# ACCRUAL MANAGEMENT PATTERN OF ELECTRIC UTILITY FIRMS IN A DEREGULATED ENVIRONMENT

**Santanu Mitra**
**Montclair State University**

## Abstract

The Energy Policy Act of 1992 has changed the economic and competitive environment of electric utility firms by deregulating the industry. Previous studies document that the value-relevance of earnings has increased and a firm's risk characteristic has changed consequent on deregulation. In the present study, I examine whether the changing role of earnings in firm valuation and increase of risk in the deregulated time period have induced electricity firms to engage in more abnormal accrual adjustments to manage earnings in an effort to maintain or improve firm values in the market. Based on a time-series analysis of 81 investor-owned electric utility firms over 15 year period, I find evidence that the sample electricity firms, in general, have exercised greater accounting flexibility/discretion to manage abnormal accruals in the post-deregulation period compared to the regulation period. However, they use such discretion to make greater adjustments of income-decreasing current accruals, which is indicative of more conservative application of GAAP. I do not find any difference in the use of income-increasing abnormal accruals by the sample firms between the two time-periods. Hence, the study produces no evidence of increase in

opportunistic reporting behavior of electricity firms in response to the deregulation. Finally, I observe no significant difference in the adjustment of non-current accruals between the pre and post deregulation period.

## Introduction

In the present study, I examine the accrual management pattern of the investor-owned electric utility firms over a period of time encompassing both the pre and post deregulated environment of the industry. By introducing deregulation, the Energy Policy Act of 1992 has changed the economics and competitiveness of electric utility industry. In the regulated regime, electricity firms were entitled to earn a specific rate of return on their investment from their captive consumer base. As consumers have little option to change electricity providers in their regions, there was little competition among electric utility firms for attracting and retaining consumers. Consumers had to accept and pay the tariff that was set by the regulators for a utility firm after considering its cost of capital and other operating expenses incurred to generate and distribute electricity. However, after deregulation the environment of competition underwent a major change in the electricity sector, which enabled consumers to choose for themselves the best and most suitable one from among various electricity providers. Therefore, under the changed economic and operating conditions electric utility firms are forced to compete with each other to retain and improve the consumer base like firms operating in other unregulated industries.

In the regulated period, the electric utility firms follow the cost-plus pricing system in setting tariffs. Under this system, an electric utility's abnormal earning is zero as regulators set revenues in a manner that makes earning equal to a specified return on book value; hence, there was little opportunity for utility firms to generate abnormal income. If all costs are recoverable and the allowed rate of return on investment is equal to the cost of capital, the market value of equity should approximate the book value. In

this case, book value is the main predictor variable for the equity market value of a firm. Thus, in a rate-regulated environment, book value is expected to possess greater ability to explain a utility firm's market value than earnings indicating that book value has greater value-relevance for the regulated electricity firms.

However, in a deregulated environment, operating flexibility of electricity firms has increased as a result of increasing competition in the industry. This provides opportunity to such firms to generate abnormal earnings either by increasing their consumer base or by fixing tariff based on their unique cost and profitability situations, or, by both. When the utility firms are free to set their own product prices, current earnings should provide an indication of a firm's ability to generate future earnings in the post-deregulation period. This economic situation gives rise to the possibility that reported earning increases in value-relevance compared to book values in the deregulated time period.

Blacconiere et al. (2000) find evidence that the deregulation in the electric utility industry has changed the investors' perceptions of the relative roles of earnings and book value in valuing firms. Book values (earnings) have become less (more) value-relevant in the post-deregulation period. Moreover, Johnson et al. (1998) document that those utility companies have become riskier after deregulation in terms of both the market risk measured by beta and firm-specific risk denoted by abnormal return variance. Their finding indicates that with increase in risk, the value of an electricity firm would be adversely affected unless it maintains the commensurate growth in its abnormal earnings.

Increasing role of accounting earnings in firm valuation and simultaneous increases in both market and firm-specific risks of electric utility firms in the post-deregulation period underscores the importance of earning as a determinant of firm value. With the increase in the role of earnings in explaining stock price variability and with the increase in risk, managers of utility firms may become more sensitive to maintain and improve the reported earnings at a certain level or within a certain range to effectively influence investors' perception about their firms and to counter the negative

effect of increasing risk on firm value. Moreover, managers usually strive to maintain and improve firm value because of a number of economic reasons, e.g., job-security, compensation and debt-covenant violation, financial distress. All those economic factors might induce managers to exploit their latitudes in the application of accounting techniques to manage reported earnings in the deregulated time period.

In the present study, I examine the change in the accrual management pattern of electricity firms in response to the change of regulatory environment which has increased the value-relevance of reported earnings in the deregulated period. By using a sample of 81 investor-owned electricity firms over a 15 year period covering 1986 through 2000, I find evidence that both the accounting flexibility/discretion exercised by those firms to manage abnormal accruals and the magnitude of abnormal accruals have increased in the deregulated time-period compared to the regulated period. It is also observed that the explanatory power of the traditional variables in the accrual model has decreased over the time period under study, further indicating an increase in the use of abnormal accruals by electricity firms in the post-deregulation period. The subsequent analysis, however, reveals that the sample firms have used their accounting discretion to manage more negative (income-decreasing) current accruals, which can be interpreted as the conservative application of GAAP. The analysis does not demonstrate any opportunistic reporting behavior of the sample electric utility firms in the post-deregulation period as is revealed from insignificant difference in the use of income-increasing abnormal accruals by such firms between the two time periods. Finally, the study does not produce any evidence of differential use of non-current accruals between the pre and post deregulation period.

