



# An Introduction to Utility Cost of Capital

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## Contents

|      |  |    |
|------|--|----|
| I.   | Introduction .....   | 3  |
| II.  | Legal standard for setting Return .....                          | 3  |
| III. | Rate of Return .....   | 4  |
| 1.   | Capital Structure .....  | 5  |
| 2.   | Return to Debt and Preferred Stock .....                         | 5  |
| 3.   | Return to Common Equity .....                                    | 6  |
| a)   | Capital Asset Pricing Model (CAPM) .....                         | 6  |
| b)   | Discounted Cash Flow (DCF) Model .....                           | 7  |
| c)   | Risk Premium (RP) Model .....                                    | 7  |
| 4.   | Additional Risk Factors Considered.....                          | 8  |
| IV.  | California ROE compare to National Average .....                 | 8  |
| V.   | Authorized ROR vs. Recorded ROR .....                            | 13 |
| 1.   | Recorded ROE vs. Authorized ROE.....                             | 13 |
| 2.   | Recorded Capital Structure vs. Authorized Capital Structure..... | 17 |
| 3.   | A Need to Focus on Recorded vs. Authorized ROR.....              | 19 |

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## I. Introduction

Utilities use long-term capital to finance investment in physical plant and assets (asset base) needed to provide utility service. Utilities also issue long-term capital to finance the replacement and expansion of their facilities to fulfill public utility service obligation. To finance investment in physical plant and assets utilities generally use long-term capital such as bonds, preferred stocks, and common equity.

Investors expect to earn a return on their capital. The Commission sets the authorized rate of return on capital. Setting an authorized rate of return does not mean that the utility is guaranteed to earn that rate of return. Rather, the authorized rate of return is merely a target estimate. The Commission sets retail prices sufficient to provide a reasonable opportunity for the utility to earn its overall revenue requirement including that target return. Whether earnings actually meet or exceed the return depends upon actual operations. ***The Commission has the responsibility to authorize a return high enough to attract investors' capital and low enough to minimize ratepayer's costs. The question is: What is a fair return that reasonably balances and optimizes these offsetting goals?***

This report discusses various factors that the Commission considers in establishing the authorized rate of return. In addition to explaining various factors considered in determining authorized rate of return, the report also provides recommendations for improving rate-of-return regulation in California. In particular, the comparison of the authorized return on equity in California to the national average calls for re-assessment of the Cost of Capital Mechanism in California. The report also calls for examination of the divergence between recorded and authorized rate of return by showing the implications of that for revenue requirement.

The remainder of this report is divided into four parts. Section II discusses the legal standards for setting rate of return on capital. Section III describes how capital structure and component costs of capital interact to determine the overall rate of return, or cost of capital. Section IV contrast return on equity for utilities in California to the national average. Finally section V compares authorized rate of return to recorded rate of return.

## II. Legal standard for setting Return

The legal standard for setting a fair rate of return has been established by the United States Supreme Court in the Bluefield and Hope decisions.<sup>1</sup> That decision states that a public utility should be provided an opportunity to earn a return necessary for it to provide utility service. The Court stated:

“The return should be reasonably sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical

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<sup>1</sup> Bluefield Water Works & Improvement Co. vs Public Service Commission of West Virginia (1923) 262 U.S. 679. Federal Power Commission vs. Hope Natural Gas Co. (1944) 320 U.S. 591.

management, to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties.”

The Bluefield decision provides a lower bound requirement (at least enough to attract capital) than an upper bound requirement. The Hope decision reinforces the Bluefield decision and in addition it provides an upper bound requirement. It emphasizes that such returns should be commensurate with returns available on alternate investments of comparable risks. The idea is based on the basic principal in finance that rational investors will only invest in a particular investment opportunity if the expected return on that opportunity is equal to the return investors expect to receive on alternative investments of comparable risk. The Hope decision states:

“The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.”

Two standards emerge from these decisions. First, return should be adequate to enable a utility to attract investors to finance the replacement and expansion of a utility’s facilities to fulfill its public utility service obligation. Second, to attract capital a utility should be able to offer returns to investors comparable to those achieved on alternative investments of comparable risk.

In applying these standards the Commission strives not to lose sight of its duty to ratepayers to protect them from unreasonable risks including risks of imprudent management and strives to strike a balance between the interest of ratepayers and shareholders.

### III. Rate of Return

The overall rate of return (ROR) or cost of capital from a ratemaking perspective is a weighted average cost of debt, preferred equity, and common equity, where the weights are the book-value percentages of debt, preferred equity, and common equity in a firm's capital structure. ROR or cost of capital, which is called the firm's weighted average cost of capital (WACC), is specified by the following formula:

$$WACC = w_d k_d + w_p k_p + w_c k_c$$

where,

$w_d$  = % of debt in capital structure,

$w_c$  = % of equity in capital structure,

$w_p$  = % of preferred stock in capital structure,

$k_d$  = cost of debt,

$k_s$  = cost of equity, and

$k_p$  = cost of preferred stock.

To apply the formula, one must estimate the cost of debt, preferred stock and common equity using methodologies accepted by both financial economists and regulators. In addition, one must determine

the appropriate capital structure mix of debt, preferred stock, and common equity. With these inputs, the Commission sets ROR using the above equation. Next issues relevant to capital structure and costs of different types of capital or component costs of capital are discussed.

## **1. Capital Structure**

Commission authorizes the percentage of common equity, preferred stock and debt that utilities are estimated to hold based on a reasonable capital structure. . The authorized capital structure is used to estimate authorized rate of return (ROR).

Equity investments are riskier than debt investments. In the event of bankruptcy equity holders have claim on asset only after debtholders are fully paid. That means return to debtholders must be paid prior to any payment to firm's equity investors. Investments that are more risky require a higher rate of return because investors are risk averse and would only buy risky assets if they are compensated with higher returns. Therefore, because equity investments are riskier than debt investments, return on equity must exceed return on debt.

In addition, for capital structure purposes, the only debt included is long term debt, typically defined as debt that matures after at least one year. Ratemaking for interest on short-term debt instruments is separately treated, and not typically a part of the capital structure used to set the rate of return.

Cost of capital can be reduced by lowering the equity ratio (percentage of more expensive capital) and increasing the debt ratio (percentage of less expensive capital) in the capital structure. Increasing debt ratio beyond a certain point can have negative consequences for a utility since that could increase the likelihood of default. Firms have an obligation to make scheduled interest and principal payments to their bondholders. Not meeting scheduled interest and principal payments can throw a firm into bankruptcy.

Since equity is more expensive than debt and increasing debt ratio beyond certain point can increase the likelihood of default, the authorized equity ratio should be lowest possible consistent with maintaining the utility's financial strength. A decline in the equity ratio below the optimum equity ratio may impact the company's credit rating and thus could expose the ratepayers to additional default risk.

