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REGULATORY RISK AND VALUATION OF REGULATED FIRMS: AN IMPLICATION TO THE UTILITY COMPANIES' FAIR RATE OF RETURN IN LIGHT OF THE 1989 SUPREME COURT'S DUQUESNE OPINION*

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Following the Supreme Court's recent opinion in the Duquesne Light Co., et al. v. Barasch et al. case (1989) concerning risks and allowed rate of return to utility companies by the state and federal regulatory agencies, several authors have recently proposed to add a regulatory risk premium, over and above the cost of capital, to the allowed rate of return in determining utility companies' revenue requirement. This study examines the relationship between utility stock prices and regulatory risks. A statistical analysis based on financial data of 59 electric utility companies between 1979 and 1988 reveals that regulatory risks are seriously being taken into consideration by investors and regulators need not add regulatory risk premium to the allowed rate of return.

I. INTRODUCTION

The Supreme Court's recent opinion in *Duquesne Light Co., et al. v Barasch, et al.,* 109 S. Ct. 609 98PUR4th 253 (1989), addressed some of the major issues facing the public utility industry. The Court concluded that return to the utility companies' equity investors should be commensurate with returns on investments in other enterprises having corresponding *risks.* In *addition,* the *risks* a utility faces are in *large* part defined by the rate methodology because *utilities* are virtually always public monopolies dealing in an essential service, and so relatively immune to the usual market risks. In determining the allowed rate of return, the State and Federal regulatory commissions generally utilized the Discounted Cash Flow (DCF) method which is discussed in Section II. Kolbe and Tye (1990) argued that regulatory risks are not adequately captured, if at all, by traditional methods which regulators utilized to establish the allowed rate of return. They proposed to add a regulatory risk premium, over and above the cost of capital, to the allowed rate of return.

Regulated utility industry is a capital intensive industry. Utility companies frequently raise capital from the financial market to finance their massive construction requirements. Utility companies have a high payout dividend policy and face various regulatory issues on a daily basis. In an inflationary economy, regulatory risk is compounded by political pressures applied by consumer groups in an effort to hold utility rates down. While empirical studies generally have supported the hypothesis that interest rate and dividend changes affect common stock prices [see Feldstein (1980, 1983), Hong (1977), Modigliani (1979), Matley (1976), Van Horne (1972), and robe (1969), Cottle (1962), Gordon (1962), Pettit (1977), Rosenberg (1979), and Litgenberger (1979, 1980, 1982), Bar-Yosef (1987), Kalay (1986), Ofer (1987), March (1987), Ambarish (1987), Brickley (1983), Bhattacharya (1979), Hakansson (1982), Asquith (1983), Miller (1982, 1983), Afarony (1980), Charest (1978), Pettit (1976), and Watts (1973)], no study has been done to investigate the effect *of* regulatory risks on the valuation of utility stocks.

The objective of this study is to examine the relationship between utility stock prices and regulatory risks and its implication to the regulatory frame work of rate of return regulation.

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The remaining sections of this paper is organized as follows. Section II presents the statistical model, methodology and data. Section III discusses the empirical results. The conclusions are in Section IV.

II. METHODOLOGY AND DATA

The statistical model constructed for this study is based on the generally accepted theory of common stock valuation. This approach is based on the principle that rational investors evaluate the expected returns and risks of securities in the financial market and set a price for a particular security which adequately compensates investors for the risks. The Discounted Cash Flow valuation approach is based on the proposition that the maximum price that a rational investor will pay for a security is an amount equal to the present value of the expected dividends plus its resale price, including capital gains. Therefore, the present market price or a stock is given by the formula:

$$P_0 = \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} + \ldots + \frac{D_t}{(1+K)^t} + \frac{P_t}{(1+K)^t} \qquad (1)$$

Equation (1) was simplified by Gordon (1962) as follows:

$$P_0 = \frac{D_1}{K-g} \qquad (2)$$

Where g is the expected dividend growth rate.
Equation (2) can be expressed as follows:

$$\frac{P_0}{B_0} = \frac{D_1/B_0}{K-g} = f(D_1/B_0, K, g) \qquad (3)$$

Where P_0 / B_0 = market price-to-book ratio
B_0 = book value
D_1 / B_0 = book yield
K = R_f + risk
R_f = Risk-free rate

Equation (3) attempts to quantify the impact and the relationship between stock prices and a number of economic, financial and risk factors associated with each utility company. The ratio of market price and book values of security i can be written as a function of several explanatory variables and can be expressed as follows:

$$P_i/B_i = f(RF, \text{book yield}, g, \text{risk}) \qquad (4)$$

There are three types of variables which we hypothesize affects the market price-to-book ratio of electric utilities:

(1) Economic Variables: High interest rates and inflation should have a negative effect on market price-to-book ratio.