## Research Question and Hypothesis

Based on the view that for electricity firms, managerial propensity to manage accruals exacerbates due to increase in

value-relevance of earnings in the post-deregulation period, I pursue the following research question in the present study:

> Do managers of electric utility firms make greater use of abnormal accruals to manage earnings in the post-deregulation period as compared to the period under regulation?

I predict that increase in value-relevance of reported earnings in the deregulated environment induces managers of electricity firms to adjust abnormal accruals at a greater level in financial reporting for a variety of economic reasons, e.g., to meet or beat earnings benchmark, for job-security, compensation and so forth in the post-deregulation period. This prediction is stated in the following alternative hypothesis as:

> **$H_a$:** Electric utility firms make greater use of abnormal accruals to manage earnings in the post-deregulation period compared to the period under regulation.

### Sample Selection and Descriptive Data

The period of study is 15 years from 1986 to 2000. I cover a sufficiently long period of time before and after the passage of the Energy Policy Act of 1992 to observe accrual management pattern of electricity firms. The sample comprises all investor-owned electric utilities (with Standard Industrial Classification (SIC) codes 4910, 4911 and 4931). I initially select 115 firms having SIC codes of 4910, 4911 and 4931 that are listed in the Compustat Research Insight database; out of which 34 firms are eliminated because of non-availability of complete data set. The final sample comprises 81 electricity firms having all required data for the variables used in the analyses. This has resulted in 1,215 firm-year observations (i.e., 81 firms for 15 years). It is noteworthy that a constant sample of firms is used for the entire period of 15 years. I term the years from 1986 to 1992 as the pre-deregulation period (i.e., seven years) and the years from 1993 to 2000 (i.e.,

eight years) as the post-deregulation period.[1] For the eight year post-regulation period, I make separate analysis for four years (1993-1996) immediately after the deregulation and for four years (1997-2000) when deregulation has already been in effect for a number of years.[2]

## Research Design

Accounting accruals reflect the summarized effects of managers' selection and application of accounting techniques. McNichols and Wilson (1988) suggest that accruals reflect the effect of earnings management in many contexts on an ongoing basis. The undoing of income differences caused by accruals could be difficult because the information required to make these adjustments is not likely to be available (Schipper 1989). If managers manipulate accruals in ways that are hard to monitor, examination of visible accounting choices to discover managerial opportunism in financial reporting would underestimate the opportunistic behavior of managers (Christie and Zimmerman, 1994). Hence, accrual management provides opportunity for managers to conveniently adjust reported earnings to their economic advantage without being easily detected.[3] In this study, I

[1] I include the year 1992 in the pre-deregulation period based on the assumption that the effects of deregulated environment began to impact management's accounting decision in financial reporting from the year after the year in which the Energy Policy Act was passed.

[2] I consider eight years (1993-2000) as the post deregulation period, which can conveniently be separated as the four-year period immediately after deregulation and the four-year period when the deregulation has already in effect for some time. This equal separation provides a uniform basis for comparative analysis of accrual management behavior of electricity firms in the two stages of deregulated period. At the same time, the total time periods under regulation and deregulation are kept almost the same (i.e., seven versus eight years) for the purpose of the analysis.

[3] For example, a manager could produce lower income by increasing bad debt expenses, increasing inventory write-offs, classifying more indirect manufacturing costs as period expenses rather than inventoriable costs, accelerating purchases of inventory at year-end when LIFO is used, extending the use of accelerated depreciation methods, or, by reducing the estimated lives

focus on abnormal accrual adjustment that is deemed to arise out of managerial discretion to manage reported earnings.

## 1. Estimation of Abnormal Accounting Accruals

Following prior research (e.g., Rangan, 1998; Teoh and Wong, 1998; Xie et al., 2003), I consider current (non-cash working capital) accruals as a means to manage earnings. Prior studies observe that managers have greater discretion over current accruals than over long-term accruals. It is easier for managers to manipulate current accruals relative to long-term accruals because they can exercise greater discretion over the choice and application of accounting techniques with regard to regular revenue and expense items.[4] Consistent with techniques employed by prior research to estimate either total accruals or current accruals (e.g., Jones, 1991; Cahan, 1992; Perry and Williams, 1994; Dechow et al., 1995; Rangan, 1998; Pyne and Robb, 2000; Xie et al., 2003), I use the following firm-specific accrual equation to compute current

---

of fixed assets (Cahan, 1992). Similarly, earnings may be increased by early recognition of sales, delayed recognition of expenses, decreasing the bad debt provisions, delaying the purchase of inventories when LIFO is used, classifying more indirect manufacturing costs as inventoriable costs rather than period expenses, or, by extending the use of straight-line method of depreciation, or by increasing the estimated lives of fixed assets.

Subsequent detection of earnings management could be costly for managers. Dechow et al. (1996) find evidence that the firms face significant increases in their costs of capital once earnings manipulations are made public. Dechow et al. (1996) also find that the identification of earnings manipulator is associated with increase in bid-ask spread, a drop in analyst following, increase in short interest rates and an increase in the dispersion of analysts' earnings forecasts.