## **2. Return to Debt and Preferred Stock**

Returns to debt and preferred Stock are more predictable than the return to common stocks. Return to bondholders, interest payment, is set by contract, therefore it is generally easy to predict. Preferred stock dividends are also set by contract, which make preferred stock similar to bonds. Commission sets return on of debt and preferred stocks based on embedded or recorded costs. Any forecasts for debt expense would be limited to new bond issuances anticipated to be added during the forecast period that the authorized rate of return will be in effect. Embedded cost of long-term debt includes the annual interest cost (coupon rate times the principal amount) and the amortization of any premium or discount at which the bond was sold Embedded cost of long-term debt is found as:

$$\text{Embedded Costs of Debt} = \frac{\text{Annual Charges}}{\text{Net Proceeds}}$$

where net proceeds is total long-term debt outstanding minus any financing charges. Similarly embedded cost of preferred stock which includes annual dividends is found as:

$$\text{Embedded Cost of Preferred Stock} = \frac{\text{Dividends}}{\text{Net Proceeds}}$$

where net proceeds is total preferred stock outstanding minus any financing charges. Any forecasts for preferred stock dividends would only apply if management anticipates a change in its dividend payout policy during the period the authorized rate of return will be in effect.

### **3. Return to Common Equity**

Measurement of return to common equity is involved since return to common equity is not contractual. Dividends to common stockholders are not fixed by the contract- they depend on the firm's earnings- and thus are not known with certainty. Instead, return on equity must be estimated. The estimation of return on equity is based on the principal that rational investors will only invest in a particular investment opportunity if the expected return on that opportunity is equal to the return investors expect to receive on alternative investments of comparable risk. In other words, for rational investors the expected return on alternative investments of commensurate risk sets the minimum return they would be willing to accept. Accordingly in cost of capital proceedings to estimate authorized return on equity (ROE) the expected return in capital markets on alternative investments of comparable risk are measured using accepted models.

Estimating the return on equity may give rise to two types of errors. First, the use of any specific model may give rise to errors or biases unique to that model. To reduce errors that may result from the application of any one model, several financial models have been employed to estimate the cost of equity. The final cost of equity figure used in calculating an overall rate of return might be the average of the models. Alternatively, the Commission may rely most heavily on the model that seems best under the circumstances. Second, to reduce errors that may result from the estimation of ROE for a single company, the models are applied to a group of companies of similar risk. A comparable group is selected by applying a set of criteria such as Bond rating, Firm size, and percentage of revenues from utility operations.

The Commission uses the following financial models to measure ROE.

#### **a) Capital Asset Pricing Model (CAPM)**

The simplifying assumption underlying CAPM is that rational investors hold a highly diversified portfolio i.e. the market portfolio. As such CAPM focuses on security's risk relative to the market portfolio and ignores firm specific risk. According to CAPM required rate of return is equal to the risk-free rate of return plus a risk premium that reflects the riskiness of the stock after diversification. Firm-specific risk does not enter into the calculation of the required return in CAPM.

$$k_s = k_{RF} + (k_M - k_{RF}) \beta$$

where:

$k_s$  = return on firm's equity,

$k_{RF}$  = risk free rate,

$k_M$  = return on overall market portfolio,

$(k_M - k_{RF})$  = market risk premium,

$\beta$  = firm's market risk.

### b) Discounted Cash Flow (DCF) Model

DCF model is based on the fundamental principle that the value of any asset is the present value of its expected cash flows. Accordingly value of a stock is the present value of the future dividend stream. In other words according to DCF model current market price of a company's stock is equal to the discounted value of all expected future dividends.

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_s)^t}$$

$P_0$  = current price per share of equity,

$D_t$  = expected dividend in period t, and

$k_s$  = required rate of return.

There are various formulations of the DCF model based on different projections of future dividend growth. Rearranging the terms in the above equation and using the simple DCF Model assumption, cost of equity becomes equal to expected dividend yield plus expected growth rate of dividend.

$$k_s = \frac{D_1}{P_0} + g$$

### c) Risk Premium (RP) Model

Risk Premium bases the cost of equity on the cost of debt and uses the premise that stocks are generally riskier than bonds. According to risk premium model investors demand a premium over bond returns for the risk associated with stocks.

$$k_s = k_d + RP$$

where;

$k_s$  = cost of equity,

$k_d$  = cost of debt, and

RP = risk premium.

#### **4. Additional Risk Factors Considered**

Commission also considers additional risk factors not specifically included in the financial models such as financial, business and regulatory risk.

Business risk refers to fluctuation in cash flows resulting from operations. Business risk depends on a number of factors including the variability in demand, sales price, and input costs, the ability to adjust output prices to reflect cost conditions, and the degree of operating leverage. Each of these factors is determined partly by the firm's industry characteristics, but each of them is also controllable to some extent by management.

Financial risk is determined by the amount of debt or financial leverage in a company's capital structure. Using financial leverage has both positive and negative effects on the company's stock price. Financing with debt inflates the expected rate of return on equity. But taking on more debt also increases fixed financial charges, thereby increasing the risk that the firm will not be able to meet its financial obligations. In general, the higher the degree of financial leverage, the riskier the debt, hence the higher the interest rate lenders will charge.

The two main types of regulatory risks are regulatory lag risk and cost recovery risk. Regulatory lag risk is related to delay, beyond the statutory period, in the ability to recover costs. Regulatory lag risk introduces uncertainty in outcome. Cost recovery risk is related to the ability of consistently recovering costs. Cost recovery risk reflects risk of future regulatory actions such as disallowance of operating expenses and rate base additions. Rating agencies assess cost recovery risk and regulatory lag risk in setting utility bond ratings.

#### **IV. California ROE compare to National Average**

Figure 1 and Figure 2 compare PG&E, SCE, SDG&E, and SoCalGas' ROE to the national average from 2000 to 2014. As Figures show PG&E and SoCalGas has had higher ROE than the national average since 2000 (with the exception of in 2002 and 2003 for SoCalGas). SCE has had higher ROE than the national average since 2001. And SDG&E has had higher ROE than the national average since 2006.

The higher than average ROE in California can be partly attributed to financial difficulties utilities experienced during the energy crisis. PG&E responded to the financial difficulty it was facing by filing for Chapter 11 bankruptcy protection on April 6, 2001. SCE's financial integrity was evaded such that it was on the verge of declaring bankruptcy. To help restore credit rating agencies and financial communities' confidence, the Commission took measures to improve the credit ratings of PG&E and SCE, in particular.

