over time (1970-1997), and Exhibit 2 shows that the % change in the electric utilities mean market value (price) closely matches the % change in the S&P 500 Composite. The increase in the market-to-book ratio is inconsistent with the significantly negative effects on stock values documented by Johnson et al., [1998], and the neutral stock price reaction documented by Besanko et al., [2001]. However, the effects documented by Johnson et al., [1998] and Besanko et al., [2001] are based on abnormal returns. When additional analysis conducted in this study is combined with their findings, it appears that both the general stock market and electric utilities experienced positive market movements in the post-regulatory period. However, absent the positive effects of the general market movements, electric utility market-to-book ratios are lower during the post-regulatory period.

To evaluate whether general stock market movements might explain the increasing market-to-book ratio for electric utilities, an additional analysis was

performed. The following model was estimated to examine the possible effects of general market movements in the regulatory period versus the post-regulatory period:

$$M/B_{i,t} = a_0 + a_1 \text{Dummy} + a_2 M/B_{index,t} + a_3 M/B_{index,t} * \text{Dummy} + e_{i,t} \quad (4)$$

Where: $M/B_{i,t}$ = *Market-to-book ratio, utility i, period t;*
$M/B_{index,t}$ = *Market-to-book ratio, index, period t;*
Dummy =*equals 1 during the post-regulatory period (1993-1997), and 0 during the regulatory period (1970-1990).*

The annual market-to-book index ($M/B_{index,t}$) was calculated for all firms in Compustat (1970-1997) excluding electric utilities and financial services firms.

The coefficient on the interactive variable, a_3, is positive and significant while the coefficient on the dummy variable, a_1, is significant and negative. The results suggest general market movements as an explanation for the increase in electric utility market-to-book ratios. Furthermore, the electric utility market-to-book ratios appear to be more responsive to general market movements during the post-regulatory period. The negative coefficient on the dummy variable suggests that aside from the positive effects of the general market movements, the electric utility market-to-book ratios are lower during the post-regulatory period than in the regulatory period.

Alternatively, the unanticipated increase in the market value-book value relation could be due to other factors. For example, while increased competition due to deregulation was expected to reduce market value of firms with excess

capacity, deregulation would also allow some firms to focus on their competitive strengths, exploit their excess capacity, and actually increase their market concentration and monopoly power. Consequently, these sustainable advantages may lead to an increase in the market value-book value relation in the post-regulatory period for some firms.

5.3.2. *Hypotheses 2a, 2b and 2c*

By the end of 1997, eleven states had enacted restructuring legislation. There were thirty-three firms operating in those jurisdictions. To examine the impact of legislation on investors' valuation of stranded cost exposure, a legislative indicator variable (LEG) was added to equation (1). LEG equals 1 if the utility operates in one of the eleven jurisdictions with enacted legislation in 1997, and 0 otherwise. Also, LEG was interacted with the stranded cost variable. The results of this sensitivity are reported in Table 7. LEG is negative and significant, however, the interaction with stranded costs while negative is insignificant. This suggests that legislation is not significantly associated with investors' valuation of stranded cost exposure.

To examine the impact of volatility on investors' valuation of stranded long-term purchase contracts, equation (1) was modified to include VOL, a volatility indicator variable. Research Data Inc.'s estimates for the stranded cost components (generating assets, regulatory assets, and purchase contracts) were used in place of total stranded costs. VOL equals 1 if the utility operates in a region that has high volatility and 0 otherwise. Also, VOL was interacted with

the estimate for long-term purchase contracts. VOL is positive and significant, and the interaction with purchase contracts is positive but insignificant.

CHAPTER 6

HYPOTHESIS TESTING: DETERMINANTS OF TIMING IN THE STRANDED COST WRITE-OFF DECISION

6.1. Hypotheses 3, 4, 5a and 5b

Hypothesis 3 predicts that utilities operating in more unfavorable state regulatory environments are more likely to defer stranded cost write-offs. Hypothesis 4 predicts that less competitive utilities with higher competitive exposure index values are more likely to defer stranded cost write-offs. Hypothesis 5a (5b) predicts that utilities with unexpected increases (unexpected decreases) in current ROE are more likely to write-off stranded costs initially.

A group means comparison (write-off firms versus non write-off firms) was used to consider whether various regulatory, competitive, and financial factors are associated with a utility's discretionary choice to write-off stranded costs. The means comparisons are shown in Table 8. The results for the state regulatory environment variable (H3) are mixed. The competitive exposure index indicates lower scores or more competitive firms reporting write-offs which is directionally consistent with H4. Firms reporting write-offs have larger increases on average in ROE than firms deferring write-offs, which is directionally consistent with H5a and the "income smoothing" argument. However, there is no support for H5b, the "big bath" argument, as firms with smaller decreases are reporting write-offs. Furthermore, size is significant in all tests, and on average, larger firms reported stranded cost write-offs.

The logistic model in equation 2 is a direct test of hypotheses 3, 4, 5a and 5b. The results are presented in Table 9. The correlations among the independent variables are presented in Table 10. Model A of Table 9 includes 3 firms that have estimated stranded benefits. Model B excludes the 3 firms that have estimated stranded benefits. None of the 28 firms reported a change in management, therefore the ΔMGT variable is excluded from the results. The state regulatory environment coefficient (b_1) is not significant or directionally consistent with the prediction, hence H3 is not supported. The competitive exposure index coefficient (b_2) is not significant or directionally consistent with the prediction, hence H4 is not supported. However, the coefficient of the competitive exposure index (b_2) is marginally significant at 0.10, although directionally inconsistent. The ROEUP and ROEDOWN coefficients (b_3 and b_4) are also insignificant and directionally inconsistent, hence H5a and 5b are not supported.

6.2. Additional Analysis

A tobit model (equation 3) was also estimated to test hypotheses 3, 4, 5a and 5b. The results are presented in Table 11 and are consistent with the logistic model results discussed in section 6.1 and presented in Table 9. None of the hypotheses are supported.