[4] Sloan (1996) reports that most of the variations in total accruals are driven by current accruals. Moreover, Bradshaw et al. (2001) suggest that current accruals exclude a variety of long-term accruals such as depreciation of plant and equipment and amortization of debt premium/discount which tend to remain fairly constant over time and account for little variations in total accruals.

accruals from the changes in non-cash working capital items as reported in the balance-sheet:

$$CACC_{it} = [\Delta CA_{it} - \Delta Cash_{it}] - [\Delta CL_{it} - \Delta CLD_{it}] \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where, $CACC_{it}$ = Total current accruals for firm i in year t;
$\Delta CA_{it}$ = Change in current assets for firm i in year t;
$\Delta Cash_{it}$ = Change in cash for firm i in year t;
$\Delta CL_{it}$ = Change in current liabilities for firm i in year t;
$\Delta CLD_{it}$ = Change in the current portion of long-term debt for firm i in year t.

Next, I employ an augmented time-series version of the modified Jones accrual model to segregate the abnormal component of current accruals that is deemed to arise out of managerial discretion to manage earnings. For this, the following accrual model is estimated on a firm by firm basis.

$$CACC_{it}/TA_{it-1} = \beta_0 + \beta_1 (\Delta REV_{it} - \Delta REC_{it})/TA_{it-1} + \beta_2 \Delta COGS_{it} /TA_{it-1} + \beta_3 \Delta OCF_{it}/TA_{it-1} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where, $CACC_{it}$ = Current accounting accruals as computed from the equation (1); $\Delta REV_{it}$ = Change in revenues of firm i in year t;
$\Delta REC_{it}$ = Change in accounts receivables of firm i in year t;
$\Delta COGS_{it}$ = Change in cost of goods sold of firm i in year t;
$\Delta OCF_{it}$ = Change in operating cash flows of firm i in year t;
$TA_{it-1}$= Total assets of firm i in year t-1;
$\varepsilon_{it}$ = Error term/residual, a proxy for abnormal current accruals.

In the above equation (2), $\Delta REV - \Delta REC$ accounts for changes in cash revenue which implies changes in the level of business activity and controls for the related non-discretionary component of current accruals. $\Delta COGS$ accounts for changes in the level of expenses that control for the related portion of normal current accruals such as changes in current liabilities, which are

more likely to be affected by changes in expenses rather than revenues. ΔOCF accounts for the effect of changes in operating cash flows on the level of normal accruals and controls for their inverse relationship. The error term/residual, ε, is the portion of current accruals that remain unexplained by the variables of the regression and used as a proxy for abnormal current accruals deemed to arise out of managerial discretion.

## 2. Accounting Discretion/Flexibility Exercised to Manage Accruals

Accounting discretion exercised to manage accruals is used as the measure of accrual management based on the notion that accounting discretion exercised indicates the extent to which managers use their latitudes in applying accounting techniques to manage accruals. I predict that managers have applied greater accounting discretion to manage accruals in financial accounting as electric utility firms moved from the regulated to the deregulated environment.

Since the residuals estimated from equation (2) proxy for the abnormal portion of current accruals deemed to arise out of managerial discretion, the standard deviation of such residuals constitutes the measure of accounting flexibility/discretion exercised to manage abnormal accruals over a period of time. I determine such accounting flexibility/discretion by estimating the firm-specific abnormal accrual variability separately for the regulated and deregulated time-periods.[5]

---

[5] For at least two reasons, the firm-specific accounting discretion estimated over a period is an efficient measure of accrual management level.

First, multi-year accrual management in a firm can effectively be captured by the variability of abnormal accruals. Prior studies show that the magnitude of abnormal accruals is positively correlated with its variability (Barton, 2001). The magnitude indicates the extent to which managers exercise discretion in applying certain accounting techniques to manage accruals. Hence, the magnitude of unsigned accruals (which is intimately related to accounting flexibility/discretion) measures a firm's success in managing earnings up or down, as needed depending on year-specific situations (e.g., DeFond and Park, 1997). Moreover, Becker et al. (1998) suggest that the variation in discretionary

In the first test, I address the issue of multi-year accrual management of electric utility firms. By applying accrual equation (2), I estimate accounting discretion used to manage current accruals at the individual firm level separately for the regulation and the deregulation periods and compare such estimated accounting discretion between the two time-periods to examine the change.

Next, I examine the time-series change in the explanatory power of the accrual model (2). The independent variables of the model explain variations of normal current accruals, the unexplained portion of current accruals being captured in residuals and is termed as abnormal accruals.[6] If management engages in greater abnormal accrual adjustments in post-deregulation period, I anticipate that the explanatory power of accrual model will decrease over time.

---

accruals implies accounting flexibility. The greater the variation in accounting accruals, the greater is the accounting flexibility/discretion exercised to make accrual adjustments in financial reporting. Reynolds and Francis (2001) argue that firms that make greater use of accruals to manage earnings should have greater volatility in their accruals over a specific time-period.

Second, managing accounting accruals is unlikely to be a single-year decision but may be a part of multi-year management strategy of employing certain accounting procedures to manipulate earnings in financial reporting process. Managers are more likely to have a long horizon while formulating a strategy for reporting accounting numbers consistent with the production, investment and financial plans of the firm for future. The year-to-year management of earnings, therefore, is a part of the broad management strategy followed in corporate financial reporting over a specific time-period in compliance with overall operating and financial plans of an organization. A multi-year measure of accrual manipulation such as variability of abnormal accruals estimated over a certain time-period reflects this multi-year aspect of earnings management.