In the case of PG&E Decision 03-12-035, which adopted the Modified Settlement Agreement, granted that until PG&E achieves a company credit rating of either A- from Standard & Poor or A3 from Moody's, the authorized ROE will be no less than 11.22 percent and the equity ratio will be no less than 52 percent. To improve utilities' cash flow and rating agencies' assessment of utilities' financial risk, the



Commission approved rates of return on equity for utilities that were high but perhaps warranted given the circumstances.

However this does not explain why ROEs remained unchanged after the financial crisis. Utilities' credit ratings did improve around the time the financial crisis started in 2007. On December 27, 2007, Moody's upgraded PG&E's credit rating from Baa1 to A3. According to the National Bureau of Economic Research the economy slipped into a recession in the 4<sup>th</sup> quarter of 2007. Furthermore yields on Treasury bonds declined significantly after financial crisis began.

Figure 1

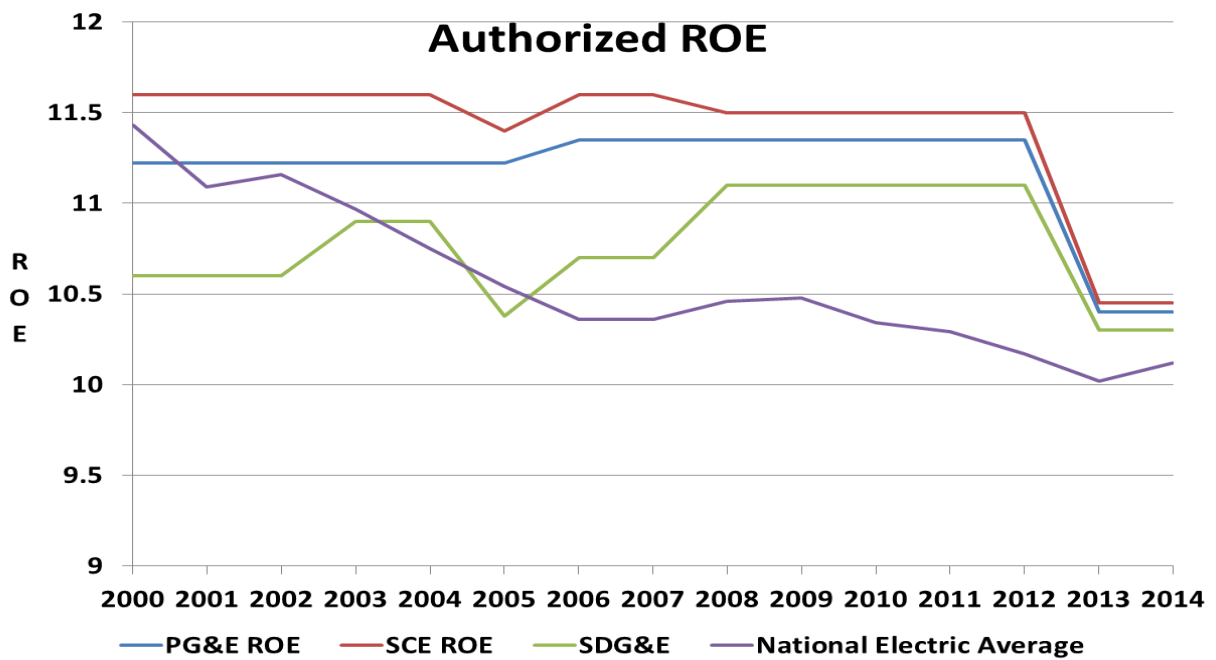
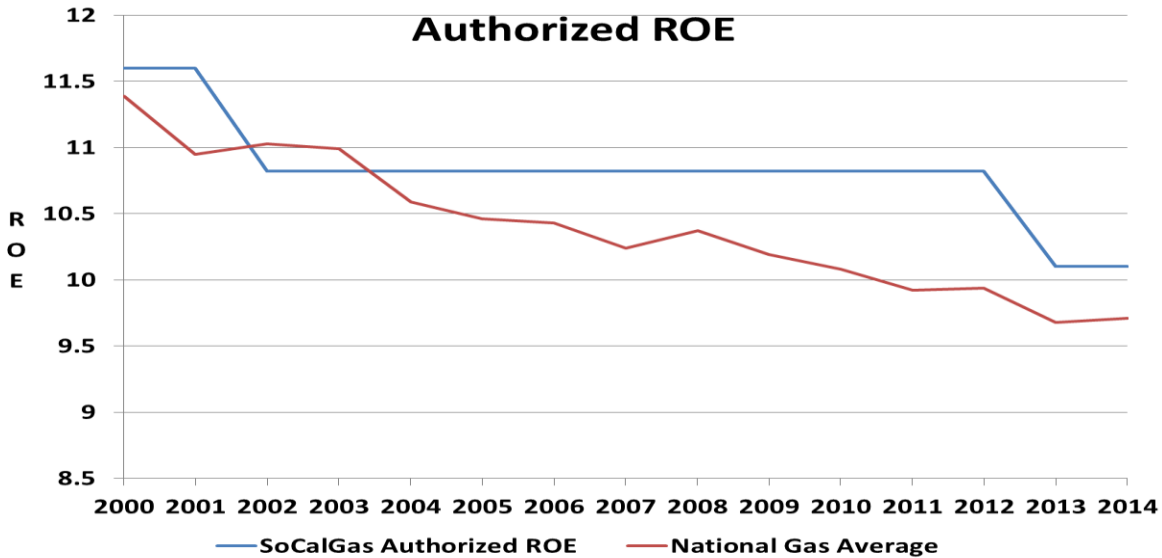


Figure 2



According to both CAPM and RP models costs of capital are a function of the required returns on risk-free securities plus a risk premium. There is no such a thing as a risk-free security. The yields on long-term US Treasury yields are used as a proxy for risk-free rate of interest. Risk premium is the difference between the return on a risky asset and risk-free asset. Risk premium represents the additional compensation investors require for bearing higher risk. The yield spread between corporate and Treasury bonds reflect risk premium investors require for accepting higher risk.