CHAPTER 7

CONCLUSIONS

Recent federal and state deregulation has increased competition in the electricity generation industry and as a result, the market's perception of the recoverability of certain stranded costs may affect the relation between market value and book value. This study examines the relation between electric utility market value and book value over time, and investigates the determinants of a utility's discretionary choice to write-off stranded costs. The evidence demonstrates that market value and book value are no longer aligned. Furthermore, the market value-book value relation has not declined; it has increased throughout the post-regulatory period. There is no evidence that stranded costs are significantly related to the change in the market value-book value relation when examining the entire sample. However, when the sample is partitioned into firms that have stranded costs and firms that have stranded benefits, stranded costs are negatively related to the market value-book value relation. This suggests that the increase in the market value-book value relation is less for firms with stranded costs. This indicates that when examining the entire sample, the effects of stranded costs are being obscured by the effects of stranded benefits.

The market value-book value relation demonstrates a significant negative relation with average state regulatory ratings. This suggests that the increase in the market value-book value relation is less for firms operating in states with average regulatory ratings. However, there is no evidence that the regulatory

ratings (average and below average) condition the relation between stranded costs and the market value-book value relation.

Although contrary to predictions, the results indicate the market value-book value relation has increased throughout the post-regulatory period. However, additional tests demonstrate that the increase in market value may be associated with general market movements. Thus, excluding the general market movements, the additional tests indicate that the market value-book value relation may be lower in the post-regulatory period than in the regulatory period.

A multivariate analysis (logistic model) was used to consider the simultaneous effect of various regulatory, competitive and financial variables on the timing of the stranded cost write-off decision. None of the factors considered in the model were significantly associated with the discretionary choice to write-off stranded costs. However, the sample size is small (N=28) and as a result the tests may have very low power.

This study demonstrates that electric utility market values and book values are not aligned in the post-regulatory period. The findings suggest that deregulation is not associated with a decline in the market value-book value relation. However, firms with stranded costs have not realized as large an increase in the market value-book value relation as firms without stranded costs. There is some indication that the increase in the market value-book value relation is associated with general market movements, which might confound any deregulation effects.

The findings also suggest that a utility's discretionary choice to write-off stranded costs is not associated with potentially negative economic consequences. This study contributes to the existing literature by demonstrating the change in the market value-book value relation, and by testing the effect of negative economic consequences on the discretionary choice to write-off stranded costs.

BIBLIOGRAPHY

Arnold, P. J. and R. H. Cheng, "The economic consequences of regulatory accounting in the nuclear power industry: market reaction to plant abandonments." *Journal of Accounting and Public Policy* 19 (2000) 161-187.

Ayres, F. L., "Characteristics of firms electing early adoption of SFAS 52." *Journal of Accounting and Economics* 8 (1986) 143-158.

Ball, R. J. and C. W. Smith, "The Economics of Accounting Policy Choice." McGraw-Hill, New York. 1992.

Banker, R. D., S. Das, and C. S. Ou, "Shareholder wealth effects of legislative events: The case of airline deregulation." *Public Choice* (91, 1997) 301-331.

Beaver, W., C. Eger, S. R. Ryan, and M. Wolfson, "Financial Reporting, Supplemental Disclosures, and Bank Share Prices." *Journal of Accounting Research,* Vol. 27 No. 2, Autumn 1989, 157-178.

Beneish, M. D., "The Effect of Regulatory Changes in the Airline Industry on Shareholders' Wealth." *Journal of Law and Economics,* (October 1991) 395-430.

Besanko, D., J. D'Souza and S. R. Thiagarajan, "The Effect of Wholesale Market Deregulation on Shareholder Wealth in the electric power industry." *Journal of Law and Economics* Vol. XLIV April 2001), 65-88.

Blacconiere, W. G., M.. F. Johnson, and M. S. Johnson, "Stranded Costs and Competitive Forces in the Electric Utility Industry." *Journal of Accounting, Auditing and Finance* (Summer 1997) 199-219.

Bowen, R. M.. and E. W. Noreen, "Determinants of the Corporate Decision to Capitalize Interest." *Journal of Accounting and Economics* 3 (August, 1981) 151-179.

Burgstahler, D. and I. Dichev, "Earnings management to avoid earnings decreases and losses." *Journal of Accounting and Economics* 24 (1) 1997, 99-126.

Cahan, S., "The effect of antitrust investigations on discretionary accruals: a refined test of the political-cost hypothesis." *The Accounting Review* 67 (1992), 77-95.

Crew, M. A. and P. R. Kleindorfer, "Stranded assets in network industries in transition." *Regulation Under Increasing Competition*, edited by Michael A. Crew, 1999, 95-104. Kuwer Academic Publishers.

Daley, L. A. and R. L. Vigeland, "The Effects of Debt Covenant and Political Costs on the Choice of Accounting Methods: The Case of Accounting for R&D Costs." *Journal of Accounting and Economics* 5 (December, 1983) 195-211.

D'Souza, Julia, "The Stock price impact of mandated accounting charges on rate-regulated firms" *Review of Accounting Studies* 5, 235-257 (2000).

D'Souza, J. M., "Rate-Regulated Enterprises and Mandated Accounting Changes: The Case of Electric Utilities and Post-Retirement Benefits Other than Pensions (SFAS No. 106)." *The Accounting Review* (July 1998) 387-410.

DeAngelo, H., L. DeAngelo, and D. J. Skinner, "Accounting choice in troubled companies." *Journal of Accounting and Economics* 17 (½) 1994, 113-143.

Edison Electric Institute, Defining the terms of a changing industry, Washington, D. C. (February 2000).

El-Gazzar, S. M. and A. J. Sannella, "The Effects of Airline Deregulation on Shareholder Wealth: Some Additional Evidence." *American Economic Journal* (June 1996) 144-154.