[6] Residuals from an accrual model termed as abnormal accruals might contain measurement errors associated with firm-performance and growth. However, at least a portion of such abnormal accruals are assumed to be the result of accounting discretion exercised by firms to manage earnings.

I cross-sectionally estimate the accrual model for each year over the sample time-period. The adjusted $R^2$ of each annual regression is indicative of the power of the model in explaining the variation of current accruals across firms. If the level of abnormal accrual adjustment went up with deregulation, the adjusted $R^2$s of annual cross-sectional regressions are expected to decline over time.

## 3. OLS Analysis to Examine the Deregulation Effect on Accrual Management

In the second test, I regress absolute current accruals on a dummy variable indicating the period of deregulation in presence of other control variables, which induce firms to manage accruals as well as account for the portion of abnormal current accruals associated with profitability, growth and structural changes in business. In the process, the effects of deregulated environment on abnormal accruals are examined in a relative setting (in comparison with the regulated time-period).

The following regression models are employed for the purpose of the second test:

$$| CACC |/TA_{it-1} = \beta_0 + \beta_1 | (\Delta REV_{it} - \Delta REC_{it}) |/TA_{it-1} + \beta_2 | \Delta COGS_{it} |/TA_{it-1} + \beta_3 | \Delta OCF_{it} |/TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \beta_{10} DEREG_{it} + \varepsilon_{it} \ldots\ldots (3)$$

$$| CACC |/TA_{it-1} = \beta_0 + \beta_1 | (\Delta REV_{it} - \Delta REC_{it}) |/TA_{it-1} + \beta_2 | \Delta COGS_{it} |/TA_{it-1} + \beta_3 | \Delta OCF_{it} |/TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \beta_{10} DEREG\_1_{it} + \beta_{11} DEREG\_2_{it} + \varepsilon_{it} \ldots\ldots (4)$$ [7]

The dependent variable and first three explanatory variables of the above models are already defined in previous

[7] This one-step regression model is consistent with the research design employed by previous studies of similar nature (e.g., Cahan, 1992; Hall and Stammerjohan, 1997; Han and Wang, 1998; Ericson and Wang, 1999).

section. The only difference is that the absolute value of these variables is used in the regression analysis. The other variables are defined as follows:

$SIZE_{it}$ = Log of total assets of firm i in year t, used as a proxy for size;

$LEV_{it}$ = Ratio of long-term liability to total assets of firm t in year t;

$MB_{it}$ = Ratio of equity market value to stockholders' equity of firm i in year t;

$ROS_{it}$ = Ratio of net income divided by sales of firm i in year t;

$CAP_{it}$ = Cash capital expenditure scaled by total assets of firm i in year t;

$\Delta SE_{it}$ = Changes in stockholders' equity of firm i in year t;

$DEREG_{it}$ = A dummy variable of 1 for deregulation years; 0 otherwise, (i.e., 1 = 1993-2000; 0 = 1986-1992);

$DEREG\_1_{it}$ = A dummy variable of 1 for years 1993 to 1996; 0 otherwise;

$DEREG\_2_{it}$ = A dummy variable of 1 for years 1997 to 2000; 0 otherwise;

In equations (3) and (4), dummy variables are the independent variables of interest. The continuous variables of both the models account for variations of normal accruals, for the portion of abnormal accruals that are used in response to various economic incentives and for the portion of abnormal accruals associated with a firm's profitability, growth and structural changes in business, so the year-specific effects on abnormal accrual level could precisely be estimated. For equation (3), DEREG refers to the deregulated periods of 1993-2000 and captures the effects of deregulated environment on magnitude of abnormal current accruals as compared to regulated environment. In terms of the hypothesis, $\beta_{10}$ is greater than 0.

In equation (4), I include two mutually exclusive dummy variables, to separately capture the effects of deregulated environment relative to regulated environment; DEREG_1 represents the years 1993-1996 and DEREG_2 represents the years

1997-2000. The objective is to compare their coefficients with reference to the intercept $\beta_0$ (which relates to the regulated period of 1986-1992). This comparison will effectively reflect differential accrual management occurred in the two stages of the deregulated time period relative to the regulated period.

According to the prediction of the hypothesis, the magnitude of abnormal current accruals would be greater in deregulated time period; hence, both $\beta_{10}$ and $\beta_{11} > 0$.

## Descriptive Data and Correlation Statistics

Descriptive data are provided in Table 1. Most of the variables have wide range of data distribution across firms. Some descriptive data are noteworthy. The average total assets and equity market value of a sample firm are $6359.33 million and 2741.20 million respectively. An average sample firm is quite large, and the size substantially varies across firms with total assets ranging from a minimum of $44.59 million to a maximum of $58176 million. Equity market value ranges between $12.09 million and $31441 million. The average current accruals are -0.52% of total assets with a minimum of -34.11% and a maximum of 20.24%. The sample firms in general have growth potential as reflected in market to book ratio which averages 1.3563. Furthermore, though an average sample firm appears to be profitable with the mean ROS at 9.38%, the profitability significantly varies across firms with a minimum of -72.12% and a maximum of 30.47%.