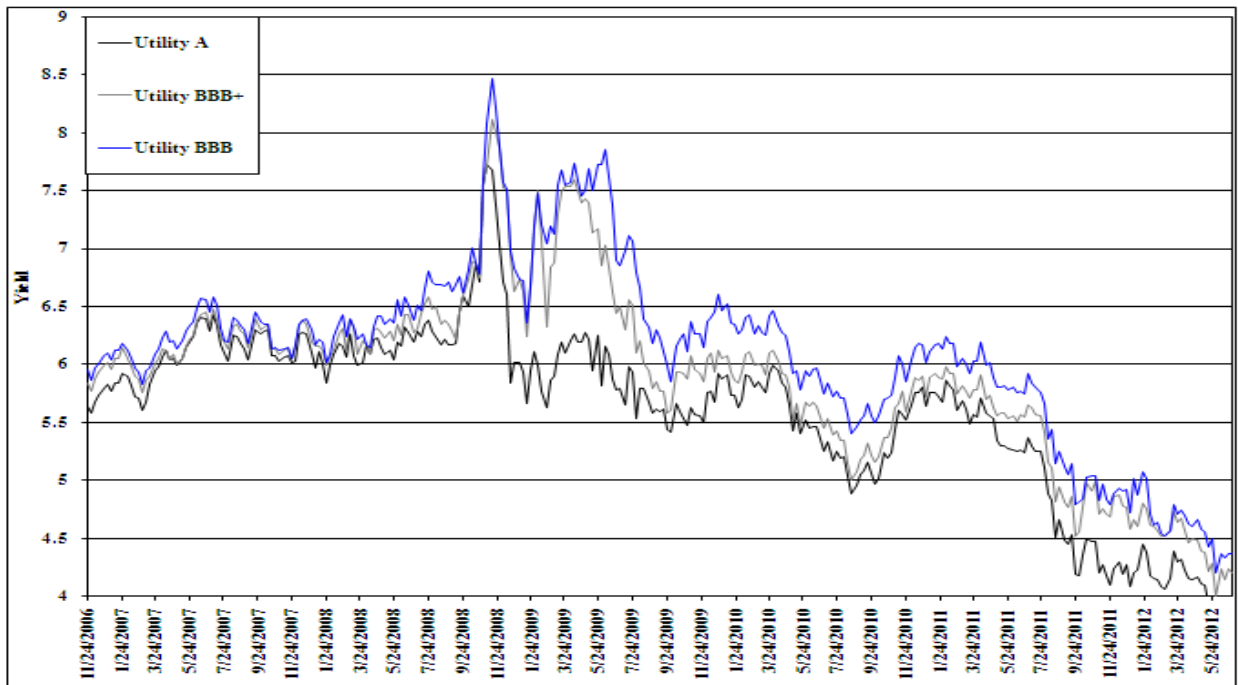
Ten-year Treasury yield in June 2007 stood at 5.03%. After financial crisis began, as Figure 3 shows, ten-year Treasury yield began a declining trend. By December 2008 ten-year Treasury yield had declined to 2.16% mainly because of the Federal Reserve expansionary monetary policy, and the economic recession. From January 2009 until April 2011, the rate fluctuated between 2.5% and 3.8%. After April 2011 the yield on ten-year Treasuries began to decline again. The yields on ten-year Treasuries in June 2012 had declined to 1.69% as economic uncertainties persisted.

The long-term corporate credit markets tightened up during the financial crisis, but improved significantly after 2009. Figure 4 shows thirty-year public utility yields for bonds rated A, BBB+ and BBB. As Figure 4 shows, the yields on public utility bonds peaked in November of 2008 but declined thereafter. As a result, market risk premium, the yield spreads on public utility bonds relative to Treasury bonds, which increased dramatically in the third quarter of 2008, decreased significantly thereafter. Figure 5 shows public utility yield spread over thirty-year Treasuries for bonds rated A, BBB+ and BBB. As Figure 5 shows, the yield spread between 30-year US Treasury bonds and A rated utility bonds peaked at over 3.50% in November of 2008, but declined to 1.25% in 2012.

Figure 3

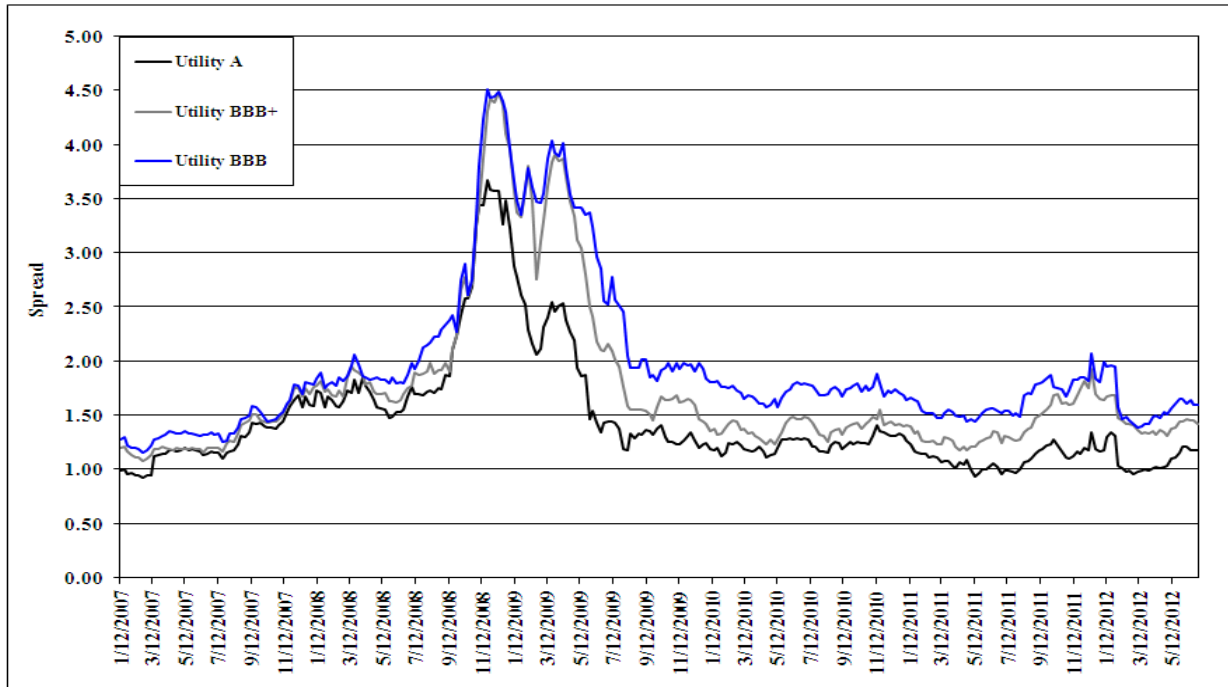


Figure 4



Based on ORA witness testimony in 2013 Cost of Capital proceeding (A.12-04-015).

Figure 5



Based on ORA witness testimony in 2013 Cost of Capital proceeding (A.12-04-015).