Elliott, J. A. and W. H. Shaw, "Write-offs as accounting procedures to manage perceptions." *Journal of Accounting Research* (Supplement 1988) 91-119.

Fama, E. F. and K. R. French, "The cross-section of expected stock returns." *Journal of Finance* (1992): 47, 427-465.

Francis, J., J. D. Hanna and L. Vincent, "Causes and effects of discretionary asset write-offs." *Journal of Accounting Research* (Supplement 1996) 117-134.

Freemont, P. B., R. K. Hornstra and S. D. Abbott, "Stranded costs will threaten credit quality of US electrics." Moody's Investors Service Global Credit Research, New York, 1995, p. 1-18.

Gebhardt, W. R., C. M. Lee and B. Swaminathan, "Toward an implied cost of capital." Cornell University Working paper, 2000. Forthcoming, *Journal of Accounting Research*, 2001.

Hagerman, L. R. and M. E. Zmijewski, "Some Economic Determinants of Accounting Policy Choice." *Journal of Accounting and Economics* 1 (August, 1979) 141-161.

Hand, J. R. M.. and T. R. Skantz, "The economic determinants of accounting choices: the unique case of equity carve-outs under SAB 51." *Journal of Accounting and Economics* 24 (2) 1997, 175-204.

Healy, P. "The effect of bonus schemes on accounting decisions."*Journal of Accounting and Economics* 7 (1-3) 1985, 85-107.

Holthausen, R. W. and R. Leftwich, "The economic consequences of accounting choice: implications of costly contracting and monitoring." *Journal of Accounting and Economics* 5 (12) 1983, 77-117.

Hughes II, K. E., "The Value Relevance of Nonfinancial Measures of Air Pollution in the Electric Utility Industry." *The Accounting Review* (April 2000) 209-228.

Jones, J., "Earnings management during import relief investigations." *Journal of Accounting Research* 29 (1991), 193-228.

Johnson, M. S., M. S. Niles and S. L. Suydam, "Regulatory changes in the electric utility industry: Investigation of effects on shareholder wealth." *Journal of Accounting and Public Policy* 17 (1998) 285-309.

Johnson, P. L., "Our changing industry." *Electric Light & Power* (December 1995) 17.

Journal of Commerce. (April 26, 1996). 1.

Kalay, A., "Stockholder-bondholders Conflicts and Dividend Constraints." *Journal of Financial Economics* 10 (July) 211-233.

Kihm, S. G., "Who really benefits from utility growth?" *Public Utilities Fortnightly* February 15, 1992 129 n4 18-20.

Kim, M. S. and W. Kross, "The impact of the 1989 change in bank capital standards on loan loss provisions and loan write-offs." *Journal of Accounting and Economics* 25 (1) 1998, 69-99

Knutson, K., "Investor-owned utilities: adjusting the focus." *Public Utilities Fortnightly* (October 1997) 135-154.

Kothari, S. P. and J. L. Zimmerman, "Price and return models." *Journal of Accounting and Economics*, 20 (1995) 155-192.

Loudder, M.. L., I. Khurana and J. R. Boatsman, "Market Valuation of Regulatory Assets in Public Utility firms." *The Accounting Review*, (July 1996) 357-373.

Loxley, C. J., "An Economic Analysis of the Stranded Cost Issue Facing Electric Utilities and Policymakers Today."*Regulation Under Increasing Competition*, edited by Michael A. Crew, 1999, 95-104. Kuwer Academic Publishers.

Mills, J. R. and J. H. Yamamura, "The power of cash flow ratios." *Journal of Accountancy*, October 1998 v186 n4 53-59.

Moody's Investors Service Global Credit Research, New York, 1996, p. 1-13.

Moody's Investors Service Global Credit Research, New York, 1995, p. 1-18.

Moore, M.. L., "Management Changes and Discretionary Accounting Decisions." *Journal of Accounting Research* (Spring 1973): 100-107.

Nelson, K. K., "Fair value accounting for commercial banks: An empirical analysis of SFAS No. 107." *The Accounting Review*, Volume 71, No. 2 (April 1996) 161-182.

Nwaeze, E. T., "Regulation and the Valuation Relevance of Book Value and Earnings: Evidence from the United States." *Contemporary Accounting Research* (Winter 1998) 547-573.

Pagach, D. and R. Peace, "Utility deregulation and stranded investments." Critical Perspectives on Accounting (2000) 11, 627-644.

Patten, D. M. and J. R. Nance, "Regulatory cost effects in a good news environment: the intra industry reaction to the Alaskan oil spill." *Journal of Accounting and Public Policy* 17 1998 (4/5), 409-429.

Ros, A. J., J. L. Domagalski and P. R. O'Connor, "Stranded Costs: Is the Market Paying Attention?" *Public Utilities Fortnightly* (May 1996) 18-21.

Schipper, K., R. Thompson and R. Weil, "Disentangling Interrelated Effects of Regulatory Changes on Shareholder Wealth: The Case of Motor Carrier Deregulation." *Journal of Law and Economics*, (April 1987) 67-100.

Seiple, C., "Stranded Investment: The Other Side of the Story." *Public Utilities Fortnightly* (March 1997) 10-11.

Smith, C. W. and J. B. Warner, "On financial contracting: An analysis of bond covenants." *Journal of Financial Economics*, June 1979, 117-161.

Soo, B. S., "Accrual response to mandated accounting principles: the case of SFAS Nos. 2 and 34." *Journal of Accounting and Public Policy* 18 1999 (1), 59-84.

Spiller, P. T., "The differential impact of airline regulation on individual firms and markets: An empirical analysis." *Journal of Law and Economics* (26, 1983) 655-689.

Standard & Poor's Industry Surveys, Standard & Poor's Corporation, New York (February 2000).

Strong, J. and J. Meyer, "Asset write-downs: management incentives and security returns." *Journal of Finance* (July 1987): 643-64.