Table 2 presents the correlation statistics for the continuous variables employed in the main analysis. The absolute current accruals are found to be significantly correlated with many explanatory variables included in regression analysis, which justifies the inclusion of those variables as controls in the analysis. Several explanatory variables are also found to be correlated to each other. These correlations however do not pose any problem of multicollinearity for the main regression analysis as the related collinearity diagnostics such as variance inflation factors or

condition indices indicate that such effects on main results are uniformly of inconsequential magnitudes.

## Results

### 1. Test of Difference in Accounting Flexibility/Discretion Exercised to Manage Accruals

Part I of Table 3 presents the results of univariate tests of difference in both the accounting flexibility/discretion exercised to use abnormal current accruals and in absolute abnormal current accruals in the pre versus post deregulation period. These two variables are computed by estimating the firm-specific regression equation (2). In the pre-deregulation period, managers of electricity firms are found to exercise significantly less discretion to manage accruals compared to the period after deregulation as is evident from the univariate t-statistic, which is -3.1008 with p-value of 0.003 (two-tailed). The similar result is obtained for the average absolute abnormal accruals, which is found to be significantly lower in pre-deregulation period compared to the deregulated period (with t-statistic: -3.3792 and p-value: 0.001). The results indicate that in periods after deregulation, management of the sample electricity firms have exercised greater accounting discretion to manage abnormal current accruals compared to the regulated time period. Consequently, the level of abnormal current accrual adjustment in financial reporting is higher in the post deregulation period.

The results of Part I are supported by the findings as reported in Part II. The explanatory power of the current accrual model is found to decrease over time as estimated by regressing the adjusted $R^2$s of 15 annual accrual regressions on the time-trend variables. The coefficient of TIME variable is found to be negative and statistically significant at 5% level (t-statistic: -1.861 and p-value: 0.080).[8] The result suggests that the portion of abnormal

[8] The model, which I employed includes CACC as the signed dependent variable of interest and all possible explanatory variables that could explain cross-sectional variation of normal accruals as well as the part of abnormal

accruals that remains unexplained by the independent variables has grown over the sample time period, which is consistent with the view that electricity firms have exercised greater discretion in adjusting abnormal current accruals as the industry moved from the regulated to the deregulated environment.

## 2. OLS Analysis of Accrual Management in the Pre versus Post Deregulation Period

Table 4 reports the ordinary least square regression results for the analysis of the deregulation effects on the level of abnormal current accruals. By using model 1, I test the year-effects of deregulation as compared to the regulated period and observe that, in presence of other control variables, the coefficient of DEREG is positive and statistically significant at 5% level (t-statistic: 2.021 and p-value: 0.022). As described earlier, in model 2 I segregate the post deregulation year effects into two parts, DEREG_1 for the first four years immediately after deregulation and DEREG_2 for the next four years when deregulation has already been effective for some years. I find evidence that increase in accrual management level is pronounced in the second part of the deregulated period. DEREG_2 is significantly positive at any level of significance with t-statistic: 4.374 and p-value: 0.000 while DEREG_1 appears to be insignificant (with p-value of 0.284).

The results suggest that electricity firms make greater adjustment of abnormal current accruals in the post-deregulation period compared to the regulation period. However, increase in the level of such accrual adjustments relates to the second stage of the deregulated time period. The test result, therefore, provides support to the prediction of the study that managers of electricity firms use

---

accruals arising out of unusual business situation (e.g., profitability, growth, structural changes in business), i.e., $CACC /TA_{it-1} = \beta_0 + \beta_1 (\Delta REV_{it} - \Delta REC_{it}) /TA_{it-1} + \beta_2 \Delta COGS_{it} /TA_{it-1} + \beta_3 \Delta OCF_{it} /TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \varepsilon_{it}$. An increase in the level of abnormal (discretionary) accruals leads to corresponding reduction of the model's power to explain the CACC variation across firms.

more abnormal accruals to manage earnings in the post deregulation period compared to the regulated period.

## Additional Analysis

*Test of deregulation effects on signed current accruals*

As a supplemental analysis, I separately examine the adjustment pattern of signed current accruals, i.e., income-increasing and income-decreasing, in the pre versus post deregulation period. The result is not reported in a table. There are 531 firm-years for income-increasing accruals and 684 firm years for income-decreasing accruals out of the total 1215 firm-years. I find that for income-increasing accruals, there is no difference in the accrual adjustment level between the pre versus post deregulation period. However, the sample electricity firms are found to make greater adjustment of income-decreasing current accruals in the post-deregulation period compared to the regulation period (t-statistic: -2.809 and p-value: 0.003). This result coupled with the one in the main analysis suggests that managers of electricity firms make greater use of their accounting discretion to manage more income-decreasing accruals in the deregulation period. Hence, it is observed that instead of making opportunistic application of GAAP (which is expected to be manifested in income-increasing accruals), the sample electricity firms have made more conservative application of GAAP in financial reporting of the post deregulation period.

*Tests of deregulation effects on non-current accruals*

For completeness of the analysis, I test the effects of deregulation on the sample firms' efforts to manage non-current accruals (i.e., depreciation, depletion and amortization expenses). For this I estimate separate regression with non-current accruals as the dependent variable and property plant and equipment as the independent variable along with other firm-specific controls. The result is not reported in a table. I do not find any evidence of

differential adjustments of non-current accruals between the pre and post deregulation periods (p-value: 0.316).