Consistent with the trend in Treasury yield and utility yield spread, as Figure 1 and 2 shows, the national average return on equity continued to decline from 2008 to 2013, while return on equity for utilities in California remained unchanged. ROE remained unchanged mainly because utilities in California did not file cost of capital applications during this period. Utilities were required to file annual cost of capital applications prior to 2008. In 2008 a Commission decision (D.08-05-035) changed the cost of capital cycle to every three years. In addition, the same decision established a uniform multi-year cost of capital mechanism (CCM) for PG&E, SCE, and SDG&E,<sup>2</sup> which regulates rates of return for these utilities in the intervening years. Commissioner John A. Bohn was the assigned Commissioner in 2008 cost of capital proceeding.

Utilities filed cost of capital applications in 2007, the year the financial crisis started, for the test year 2008. The 2008 cost of capital decision (D.08-05-035) required utilities to file cost of capital applications on April 20, 2010 for the test year 2011. Instead utilities filed and were granted extensions in 2010, and again in 2011. In 2012 utilities filed cost of capital applications for the test year 2013. The 2013 COC decision (D.12-12-034) lowered utilities' ROE for 2013 and brought California's ROE closer to the national average. Commissioner Mike J. Ferron was the assigned Commissioner in 2013 cost of capital proceeding.

<sup>2</sup> SoCalGas has operated under a cost of capital automatic adjustment mechanism (MICAM) since 1997.

As required by D.08-05-035 between the test years, from 2009 to 2012, utilities' cost of capital was regulated by cost of capital mechanism (CCM). The prominent feature of CCM is that it is backward looking. According to CCM:

“in any year when the difference between the 12-month average Moody's utility bond rates and the benchmark 12-month average Moody's utility bond rates exceeds a trigger of 100-basis point, an automatic adjustment to the utilities' returns on equity (equal to one-half of the difference) shall be made by an advice letter.”

In contrast in cost of capital proceedings the Commission sets cost of capital based on the future expected cost of capital. The backward looking characteristic of CCM might have contributed to failure of ROEs in California to adjust to changes in financial environment after the financial crisis. The stickiness of ROE in California during this period, in the face of declining trend in nationwide average, calls for re-assessment of CCM.

## V. Authorized ROR vs. Recorded ROR

In cost of capital proceedings the Commission has stated it is important that the authorized rate of return does not consistently be higher or lower than recorded rate of return. In other words it is important that the authorized rate of return approximates the recorded rate of return over the long run. Recorded ROR can diverge from the authorized ROR when the recorded ROE diverges from the authorized ROE or when recorded capital structure diverges from the authorized capital structure.

### 1. Recorded ROE vs. Authorized ROE

Authorized ROE is based on investors' expected ROE. Therefore ROE is estimated beforehand. In contrast recorded ROE is calculated after the fact and is based on actual or recorded costs and earnings. Recorded ROE can turn out to be higher/lower than authorized ROE depending on recorded costs and earnings. Recorded ROE is defined as:

$$\text{ROE} = \frac{\text{Net Income}}{\text{Rate Base Equity}}$$

More accurately recorded ROE is based on regulatory earnings, which exclude unregulated parts of the utility business. Regulatory earnings exclude below the line items<sup>3</sup> and non-utility costs and revenues because they are not parts of utilities' cost of service based rates and should be borne by shareholders.

Figure 6-9 compares the recorded ROEs for PG&E, SCE, SDG&E, and SoCalGas to the authorized ROEs over the period between 1997 and 2014. As demonstrated by the Figures PG&E's, SEC's and SDG&E's

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<sup>3</sup> For example starting from the reported earnings from annual FERC Forms 1 and 2, PG&E subtract below-the-line items such as lobbying, advertising, charitable contributions, political contributions, AFUDC (allowance for funds used during construction) equity, shareholder incentive revenues (customer energy efficiency shareholder incentives, core procurement incentive mechanism, reliability incentive mechanism etc.) and the cost of non-utility activities to obtain regulatory returns.

recorded and authorized ROE have approximated each other over time. However, SoCalGas' recorded and authorized rates of return have consistently diverged with SoCalGas' recorded ROE being considerably higher than the authorized ROE during the period 2004-2014. It should be pointed out that SoCalGas was operating under Performance Based Ratemaking until 2008.

Table 1 demonstrates the average difference between the recorded and authorized ROE and the recorded and authorized ROR during the period 2004-2014. As Table 1 demonstrates, during this period, PG&E's average recorded ROE and ROR were 0.83 basis points and 49 basis points below the average authorized ROE and ROR, respectively. SCE's average recorded ROE and ROR were 43 basis points and 9 basis points above the average authorized ROE and ROR respectively. SDG&E's average recorded ROE and ROR were 65 basis points and 48 basis points above the average authorized ROE and ROR, respectively. Finally, SoCalGas' average recorded ROE and ROR were 305 basis points and 181 basis points above the average authorized ROE and ROR respectively.

Table 2 provides a rough estimates of the impact of the divergence between recorded and authorized ROE on revenue requirement. The revenue requirement impact estimates in Table 2 are based on the information utilities provided in 2013 cost of capital proceeding regarding how a 10 basis points change in ROE impact the revenue retirement. The difference between authorized and recorded ROE in 2013 is based on what utilities have reported to the Commission.