Studness, C. M., "Recovering stranded investment and preserving shareholder wealth." *Public Utilities Fortnightly* (March 1997) 135-139.

Studness, C. M., "The flawed case for stranded cost recovery." *Public Utilities Fortnightly* 133 1995 (3), 38-40.

Teets, Walter, "The Association between Stock Market Responses to Earnings Announcements and Regulation of Electric Utilities." *Journal of Accounting Research* (Autumn 1992) 274-285.

Trebing, H. M., "Structural change and the future of regulation." *Land Economics* (August 1995) 401-414.

Tung, S. S. and J. J. Weygandt, "The Determinants of Timing in the Adoption of New Accounting Standards: A Study of SFAS No. 87, Employers' accounting for Pensions." *Journal of Accounting, Auditing and Finance*, 1994 v 9(2), 325-337.

Watts, R. L. and J. L. Zimmerman, "Towards a positive theory of the determinants of accounting standards. *The Accounting Review*, 1978, 53 (1), 112-134.

Zmijewski, M. E. and R. L. Hagerman, "An income strategy approach to the positive theory of accounting standard setting/choice." *Journal of Accounting and Economics*, August, 1981, 129-150.

TABLE 1

Typical Regulatory Assets[a]

- Extraordinary property losses from storm or other damage and environmental clean-up costs excluding any insurance coverage.

- Unrecovered and abandoned plant and regulatory study costs that would normally be capitalized if carried through to completion, but the utility and regulator agree not to proceed.

- Income taxes that are deferred for recovery through future rates when the tax costs are actually paid.

- Deferred fuel costs which are eligible for recovery through a "true-up" of a fuel adjustment clause.

- Pension and other benefits, including the accrual for future other-than pension employee benefits and early retirement costs-normally expenses under GAAP, these are deferred based on the regulator's promise to allow future recovery.

[a]Loxley, 1999.

TABLE 1

Typical Regulatory Assets

- **Demand-side management costs[b] which are frequently "lumpy" in nature or time and deferred for collection through future rates to spread the costs over the period of expected benefits.**

[b]Demand-side management includes the planning, implementation, and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage.

TABLE 2

Panel A (all firms)

DESCRIPTIVE STATISTICS OF FIRMS

ITEM	*N*	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
M/B '70-'90	87	0.965	0.392	0.551	3.986	0.887
M/B '90	86	1.380	0.411	0.482	3.558	1.304
M/B '91-'97	88	1.597	0.447	0.859	3.548	1.523
M/B '93-'97	88	1.572	0.465	0.738	3.578	1.473
M/B '97	88	1.797	0.578	0.582	4.486	1.704
RISK '86-'90	87	0.872	0.937	0.153	8.043	0.659
RISK '93-'97	84	0.923	1.542	0.250	14.356	0.690
REG '97	84	2.071	0.576	1.000	3.000	2.000
ROE '97	85	0.110	0.069	-0.155	0.477	0.107
BK VAL '97	84	2,091.61	2,135.08	91.196	9,763.39	1,329.45
S COSTS	87	1,328.17	2,519.83	-1,882.65	9,647.85	445.90
GEN	87	273.98	1,548.47	-3,250.32	8,075.17	41.98
REG	87	592.25	936.19	-88.24	6,608.72	261.76
PC	87	461.93	1,187.95	-1,143.48	7,865.74	39.56

M/B (Market-to-book) is defined as market value of equity divided by book value of equity.
RISK is defined as 5 year average of total long-term debt divided by market value of equity.
REG is defined as state regulatory environment rating, 1=below average, 2=average, 3=above average.
ROE is defined as return on equity.
BK VAL is defined as book value of equity.
S COSTS is defined as total stranded costs as estimated by Research Data Inc. (in millions).
GEN is defined as stranded generating assets as estimated by Research Data Inc. (in millions).
REG is defined as stranded regulatory assets as estimated by Research Data Inc. (in millions).
PC is defined as stranded long-term purchase contracts as estimated by Research Data Inc. (in millions).

TABLE 2

Panel B (firms with stranded costs)

DESCRIPTIVE STATISTICS OF FIRMS

ITEM	*N*	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
M/B '70-'90	53	0.952	0.454	0.551	3.986	0.884
M/B '90	52	1.238	0.247	0.482	1.926	1.228
M/B '91-'97	54	1.473	0.381	0.859	3.331	1.430
M/B '93-'97	54	1.451	0.403	0.738	3.331	1.387
M/B '97	54	1.623	0.428	0.582	2.685	1.610
RISK '86-'90	53	1.090	1.139	0.153	8.043	0.822
RISK '93-'97	52	1.140	1.930	0.250	14.356	0.795
REG '97	53	2.019	0.571	1.000	3.000	2.000
ROE '97	52	0.099	0.078	-0.155	0.478	0.103
BK VAL '97	52	2,530.96	2,279.63	114.06	9,763.39	1,971.81
S COSTS	54	2,395.16	2,669.22	817.00	9,647.85	1,216.97
GEN	54	798.85	1,680.08	-1,164.14	8,075.17	317.68
REG	54	854.11	1,078.21	-26.83	6,608.72	531.98
PC	54	742.20	1,422.93	-567.22	7,865.74	193.79

All variables are defined in Panel A.

TABLE 2

Panel C (firms with stranded benefits)

DESCRIPTIVE STATISTICS OF FIRMS

ITEM	*N*	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
M/B '70-'90	33	0.988	0.278	0.687	2.100	0.901
M/B '90	33	1.605	0.517	1.165	3.558	1.471
M/B '91-'97	33	1.803	0.482	1.175	3.548	1.699
M/B '93-'97	33	1.773	0.502	0.972	3.578	1.693
M/B '97	33	2.087	0.682	0.931	4.486	1.880
RISK '86-'90	33	0.526	0.223	0.209	0.992	0.478
RISK '93-'97	32	0.571	0.175	0.310	0.965	0.540
REG '97	31	2.161	0.583	1.000	3.000	2.000
ROE '97	32	0.127	0.048	0.032	0.268	0.123
BK VAL '97	31	1,395.82	1,699.54	91.20	7,541.40	748.74
S COSTS	33	-417.81	446.29	-1,882.65	-16.99	-221.57
GEN	33	-584.89	737.13	-3,250.32	244.74	-261.43
REG	33	163.76	353.52	-88.24	1,706.83	39.64
PC	33	3.32	299.65	-1,143.48	796.97	9.00

All variables are defined in Panel A.