## Conclusions

In the present study, I have examined the changes in accrual management pattern of investor-owned electricity firms in response to the deregulation introduced by the Energy Policy Act of 1992. Prior studies observe that the value-relevance of earnings has increased (Blacconiere et al. 2000) and the risk characteristic has changed for electricity firms (Johnson et al. 1998) as the industry moved from the regulated to the deregulated environment. Consequent upon increase in earning's role in firm-valuation, it is predicted that deregulation provides greater incentives to electricity firms to manage earnings. I focus on management of current (non-cash working capital) accruals as a tool to manipulate earnings and use a 15-year period to test the time-series change in abnormal accrual adjustments of the 81 sample electricity firms. I find evidence consistent with the view that the electricity firms have exercised greater accounting discretion to manage abnormal current accruals in the deregulated period compared to the regulated period. However, the analysis demonstrates that greater accrual adjustment took place in the second four-year stage of the eight-year sample deregulation period. Further, I observe that the sample electricity firms use greater accounting discretion to make more conservative application of GAAP in the post-deregulation period as is revealed in the greater use of income-decreasing (negative) abnormal accruals during such time period compared to the period under regulation. I infer that this pattern of accrual management might be caused by the electricity firms' concern to reduce the regulatory attention or other political costs in the post deregulation period or due to their efforts to create reporting slack. Since income-increasing abnormal accruals can be interpreted as a form of biased financial reporting, which causes concern for regulators and financial statement users, the present study does not find evidence of such opportunistic reporting behavior on the part of the sample electricity firms in response to deregulation.

Moreover, I do not find any difference in the level of non-current accrual adjustment between the two time-periods.

## References

Barton, J., 2001. Does the use of financial derivatives affect earnings management decisions? Accounting Review 76: 1-26.

Becker, C.L., M.L. DeFond, J. Jiambalvo and K.R. Subramanium, 1998. The effect of audit quality on earnings management. Contemporary Accounting Research 15: 1-24.

Bradshaw, M.T., S.A. Richardson and R.G. Sloan, 2001. Do analysts and auditors use information in accruals? Journal of Accounting Research (June): 35-74.

Blacconiere, W.G., M.F. Johnson and M.S. Johnson, 2000. Market valuation and deregulation of electric utilities. Journal of Accounting and Economics 29: 231-260.

Cahan, S.F., 1992. The effect of antitrust investigations on discretionary accruals: A refined test of the political cost hypothesis. The Accounting Review 67: 77-95.

Christie, A.A. and J.L. Zimmerman, 1994. Efficient and opportunistic choices of accounting procedures: Corporate control contests. The Accounting Review 69: 539-566.

Dechow, P.M., R.G. Sloan and A.P. Sweeney, 1995. Detecting earnings management. The Accounting Review (April): 193-225.

Dechow, P.M., R.G. Sloan and A.P. Sweeney, 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by SEC. Contemporary Accounting Research 13: 1-36.

DeFond, M.L. and C. Park, 1997. Smoothing income in anticipation of future earnings. Journal of Accounting and Economics 23: 115-139.

Ericson, M. and S. Wang, 1999. Earnings management by acquiring firms in stock for stock mergers. Journal of Accounting and Economics 27: 149-176.

Hall, S.C. and W.W. Stammerjohan, 1997. Damage awards and earnings management in the oil industry. The Accounting Review 72: 47-65.

Han, J.C. and S. Wang, 1998. Political costs and earnings management of oil companies during the 1990 Persian Gulf crisis. The Accounting Review 73 (1): 103-117.

Jones, J.J., 1991. Earnings management during import relief investigations. Accounting Review 29: 193-228.

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

McNichols, M. and G. P. Wilson, 1988. Evidence of earnings management from the provision for bad debts. Journal of Accounting Research 26: 1-31.

Perry, S. E. and T. H. Williams 1994. Earnings management preceding management buyout offers. Journal of Accounting and Economics 18: 157-179.

Pyne, J.L. and S.W.G. Robb, (2000). Earnings management: The effect of ex-anti earnings expectations. Journal of Accounting Auditing and Finance 15: 371-392.

Rangan, S., 1998. Earnings management and the performance of seasoned equity offerings. Journal of Financial Economics 50: 101-122.

Reynolds, K. and J. Francis, 2001. Does size matter? The influence of large clients on office-level auditor reporting decisions. Journal of Accounting and Economics 30, 375-400.

Schipper, K., 1989. Earnings Management. Accounting Horizons 3: 91-102.

Sloan, R., 1996. Do stock prices fully impound in accruals about future earnings? The Accounting Review 71: 289-315.

Teoh, S.H., I. Welch and T.J. Wong. 1998. Earnings management and the underperformance of seasoned equity offerings. Journal of Financial Economics 50: 63-99.

Xie, B., W.N. Davidson and P.J. DaDalt, 2003. Earnings Management and corporate governance: the role of the board

and the audit committee. Journal of Corporate Finance 9: 295-316.