**Figure 6**

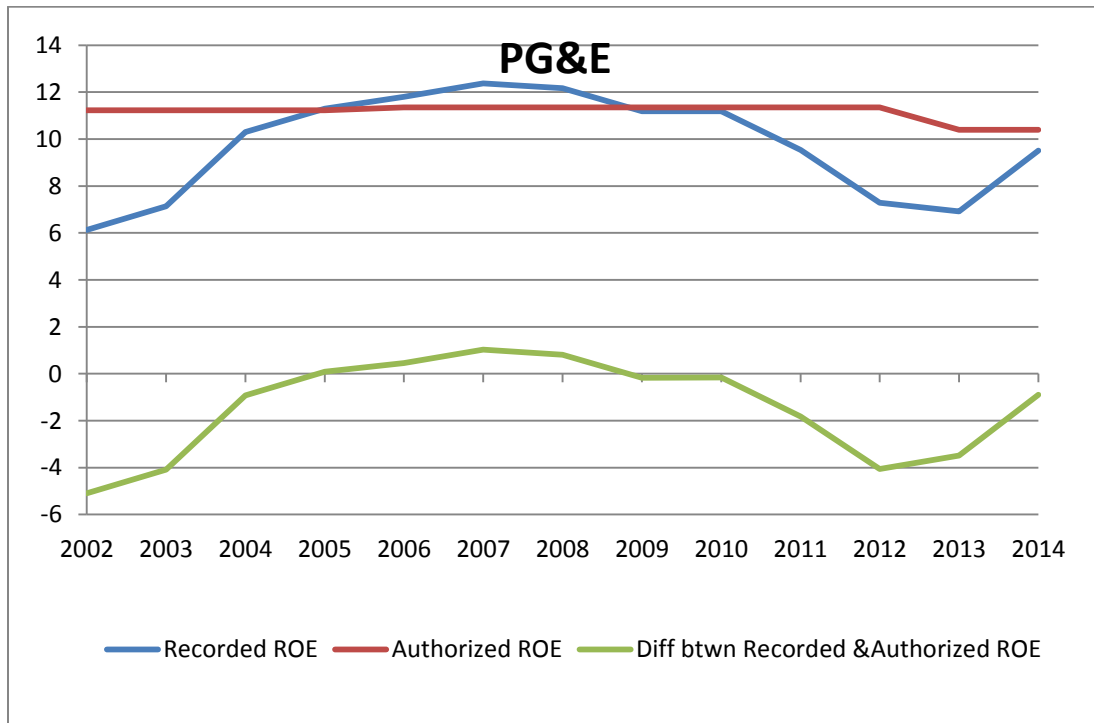


Figure 7

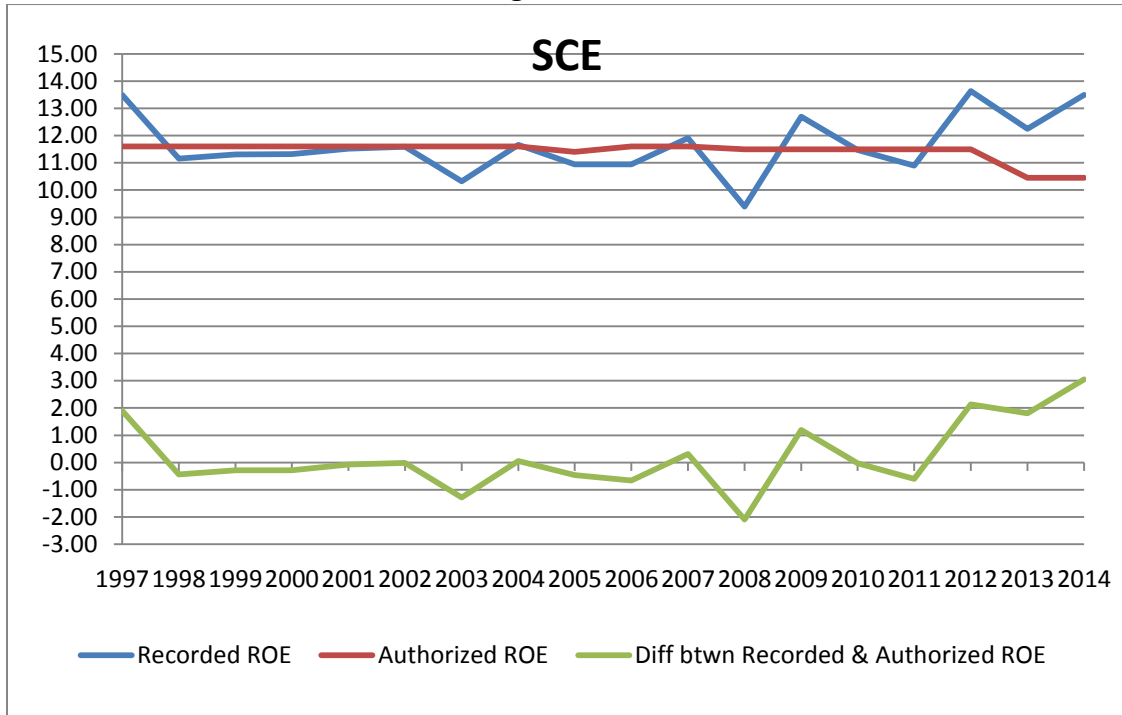


Figure 8

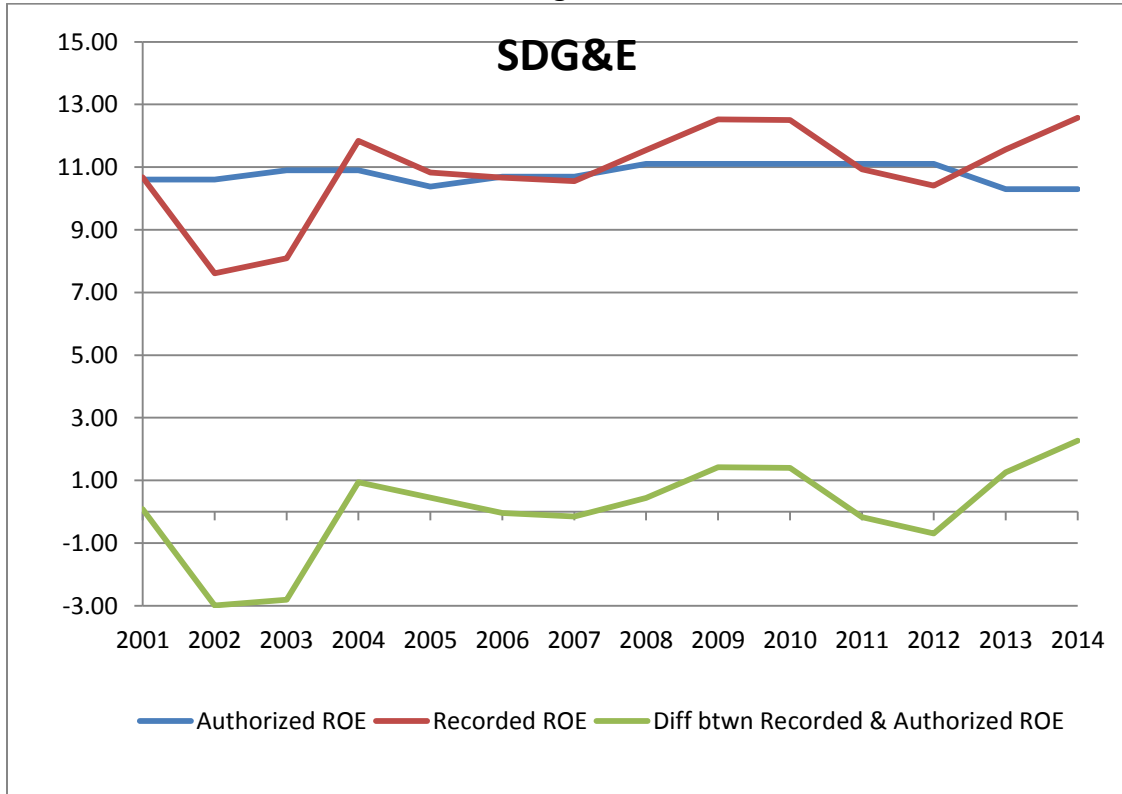
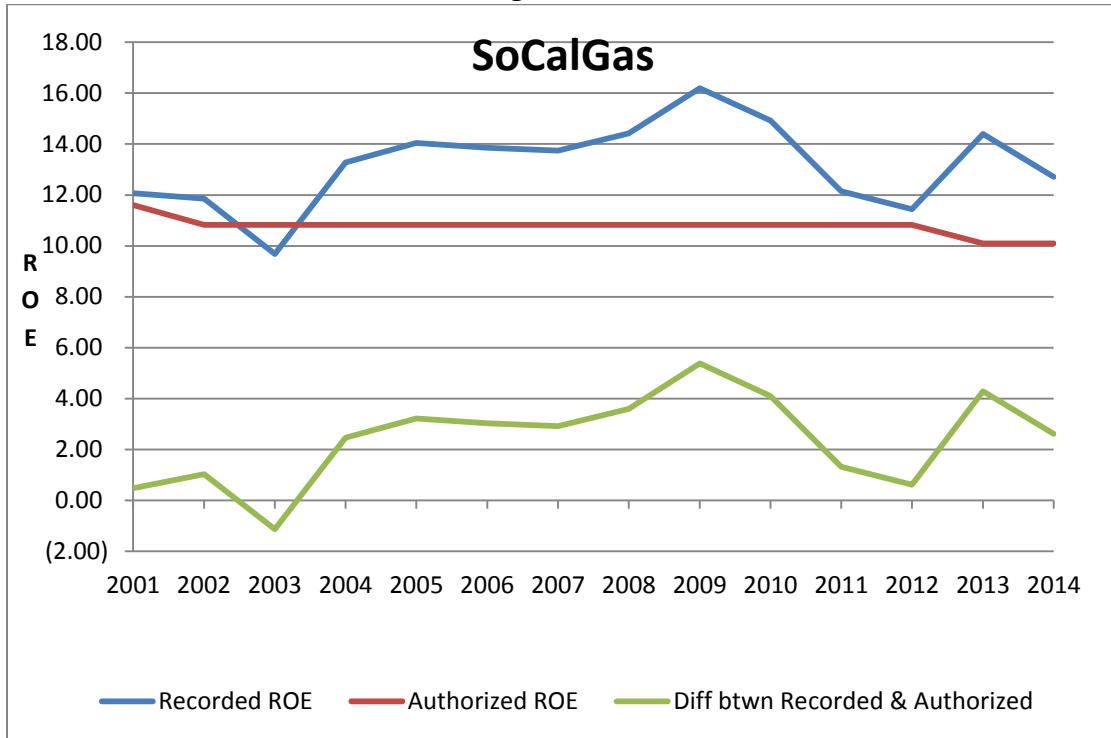