TABLE 3

PANEL A

(All Firms, N=28)

DESCRIPTIVE STATISTICS OF FIRM CHARACTERISTICS

ITEM	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
S COSTS	2,223.36	2,601.39	-1,882.65	9,647.85	1,893.26
REG	1.821	0.548	1.000	3.000	2.000
DEBT RATIO	0.474	0.077	0.240	0.610	0.480
INT COV	3.212	1.103	0.722	5.906	3.250
INT EXP	248.846	253.134	7.900	1,160.000	177.100
M/B '97	1.465	0.377	0.582	2.097	1.587
ROE	0.268	0.116	0.037	0.577	0.264
ROE CHG	0.005	0.123	-0.419	0.218	0.006
CEI	15.607	7.549	3.000	31.000	15.000
SIZE	1.694	1.227	-1.156	3.999	1.883
TOT ASSETS	9,797.53	11,057.02	314.800	54,548.00	6,571.85
OP INC	700.418	665.132	4.100	2,900.00	590.050
EBIT	706.879	635.978	5.700	2,730.000	597.300
NET INC	80.250	402.647	-1,497.100	712.700	77.200

S COSTS is defined as total stranded costs as estimated by Research Data Inc. (in millions).
WRITE-OFF is defined as the amount of the stranded cost write-off (in millions).
REG is defined as the state regulatory environment rating, 1=below average, 2=average, 3=above average.
DEBT RATIO is defined as total long term debt divided by book equity.
INT COV is defined as earnings before interest and taxes divided by interest expense.
INT EXP is defined as total interest expense. (in millions).
ROE is defined as return on equity.

ROE CHG is defined as the change in ROE versus the prior year.
CEI is defined as Research Data Inc.'s competitive exposure index score.
SIZE is defined as the natural logarithm of total assets (in millions).
TOTASSETS is defined as total assets (in millions).
OP INC is defined as operating income (in millions).
EBIT is defined as earnings before interest and taxes (in millions).
NI is defined as net income (in millions).

TABLE 3

PANEL B

(Write-off firms, N=13)

DESCRIPTIVE STATISTICS OF FIRM CHARACTERISTICS

ITEM	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
S COSTS	2,811.96	2,199.93	-1,079.67	7,352.33	2,453.10
WRITE-OFF	668.954	878.938	40.300	3,100.000	370.900
REG	1.846	0.555	1.000	3.000	2.000
DEBT RATIO	0.490	0.063	0.335	0.610	0.490
INT COV	3.031	0.744	2.149	4.278	2.799
INT EXP	309.877	154.837	150.700	601.000	255.000
M/B '97	1.536	0.315	0.723	1.980	1.605
ROE	0.309	0.093	0.187	0.510	0.273
ROE CHG	0.040	.097	-0.102	0.218	0.003
CEI	14.077	6.825	3.000	29.000	15.000
SIZE	2.318	0.451	1.720	2.945	2.270
TOT ASSETS	11,156.48	5,030.87	5,583.000	19,015.000	9,683.800
OP INC	891.038	417.399	324.400	1,794.000	896.100
EBIT	905.162	409.640	345.400	1,776.000	893.000
NET INC	7.400	550.302	-1,497.100	644.000	167.900

All variables are defined in Panel A.

TABLE 3

PANEL C

(Non write-off firms, including firms with stranded benefits, N=15)

DESCRIPTIVE STATISTICS OF FIRM CHARACTERISTICS

ITEM	*MEAN*	*STD DEV*	*MIN*	*MAX*	*MEDIAN*
S COSTS	1,713.23	2,881.36	-1,882.65	9,647.85	725.98
REG	1.800	0.561	1.000	3.000	2.000
DEBT RATIO	0.459	0.087	0.240	0.592	0.460
INT COV	3.369	1.347	0.712	5.906	3.686
INT EXP	195.953	310.758	7.900	1,160.000	57.400
M/B '97	1.404	0.425	0.582	2.097	1.456
ROE	0.232	0.126	0.037	0.577	0.235
ROE CHG	-0.026	0.138	-0.419	0.125	0.008
CEI	16.933	8.119	7.000	31.000	16.000
SIZE	1.153	1.434	-1.156	3.999	0.901
TOT ASSETS	8,619.77	14,521.97	314.800	54,548.00	2,462.90
OP INC	535.213	800.553	4.100	2,900.000	186.4000
EBIT	535.033	753.701	5.700	2,730.00	215.400
NET INC	143.387	209.521	-35.100	712.700	60.800

All variables are defined in Panel A.

TABLE 4

MARKET-TO-BOOK RATIO

No. of FIRMS	PERIOD	MARKET-TO-BOOK RATIO
87	Regulatory (1970-1990)	0.965*
88	Post-regulatory (1993-1997)	1.572**
86	Pre-FERC Order No. 888 (1993-1995)	1.506**
88	Post-FERC Order No. 888 (1996-1997)	1.646**
86	Legislative (1991-1992)	1.646**

*Indicates not statistically different from 1 at .05.
**Indicates statistically different from the regulatory period, 1970-1990 at .05.