**Table 1: Descriptive Data for Variables Employed in the Study**
**N = 1215**

| Variables | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| CACC | -0.0052 | 0.0352 | -0.3411 | 0.2024 |
| (ΔREV - ΔREC) | 0.0319 | 0.1211 | -0.7228 | 1.8516 |
| ΔCOGS | 0.0339 | 0.1316 | -0.5700 | 2.1148 |
| ΔOCF | 0.0028 | 0.0332 | -0.5131 | 0.3742 |
| LEV | 0.3376 | 0.0846 | 0.0600 | 0.9004 |
| MB | 1.3563 | 1.3965 | -11.4240 | 41.8057 |
| ROS | 0.0938 | 0.0651 | -0.7212 | 0.3047 |
| CAP | 0.0591 | 0.0303 | 0.0042 | 0.3325 |
| ΔSE | 46.84 | 360.85 | -3714.00 | 5422.91 |
| TA (in million $) | 6359.33 | 7244.31 | 44.59 | 58176.00 |
| MVE (in million $) | 2741.20 | 3219.95 | 12.09 | 31441.05 |

Definition of variables

CACC = Current accounting accruals as computed as (ΔCA - ΔCash) – (ΔCL - ΔCLD);
where, ΔCA = Change of total current assets; ΔCL = Change of total current liabilities; and ΔCLD = Change in current portion of long term debt.
(ΔREV - ΔREC) = Changes in revenue adjusted by changes in accounts receivables;
ΔCOGS = Changes in cost of goods sold;
ΔOCF = Changes in operating cash flows;
LEV = Long term debt divided by total assets;
MB = Market to book ratio;
ROS = Return on sales computed as net income divided by net sales;
CAP = Cash capital expenditures scaled by total assets.
ΔSE = Changes in stockholders' equity;
TA = Total assets;
MVE = Market value of equity.

**Table 2: Correlation Statistics for Continuous Variables used in Multiple Regression Analyses**
**N = 1215**

| Variables | \| CACC \| | \| ($\Delta REV_{it}$ - $\Delta REC_{it}$) \| | \| $\Delta COGS_{it}$ \| | \| $\Delta OCF_{it}$ \| | $SIZE_{it}$ | $LEV_{it}$ |
|---|---|---|---|---|---|---|
| \| CACC \| | 1.000 | | | | | |
| \| ($\Delta REV_{it}$ - $\Delta REC_{it}$) \| | 0.179 | 1.000 | | | | |
| | **0.000** | | | | | |
| \| $\Delta COGS_{it}$ \| | 0.197 | 0.962 | 1.000 | | | |
| | **0.000** | **0.000** | | | | |
| \| $\Delta OCF_{it}$ \| | 0.085 | 0.100 | 0.085 | 1.000 | | |
| | **0.003** | **0.000** | **0.003** | | | |
| $SIZE_{it}$ | -0.117 | -0.019 | -0.006 | -0.132 | 1.000 | |
| | **0.000** | **0.519** | **0.823** | **0.000** | | |
| $LEV_{it}$ | -0.033 | -0.029 | -0.035 | -0.043 | -0.012 | 1.000 |
| | **0.244** | **0.310** | **0.228** | **0.131** | **0.682** | |
| $MB_{it}$ | -0.029 | 0.045 | 0.056 | 0.001 | 0.083 | -0.028 |
| | **0.307** | **0.119** | **0.053** | **0.985** | **0.004** | **0.332** |
| $ROS_{it}$ | -0.230 | -0.183 | -0.193 | -0.168 | 0.251 | 0.013 |
| | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** | **0.650** |
| $CAP_{it}$ | 0.196 | 0.077 | 0.071 | 0.064 | -0.078 | 0.009 |
| | **0.000** | **0.007** | **0.013** | **0.026** | **0.007** | **0.746** |
| $\Delta SE_{it}$ | 0.040 | 0.052 | 0.044 | 0.009 | -0.033 | -0.033 |
| | **0.168** | **0.069** | **0.124** | **0.767** | **0.245** | **0.244** |

**Table 2 (Continued)**

| Variables | $MB_{it}$ | $ROS_{it}$ | $CAP_{it}$ | $\Delta SE_{it}$ |
|---|---|---|---|---|
| \| CACC \| | | | | |
| \| ($\Delta REV_{it}$ - $\Delta REC_{it}$) \| | | | | |
| \| $\Delta COGS_{it}$ \| | | | | |
| \| $\Delta OCF_{it}$ \| | | | | |
| $SIZE_{it}$ | | | | |

| | | | | |
|---|---|---|---|---|
| $LEV_{it}$ | | | | |
| $MB_{it}$ | 1.000 | | | |
| $ROS_{it}$ | 0.102 | 1.000 | | |
| | **0.000** | | | |
| $CAP_{it}$ | 0.045 | 0.070 | 1.000 | |
| | **0.121** | **0.015** | | |
| $\Delta SE_{it}$ | 0.004 | -0.035 | 0.058 | 1.000 |
| | **0.889** | **0.222** | **0.044** | |

Note: For each variable, the number in the first row is Pearson Correlation coefficient and in the second row is two-tailed p-value. The variables are already defined in previous section.