Figure 9



As Table 2 demonstrates, PG&E received around \$592 million dollar less in revenue requirement because its recorded ROE ended up being 348 basis points below the authorized ROE in 2013. SCE received around \$302 million dollar more in revenue requirement because its recorded ROE ended up being 180 basis points above the authorized ROE in 2013. SDG&E's received around \$43 million dollar more in revenue requirement because its recorded ROE ended up being 126 basis points above the authorized ROE in 2013. Finally, SoCalGas received around \$112 million dollar more in revenue requirement because its recorded ROE ended up being 429 basis points above the authorized ROE in 2013.



**Table 1**

| <b>Utility</b> | <b>Average Difference between Recorded and Authorized ROE 2004-2014 (%)</b> | <b>Average Difference between Recorded and Authorized ROR 2004-2014 (%)</b> |
|----------------|---|---|
| PG&E           | -0.83   | -0.49   |
| SCE            | 0.43  | 0.09  |
| SDG&E          | 0.65  | 0.48  |
| SoCalGas       | 3.05  | 1.81  |

**Table 2**

| <b>Utility</b> | <b>Change in Revenue Requirement resulting from 10 basis Change in ROE 2013 (million)</b> | <b>Difference between Recorded and Authorized ROE 2013 (%)</b> | <b>Change in Revenue Requirement resulting from the difference between Recorded and Authorized ROE 2013 (million)</b> |
|----------------|---|--|---|
| PG&E           | 17.0  | -3.48  | -591.60   |
| SCE            | 16.8  | 1.80   | 302.40  |
| SDG&E          | 3.4   | 1.26   | 42.84   |
| SoCalGas       | 2.6   | 4.29   | 111.54  |

## **2. Recorded Capital Structure vs. Authorized Capital Structure**

A utility can reduce its cost of capital by reducing the percentage of equity (more expensive capital) and increasing the percentage of debt (less expensive capital) in its capital structure. Increasing the debt ratio above authorized debt ratio has the impact of reducing the actual cost of capital, while a utility is being paid a higher authorized ROR based on a higher percentage of authorized common equity. Such a change in a utility's capital structure would allow the utility to earn excess profits via a reduction in the utility's actual cost-of-capital.

This strategy has repercussions for shareholders and ratepayers. Shareholders would benefit by receiving the difference between the actual and authorized cost of capital. However the change in capital structure may harm ratepayers by weakening utility’s financial position, which overtime is important in determining the rates it must charge its customers. The authorized equity ratio should be lowest possible consistent with maintaining the utility's financial strength. A decline in the equity ratio below the optimum equity ratio may impact the company's credit rating and thus could expose the ratepayers to additional default risk.

The Commission encountered this issue when Southwest Gas Company filed its cost of capital application (A.02-02-012) in 2002. Comparison of the authorized and recorded capital structure revealed that Southwest had used the authorized capital structure (including 50 percent debt) to estimate the overall rate of return even though the Company's actual capital structure was more leveraged (61 percent debt). The use of the authorized capital structure, when the recorded capital structure is more leveraged has the impact of inflating the overall rate of return. It was further revealed that Southwest Gas Company had consistently deviated from its authorized capital structure over the previous decade by carrying more debt.

As Figure 10 and Figure 11 demonstrate Southwest Gas Company’s authorized debt and equity ratio remained constant from 1989 to 2002. Company’s recorded debt and equity ratio fluctuated during this period. More specifically the recorded debt ratio was between 10 to 14 percent higher than the authorized debt ratio during this period.

On February 1, 2001, S&P changed the rating outlook for Southwest Gas from stable to negative. In its press release S&P explained that the outlook reflected the firm’s weakening financial profile as a result of increased leverage used to finance infrastructure growth. The findings raised doubts regarding the Southwest's management prudence in setting capital structure policy.