(2) Dividend Policy: High book yield and expected dividend growth rate should have a positive effect on market price-to-book ratio.

(3) Risk Factors: Regulatory risk should have a negative impact on market price-to-book ratio.

High bond ratings, cash flow coverage of dividends, return on equity; and common equity ratio should have a positive impact on market price-to-book ratio.

TABLE 1

The List of Fifty-Nine Electric Utility Companies

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Allegheny Power System
American Electric Power Company
Atlantic City Electric Company
Baltimore Gas & Electric Company
Boston Edison Company
Carolina Power & Light Company
Central Illinois Public Service Company
Central & South West Corporation
CILCORP, Inc.
Cincinnati Gas & Electric Company
Centerior Energy Corporation
Commonwealth Edison Company
Consolidated Edison Company of New York, Inc.
CMS Energy Corporation
DPL Inc.
Delmarva Power & Light Company
Detroit Edison Company
Dominion Resources, Inc.
Duke Power Company
DQE, Inc.
Entergy Corporation
Florida Progress Corporation
FPL Group, Inc.
Gulf States Utilities Company
Hawaiian Electric Industries, Inc.
Houston Industries
Idaho Power Company
Illinois Power Company
IPALCO Enterprises, Inc.
Kansas City Power & Light Company
Kansas Power & Light Company
Long Island Lighting Company
New England Electric System
New York State Electric & Gas Company
Niagara Mohawk Power Company
Northeast Utilities
NIPSCO Industries, Inc.
Northern States Power Company
Ohio Edison Company
Oklahoma Gas & Electric Company
PacifiCorp
Pacific Gas & Electric Company
Pennsylvania Power & Light Company
Philadelphia Electric Company
Portland General Corporation

TABLE 1 (Cont.)

The List of Fifty-Nine Electric Utility Companies

Potomac Electric Power Company
Public Service Company of Colorado
PSI Holdings, Inc.
Public Service Company of New Mexico
Public Service Enterprise Group, Inc.
Puget Sound Power & Light Company
San Diego Gas & Electric Company
SCANA Corporation
Southern California Edison Company
Southern Company
Texas Utilities Company
Tucson Electric Power Company
Union Electric
Wisconsin Energy Corporation

In specifying (4), our intent is to construct a statistical model to quantify the changes in the market price-to-book ratio and to examine the relative importance of regulatory risk versus other economic and financial factors in the valuation of utility stock prices.

This empirical study is based on financial and regulatory ratings data from 1979 through 1988 of 59 electric utility companies shown in Table 1. The data was obtained from Dean Witter Reynolds, Inc., Salomon Brothers, Inc., Argus Research Corporation, Federal Reserve Statistical Release, Moody's and Standard & Poor's bond ratings. The dependent and independent variables were defined as follows:

- Market/book ratio (P_0/B_0): The month-end market price divided by book value per share.
- Book yield (BYD): Indicated dividend rate divided by book value per share.
- Risk-free rate (I): The interest rate of the 30-year U. S. Treasury Bonds.
- Bond ratings (BR): The combination of Moody's and Standard and *Poor's* bond ratings for each utility's *first* mortgage bond.
- Dividend per share growth (DPS5): Security Analysts' estimate of five-year growth in dividends.
- Common equity ratio (CE): Net worth divided by total asset.
- Cash flow coverage of common stock dividends *(DC):* Operating cash flow divided by common stock dividends.
- Return on equity (ROE): The current earnings per share (trailing 12 months) divided by the book value per share.
- Regulatory risk (RR): The regulatory risk data of each utility is the revenue weighted average of the state regulatory ratings obtained from the Argus Research Corporation. Argus regulatory ratings are derived from a large number of factors which are reflected in the decisions of the state regulatory commissions, the operating results of companies in their jurisdictions, public and private statements of commissioners and commission staff members.