**Table 3**

**Part I**
**Univariate Tests of Difference in Flexibility/Discretion Exercised to Manage Abnormal Current Accruals and Difference in Absolute Abnormal Current Accruals between the Pre and Post Deregulation Period**

Both the standard deviation of residuals and absolute residuals are estimated from the following 81 firm-specific regressions separately for the pre and post deregulation period: $CACC_{it} = \beta_0 + \beta_1 (\Delta REV_{it} - \Delta REC_{it}) + \beta_2 \Delta COGS_{it} + \beta_3 \Delta OCF_{it} + \varepsilon_{it}$[9]

**Panel A**
For the period of 1986-1992 (Pre-deregulation):
Average standard deviation of residuals (i.e., abnormal accrual variability): 0.0201

For the period of 1993-2000 (Post-deregulation):
Average standard deviation of residuals (i.e., abnormal accrual variability): 0.0283

Univariate test of mean difference for 81 observations (Pre versus post deregulation period)

**t-statistic: -3.1008; p-value: 0.003 (two-tailed).**

**Panel B**
For the period of 1986-1992 (Pre-deregulation):
Average absolute residuals (i.e., absolute abnormal current accruals): 0.0111

For the period of 1993-2000 (Post-deregulation):
Average absolute residuals (i.e., absolute abnormal current accruals): 0.0164

Univariate test of mean difference for 81 observations (Pre versus post deregulation period)

**t-statistic: -3.3792; p-value: 0.001 (two-tailed).**

[9] The correlation coefficient between standard deviation of residuals and mean absolute residuals is highly significant at any level for both the pre and post deregulation period. The coefficient ranges from 0.96 to 0.99.

**Table 3 (Continued)**

**Part II**
**Time-Series Change in Explanatory Power of Current Accrual Model over the Sample Period of 1986 to 2000**

Model: Adjusted $R^2_i = \beta_0 + \beta_1 TIME_i + \varepsilon_i$; (No. of observations: 15)

t-statistic for the coefficient of TIME is **-1.865** and p-value: **0.080** (two tailed).

Note: The dependent variable, adjusted $R^2$, is estimated from the following 15 annual cross-sectional regressions: $CACC /TA_{it-1} = \beta_0 + \beta_1 (\Delta REV_{it} - \Delta REC_{it}) /TA_{it-1} + \beta_2 \Delta COGS_{it} /TA_{it-1} + \beta_3 \Delta OCF_{it} /TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \varepsilon_{it}$

The independent variable, TIME, is the time trend variable coded as 1, 2, 3,....., 14, 15 for years starting with 1986 and ending with 2000, i.e., 1986 coded as 1, 1987 as 2, 1988 as 3, ……., 1999 as 14 and 2000 as 15.

**Table 4: Regression Analysis of the Deregulation Effects on Magnitude of Abnormal Current Accruals in Presence of Other Control Variables**

**N = 1215**

Model 1: $| CACC |/TA_{it-1} = \beta_0 + \beta_1 | (\Delta REV_{it} - \Delta REC_{it}) |/TA_{it-1} + \beta_2 | \Delta COGS_{it} |/TA_{it-1} + \beta_3| \Delta OCF_{it} |/TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \beta_{10} DEREG_{it} + \varepsilon_{it}$

Model 2: $| CACC |/TA_{it-1} = \beta_0 + \beta_1 |(\Delta REV_{it} - \Delta REC_{it})|/TA_{it-1} + \beta_2 | \Delta COGS_{it} |/TA_{it-1} + \beta_3 | \Delta OCF_{it} |/TA_{it-1} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 MB_{it} + \beta_7 ROS_{it} + \beta_8 CAP_{it} + \beta_9 \Delta SE_{it} + \beta_{10} DEREG\_1_{it} + \beta_{11} DEREG\_2_{it} + \varepsilon_{it}$

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| Variables | Coeff. | t-stat | p-value | Coeff. | t-stat | p-value |
| Intercept | 0.027 | 5.070 | 0.000 | 0.028 | 5.210 | 0.000 |
| $\| \Delta REV_{it} - \Delta REC_{it} \|/TA_{it-1}$ | -0.168 | -1.691 | 0.045 | -0.153 | -1.548 | 0.061 |
| $\| \Delta COGS_{it} \|/TA_{it-1}$ | 0.298 | 2.981 | 0.002 | 0.256 | 2.570 | 0.005 |
| $\| \Delta OCF_{it} \|/TA_{it-1}$ | 0.017 | 0.621 | 0.268 | 0.009 | 0.334 | 0.369 |
| $SIZE_{it}$ | -0.058 | -2.043 | 0.021 | -0.073 | -2.560 | 0.006 |
| $LEV_{it}$ | -0.024 | -0.900 | 0.184 | -0.012 | -0.439 | 0.330 |
| $MB_{it}$ | -0.032 | -1.151 | 0.125 | -0.040 | -1.465 | 0.072 |
| $ROS_{it}$ | -0.188 | -6.443 | 0.000 | -0.177 | -6.067 | 0.000 |
| $CAP_{it}$ | 0.205 | 7.397 | 0.000 | 0.204 | 7.423 | 0.000 |
| $\Delta SE_{it}$ | 0.016 | 0.597 | 0.276 | 0.015 | 0.553 | 0.290 |
| $DEREG_{it}$ | **0.058** | **2.021** | **0.022** | | | |
| $DEREG\_1_{it}$ | | | | -0.017 | -0.571 | 0.284 |
| $DEREG\_2_{it}$ | | | | **0.138** | **4.374** | **0.000** |
| Adjusted $R^2$ | 0.119 | | | 0.134 | | |

Note: The reported p-values are all one-tailed except intercept.
The variables are defined in previous section except the following:

For Model 1, DEREG = A dummy variable of 1 for years 1993-2000 and 0 other wise. For Model 2, DEREG_1 = A dummy variable of 1 assigned to years 1993-1996 and 0 otherwise; DEREG_2 = A dummy variable of 1 assigned to years 1997-2000 and 0 otherwise.