**Figure 10**

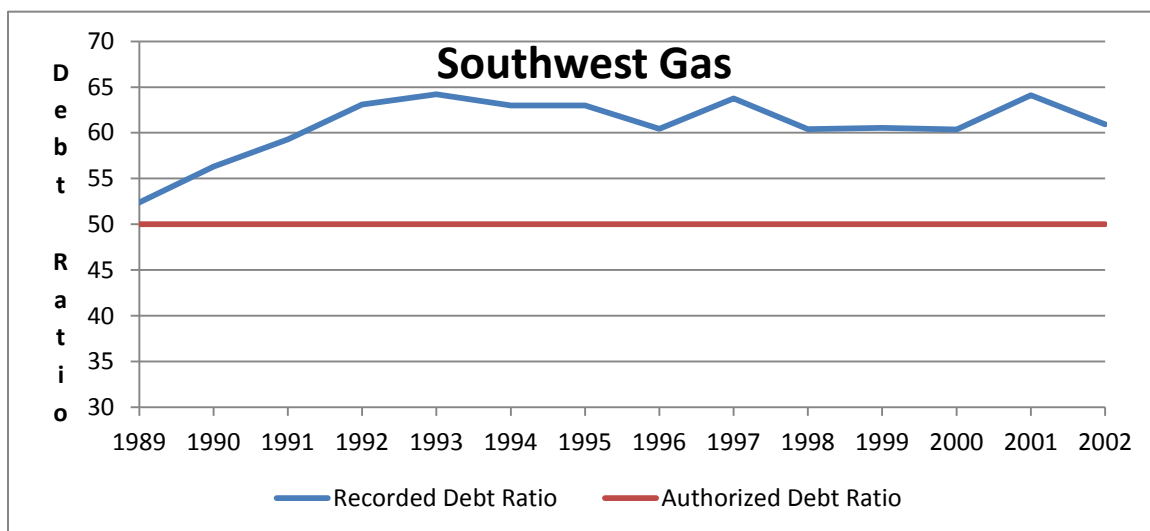
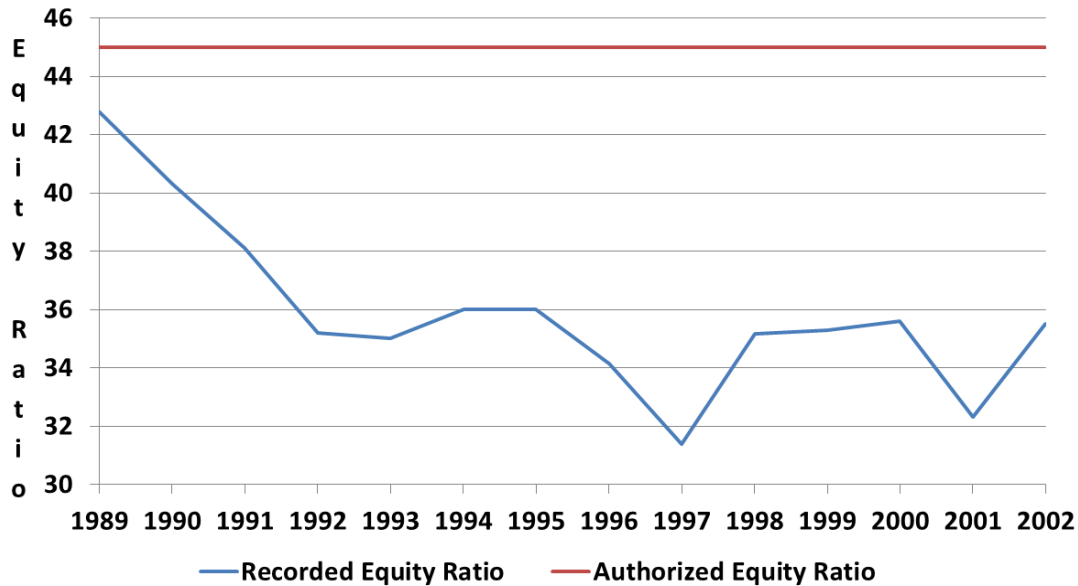


Figure 11

## Southwest Gas



### 3. A Need to Focus on Recorded vs. Authorized ROR

In theory under cost of service or rate of return regulation, the regulatory agency sets the price the utility can charge so as to earn sufficient revenues, including a fair rate of return on investment, by passing its costs on to consumers. The regulated price would then be adjusted upward/downward if the utility starts making a lower/higher rate of return. To satisfy the goal of revenue adequacy, the cost of service regulation shifts a variety of firm-specific and market risk to customers. As a result, it has been argued, firms subject to cost of service regulation do not have an incentive to operate efficiently because they are not allowed to keep the cost savings.

In reality, the Commission operating under cost of service regulation holds public hearings to evaluate costs and to reset rates every three years. The gap between regulatory reviews allows prices to adjust slowly to changing costs. The tendency of prices to adjust slowly to changing costs restores some of the incentives for efficiency in cost of service regulation by allowing utilities to keep some of the cost savings. The tendency of prices to adjust slowly to changes in costs also creates divergence between authorized and recorded rate of return.

Utilities' true costs and true rate of return are reflected in recorded costs and recorded rate of return. By working more efficiently utilities can lower their recorded costs below authorized costs and thus increase their recorded rate of return above the authorized rate of return. In that sense divergence between authorized and recorded rate of return can reflect gains in operating efficiency.

However, the shortcomings of the formal review process stemming from the existence of asymmetry of information between regulatory agencies and utilities could also create such a divergence. Simply put utilities have an advantage in the sense that they know more about their business operation and could use that advantage to earn extra profit. When forecasts of costs used by the Commission are not robust and are subjected to gaming then that could also create divergence between authorized and recorded rate of return.

Because of possibility of gaming the system, it is important to investigate the reasons for the divergence when a utility records a rate of return that is higher than its authorized rate of return. It is not always easy to detect gaming. But perhaps when a utility holds a modified capital structure, which is different from the utility's authorized capital structure by being highly leveraged, over an extended period of time that is an indication that the utility is trying to inflate its rate of return at the expense of ratepayers. However, when shareholders receive a higher rate of return because recorded costs are lower than authorized costs, it is difficult to tell whether that had happened because forecasts of costs were inflated or it is due to gain in operating efficiency.

Another potential way that the utility's actual return may deviate from the authorized return is where the utility significantly over or underspends on capital expenditures, causing its actual rate base to deviate from the authorized level.

The primary concern of the Commission has been to keep nominal prices from increasing. Firms which can increase their earned rates of return without raising customer prices seem to have been permitted to earn above-authorized returns. The reason for allowing utilities to earn a rate of return higher than the authorized rate of return and not investigating the underlying causes seems to be rooted on the belief that the ability to earn a higher rate of return provides an incentive for operating efficiently.

However the existence of asymmetry of information between regulators and utilities implies that possibility of gaming the system do exist. The report at hand does not offer any answers to this issue. It merely calls for more attention to different aspects of this issue.