Utilizing a cross sectional time series data base, this model may be expressed as follows:

$$P_{it}/B_{it} = a + b_1 I_{it} + b_2 BYD_{it} + b_3 RR_{it} + b_4 DPS5_{it} + b_5 DC_{it} + b_6 BR_{it} + b_7 ROE_{it} + b_8 Ce_{it} + e_{it} \quad (5)$$

Where: I = company I
t = time t
a = the intercept
b = regression coefficient
e_{it} = the random error

III. EMPIRICAL RESULT

As shown in Table 2, a cross-sectional regression estimate of expression (4) and (5) yield the following result:

P /B = 38.43 - 3.51 I + 8.35 BYD - 1.41 RR + 0.61 DPS5 + 1.68 DC + .68 BR + .25 ROE + .09 CE
(-40.92) (44.39) (-10.47) (13.14) (9.24) (6.35) (3.73) (1.98)

(t-statistics in parentheses below the coefficients) (R2 = .71)

The coefficients of interest rates (I), book yield (BYD), dividend growth (DPS5) and regulatory risk (RR) are statistically significant, as evidenced by the t-statistics (at 5% level of significant) of -40.92, 44.39, 13.14, and -10.47; and the R2 of 71%.

Durbin-Watson *test* was utilized to test the hypothesis of no autoregression. As shown in Table 2, the Durbin-Watson statistic of 1.91 indicates that there is no autoregression and we can retain the statistical estimates without concerning a bias of the estimated standard error. The low correlation coefficients of the correlation matrix indicates little multicolinearity between the independent variables.

TABLE 2

Statistical Results

Dependent Variable: P/B: Market Price/Book Value

Independent Variables	B	Standard Error B	t
I: Interest Rate	-3.51	.09	-40.92
BYD: Book Yield	8.35	.19	44.39
RR: Regulatory Risk	-1.41	.13	-10.47
DPS5: Dividend Growth	.61	.05	13.14
DC: Cash Coverage of Dividend	1.68	.18	9.24
BR: Bond Rating	.68	.11	6.35
ROE: Return on Equity	.25	.07	3.73
CE: Common Equity Ratio	.09	.04	1.98
(CONSTANT)	34.43		
Multiple R	.84		
R Square	.71		
Adjusted R Square	.7		
Standard Error	5.06		
Durbin-Watson Statistic	1.91		

The statistical results indicated that investors respond positively to the utility stocks with high dividend and quality earnings, which is reflected in the book yield and return on equity variables.

The empirical results indicated that utility investors have taken the regulatory risk into consideration in evaluating utility common stock. The evidence suggests that a poor regulatory climate would contribute to the increase in the riskiness of regulated companies' stocks.

The results suggest that expected growth in dividend or capital appreciation is an investment objective of utility stock holders. This is consistent with the discounted cash flow approach in the valuation theory of common stock.

The belief that high interest rates and inflation would erode utility earnings and cash flow is also supported by our empirical results. The coefficient associated with the U. S. Treasury bond rate is as significant as the dividend variable. The results clearly indicate that the high interest rate and inflationary expectation have a negative impact upon utility stock price.

All of the financial risk factors are significantly related to the valuation of *utility common stocks, The evidence* suggests that a *high cash* coverage of dividend, common equity ratio and bond rating would *have* a positive impact upon utility stock prices.

IV. CONCLUSIONS

This study examines the relationships between utility stock prices and regulatory risks. The empirical results led to the following conclusions:

- Regulatory risks are seriously being taken into consideration by utility investors in evaluating utility stocks. In determining the allowed rate of return, the state and federal regulatory commissions generally utilized the Discounted Cash Flow (DCF) method, Therefore, regulatory risks already have been accounted for in the utility's allowed rate of return. Regulators need not add a regulatory risk premium, over and above the cost of capital, to the allowed rate of return.
- The empirical evidence suggests that the high interest rate, inflation and poor regulatory climate would have a negative impact upon utility stock price, This could be explained that utilities can only raise prices after lengthy regulatory hearings; therefore, regulatory lag is primarily responsible for the fact that utilities are hit hard by inflation.
- Cash dividend, high expected growth in dividend and quality earnings would have positive impact upon the value of utility stocks.

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