TABLE 5

TESTS OF HYPOTHESES 2a, 2b AND 2c

PARAMETER ESTIMATES FROM EQUATION (1)

$$(MV/BV)_{i,yr} - (MV/BV)_{i,r} = a_0 + a_1 SC_{i,yr} + a_2 REGHI_{i,yr} + a_3 REGMD_{i,yr} + a_4 SC_{i,yr} * REGHI_{i,yr} + a_5 SC_{i,yr} * REGMD_{i,yr} + a_6 RISK_i + a_7 ROE_{i,yr} + e_i$$

(-) (-) (-) (-) (-)

	N	a_0	a_1	a_2	a_3	a_4	a_5	a_6	a_7
Model A[1]	79	0.098	-0.106	-0.008	-0.217*	0.198	0.097	0.027	2.630*
Model B[2]	79	0.102	-0.104	-0.005	-0.216*	0.186	0.093	0.029	2.603*
Model C[3]	79	0.093	-0.107	-0.015	-0.218*	0.214	0.101	0.026	2.673*
Model D[4]	50	0.577*	-0.712*	-0.367	-0.565*	0.721*	0.641*	0.055	2.400*
Model E[5]	28	0.183	0.401	-1.172	-0.221	-20.195	-0.300	-0.148	2.296
Expected sign			(-)	(-)	(-)	(-)	(-)		

[1]Base case, all firms
[2]Includes low estimate for long-term purchase contracts, all firms
[3]Includes high estimate for long-term purchase contracts, all firms
[4]Base case, firms with stranded costs
[5]Base case, firms with stranded benefits
*indicates significance at 0.05.

$MV/BV_{i,r}$ = Market-to-book ratio, firm *i*, regulatory 5 yr average, 1986-1990;
$SC_{i,yr}$ = Total stranded costs, firm *i*, in 1997, scaled by the book value of equity;
$REGHI_{i,yr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is below average, and 0 otherwise in 1997;
$REGMD_{i,yr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is average, and 0 otherwise in 1997;
$RISK_i$ = Total long-term debt to market value of equity, post regulatory 5 yr average (1993-1997) minus regulatory 5 yr average (1986-1990), firm *i*;
$ROE_{i,yr}$ = Return on equity, firm *i*, in 1997.

TABLE 6

CORRELATIONS AMONG INDEPENDENT VARIABLES

(N=79)

	SC	REGMD	REGHI	SC*REGMD	SC*REGHI	RISK	ROE
SC	1.000	0.152	0.082	-0.981	-0.674	-0.078	0.079
REGMD	0.152	1.000	0.401	-0.187	-0.121	0.019	-0.095
REGHI	0.082	0.401	1.000	-0.083	-0.542	0.026	-0.017
SC*REGMD	-0.981	-0.187	-0.083	1.000	0.672	0.036	-0.020
SC*REGHI	-0.674	-0.121	-0.542	0.672	1.000	-0.058	0.130
RISK	-0.078	0.019	0.026	0.036	-0.058	1.000	-0.531
ROE	0.079	-0.095	-0.017	-0.020	0.130	-0.531	1.000

All variables are defined in Table 5.

TABLE 7

TESTS OF HYPOTHESES 2a, 2b AND 2c

PARAMETER ESTIMATES FROM EQUATION (1)

$$(MV/BV)_{i,pr} - (MV/BV)_{i,r} = a_0 + a_1 SC_{i,pr} + a_2 REGHI_{i,pr} + a_3 REGMD_{i,pr} + a_4 SC_{i,pr} * REGHI_{i,pr} + a_5 SC_{i,pr} * REGMD_{i,pr} + a_6 RISK_i + a_7 ROE_{i,pr} + a_8 LEG_i + a_9 LEG_i * SC_{i,pr} + e_i$$

		(-)	(-)	(-)	(-)					
N	**a_0**	**a_1**	**a_2**	**a_3**	**a_4**	**a_5**	**a_6**	**a_7**	**a_8**	**a_9**
79	0.183**	0.044	-0.046	-0.197*	0.081	0.034	0.030	2.211*	-0.144**	-0.090
Expected sign		(-)	(-)	(-)	(-)	(-)				

*indicates significance at 0.05.

**indicates significance at 0.07.

$MV/BV_{i,r}$ = Market-to-book ratio, firm *i*, regulatory 5 yr average, 1986-1990;

$SC_{i,pr}$ = Total stranded costs, firm *i*, in 1997, scaled by the book value of equity;

$REGHI_{i,pr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is below average, and 0 otherwise in 1997;

$REGMD_{i,pr}$ = A dummy variable, firm *i*, equal to 1 if the state regulatory environment rating is average, and 0 otherwise in 1997;

$RISK_i$ = Total long-term debt to market value of equity, post regulatory 5 yr average (1993-1997) minus regulatory 5 yr average (1986-1990), firm *i*;

$ROE_{i,pr}$ = Return on equity, firm *i*, in 1997;

LEG_i = Equal to 1 if the utility operates in one of the eleven jurisdictions with enacted legislation in 1997, 0 otherwise.

TABLE 8

MEANS COMPARISONS

VARIABLE	Column B N=13 Firms reporting write-offs	Column C N=12 Firms deferring write-offs[1]	Column D N=15 Firms deferring write-offs[2]	Hypotheses
State Regulatory Environment (REG)	1.846	1.917	1.800	H3: Col C (Col D) < Col B
Competitive Exposure Index (CEI)	14.077	18.583	16.933	H4: Col C (Col D)> Col B
ROEUP	0.091	0.058	0.057	H5a: Col C (Col D) < Col B
ROEDOWN	-0.042	-0.135	-0.120	H5b: Col C/(Col D) > Col B
SIZE	2.318	1.135*	1.153*	
RDI Estimated Stranded Costs (000's)	2,811.96	2,371.44	1,713.23	
Debt Ratio	0.490	0.456	0.459	
Interest Coverage Ratio	3.031	3.418	3.369	
Interest Expense (000's)	309.877	144.825*	195.953	
ROE	0.309	0.195*	0.232	
Total Assets (000's)	11,156.48	6,072.83	8,619.77	
Operating Income (000's)	891.038	413.958*	535.213	
EBIT (000's)	905.162	428.200*	535.033	
Net Income (000's)	7.400	154.117	143.387	

[1]Excludes 3 firms with estimated stranded benefits.
[2]Includes 3 firms with estimated stranded benefits.
*Indicates significantly different (at 0.05) from firms reporting write-offs.
REG = State regulatory environment rating, 1=below average, 2= average, 3=above average;
CEI = Competitive Exposure Index. Lower values indicate a more competitive position;
ROEUP =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if > 0, otherwise 0;
ROEDOWN =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if < 0, otherwise 0;
SIZE = Natural logarithm of total assets (in millions);
DEBT RATIO = LTD/Book Equity;
INT COV RATIO = EBIT/Interest Expense.

TABLE 9

TESTS OF HYPOTHESES 3, 4, 5a AND 5b

\PARAMETER ESTIMATES FROM EQUATION (2)

$$\text{Stranded Cost Write-offs}_{i,t} = b_0 + b_1 \underset{(+)}{\text{REG}_{i,t}} + b_2 \underset{(-)}{\text{CEI}_{i,t}} + b_3 \underset{(+)}{\text{ROEUP}_{i,t}} + b_4 \underset{(-)}{\text{ROEDOWN}_{i,t}} + b_5 \text{SIZE}_{i,t} + b_6 \text{REORG}_{i,t} + \mu_{i,t}$$

	N	b_0	b_1	b_2	b_3	b_4	b_5	b_6
Model A[1]	28	2.263	-0.889	0.150**	-9.700	4.539	-1.350*	0.654
Model B[2]	25	4.762	-2.200	0.358**	-15.122	17.834	-3.242*	1.627
Expected sign			(+)	(-)	(+)	(-)		

[1]Includes 3 firms with estimated stranded benefits.
[2]Excludes 3 firms with estimated stranded benefits.
*Indicates significance at 0.05.
**Indicates significance at 0.10.

Stranded Cost Write-offs $_{i,t}$ =1 if stranded costs are written-off initially (i.e., within the first year of passage of the state deregulation order), and 0 if stranded costs are *not* written- off initially (i.e., deferred write-offs);

REG = State regulatory environment rating, 1=below average, 2=average, 3=above average;

CEI = Competitive Exposure Index. Lower values indicate a more competitive position;

ROEUP =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if > 0, otherwise 0;

ROEDOWN =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if < 0, otherwise 0;

SIZE = Natural logarithm of total assets (in millions);

REORG =Indicates a major reorganization or restructuring in the year following passage of the state deregulation order.

TABLE 10

CORRELATIONS AMONG INDEPENDENT VARIABLES

(N=28)

	REG	CEI	ROEUP	ROEDOWN	SIZE	REORG
REG	1.000	-0.367	0.286	-0.260	0.221	-0.128
CEI	-0.367	1.000	-0.426	0.325	-0.402	-0.093
ROEUP	0.286	-0.426	1.000	-0.348	0.122	-0.011
ROEDOWN	-0.260	0.325	-0.348	1.000	-0.472	0.124
SIZE	0.221	-0.402	0.122	-0.472	1.000	-0.116
REORG	-0.128	-0.093	-0.011	0.124	-0.116	1.000

All variables are defined in Table 9.

TABLE 11

TESTS OF HYPOTHESES 3, 4, 5a AND 5b

PARAMETER ESTIMATES FROM EQUATION (3)

$$\text{Stranded Cost Write-off amount}_{i,t} = c_0 + c_1 \underset{(+)}{\text{REG}}_{i,t} + c_2 \underset{(-)}{\text{CEI}}_{i,t} + c_3 \underset{(+)}{\text{ROEUP}}_{i,t} + c_4 \underset{(-)}{\text{ROEDOWN}}_{i,t} + c_5 \text{SIZE}_{i,t} + c_6 \text{REORG}_{i,t} + \mu_{i,t}$$

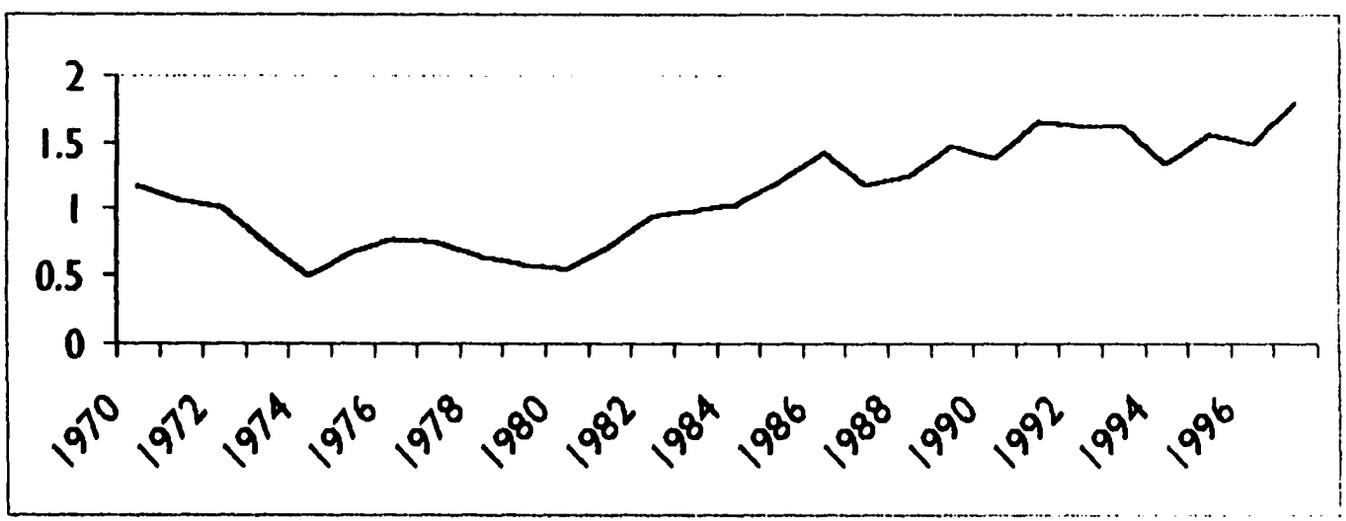
	N	c_0	c_1	c_2	c_3	c_4	c_5	c_6
Model A[1]	28	-0.047	0.008	-0.005	0.161	-0.082	0.047**	-0.055
Model B[2]	25	-0.078	0.017	-0.006	0.076	-0.278	0.074**	-0.075
Expected sign			(+)	(-)	(+)	(-)		

[1]Includes 3 firms with estimated stranded benefits.
[2]Excludes 3 firms with estimated stranded benefits.
*Indicates significance at 0.05.
**Indicates significance at 0.08.

Stranded Cost Write-off amount $_{i,t}$ =reported amount for firms writing-off stranded costs initially (i.e., within the first year of passage of the state deregulation order), deflated by total assets at the end of year t-1, and 0 for non-write-off firms;

REG = State regulatory environment rating, 1=below average, 2= average, 3=above average;
CEI = Competitive Exposure Index. Lower values indicate a more competitive position;
ROEUP =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if > 0, otherwise 0;
ROEDOWN =(Current year operating income before taxes and write-offs / average common equity) – (prior year operating income before taxes / average common equity) if < 0, otherwise 0;
SIZE = Natural logarithm of total assets (in millions);
REORG =Indicates a major reorganization or restructuring in the year following passage of the state deregulation order.

EXHIBIT 1
1970-1997 Market-to-Book

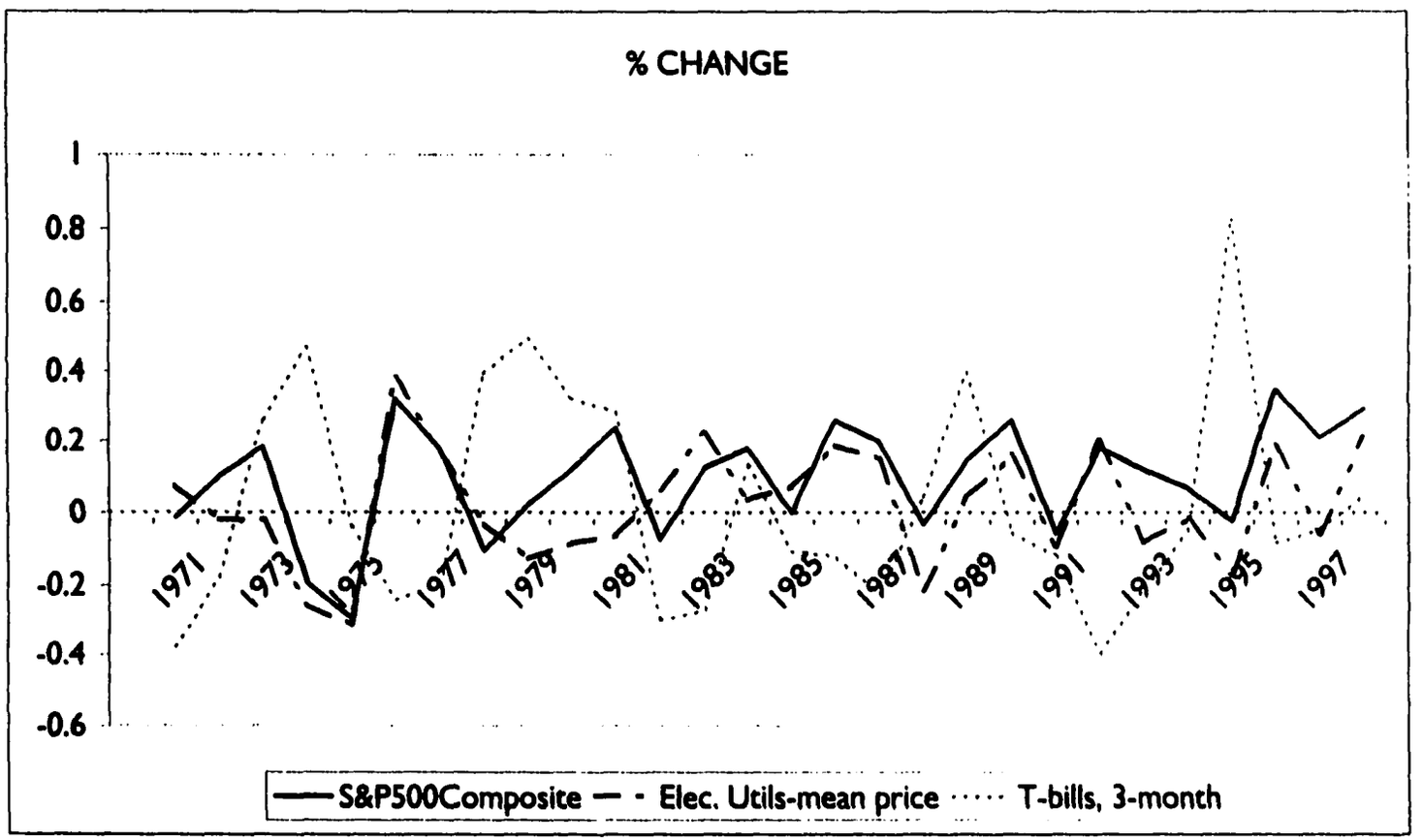


	Market-to-Book (mean)					
	N=87	N=88	STRANDED COSTS/(BENEFITS) 000'S, N=87			
	'70-'90	'91-'97	MIN	MAX	MEAN	TOTAL
ALL FIRMS	0.965*	1.597**	(1,882.65)	9,647.87	1,328.17	115,550.94

*indicates not significantly different from 1 at .05

**indicates significantly different from 1 at .05

EXHIBIT 2


% CHANGE
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
S&P500Composite
Elec. Utils-mean price
T-bills, 3-month