Regulating Utility Rates of Return: the Case of the Ontario Natural Gas Sector

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While the regulation of public utilities is a widely accepted form of government intervention in the market economy, there are few empirical studies of the effectiveness of one of their key components: the setting of an allowed rate of return. Using the Ontario natural gas sector as a case study, this article examines the effectiveness of utility regulation in setting a market rate of return and concludes that despite market rate objectives, natural gas utilities in Ontario have consistently earned above-market returns. Several mitigative factors are examined, including a proposal to increase competition through deregulation.

Sila réglementation des entreprises de services publics est une forme d'intervention de l'État largement acceptée, il existe pourtant peu d'études empiriques sur l'efficacité d'une de ses composantes clés: la fixation d'un taux de rendement plafond. En prenant pour étude de cas le secteur du gaz naturel ontarien, cet article examine l'efficacité de la réglementation des services publics lorsqu'il s'agit de fixer un taux de rendement marché. Il conclut qu'en dépit des objectifs de taux du marché, les compagnies de gaz naturel ontariennes ont enregistré des rendements excessifs. Plusieurs facteurs modérateurs sont passés en revue, entre autres une proposition visant à augmenter la concurrence par le biais de la déréglementation.

1.0 Introduction

The regulation of public utilities is one of the most widely accepted forms of government intervention in a market economy. However, there have been relatively few empirical studies of the effectiveness of one of its key components: the setting of an allowed rate of return. This article examines the effectiveness of rate-of-return regulation using the Ontario natural gas utility sector as a case study.

The rationale for utility rate-of-return regulation is largely economic. Certain industries, particularly in the energy and communications sectors, exhibit a tendency toward natural monopoly. Conditions favourable to natural monopoly include high fixed costs, a high ratio of fixed to variable costs, and declining marginal costs over a significant range of output. As a result of these conditions, an already-established firm can supply incremental demand at a price lower than any potential competitor.

In a market characterized by monopoly, a firm is able to restrict output, keep price levels higher than marginal costs, and earn excessive returns, or monopoly rents. However, natural monopoly cannot be efficiently controlled by legal prohibition because competition would require extensive duplication of plant and equipment. Therefore, the practice in most

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market economies has been to accept monopoly as necessary, while controlling the resulting economic distortions by external regulation.

Traditionally, external regulation of utilities has focused on setting a rate of return that a utility can earn on its investment. If this rate can be set at the level which would have prevailed in a competitive marketplace, then monopoly rents can be eliminated and the resulting price and output distortions avoided.[1]

However, the effectiveness of traditional rate-of-return regulation has been questioned for some time. Averch and Johnson (1962) argued that rate-of-return regulation does not produce an economically efficient result because it distorts investment decisions. Utilities are encouraged to invest in additional plant, even though that may not be the most efficient alternative, because such investment increases the rate base.

Bernstein (1955), in a review of US regulatory experience in the 1950s, argued that regulatory agencies tend to be captured by the firms they regulate – making decisions which consistently favoured the economic interests of regulated firms. Stigler (1971), in his "economic theory of regulation," went further to argue that regulation itself arises directly from the demands of the regulated firm. It has also been widely argued that any efficiency gains from the regulation of public utilities are more than offset by the inefficiencies inherent in regulation itself (Bonbright et al., 1988; Primeaux, 1988).

This article focuses specifically on the effectiveness of utility regulation in setting a market rate of return for regulated utilities. Based on a discussion of the Canadian natural gas pipeline and distribution sectors and on more detailed empirical evidence from Ontario's gas distribution industry, it concludes that rate-of-return regulation has not achieved its objectives. Rates of return have been significantly higher than market-based rates.

Section 2 summarizes the approaches used to establish regulated rates of return and presents the existing evidence on the outcome of rate-of-return regulation. Section 3 reviews the way in which theoretical approaches to rate-of-return regulation have been applied to distribution companies in Ontario and presents the empirical evidence on *ex post* returns in this sector. Section 4 evaluates some of the alternative approaches to regulatory rate setting which have been proposed to correct the weaknesses of the traditional model.

2.0 Setting Allowable Rates of Return for Public Utilities – An Overview

2.1 Approaches to Setting Utility Rates of Return

In traditional rate-of-return regulation, an appropriate rate of return for the regulated firm is the cost of capital to the firm. The cost of capital to a utility is the annual percentage return that a utility must receive in order to service its debt, pay a return to its equity holder, and ensure sufficient capital to meet future needs. The cost of capital is comprised of the cost of the firm's debt and dividends on preferred stock (senior capital), and the cost of its common stock.[2]

Estimating the cost of senior capital is relatively straightforward. Using a historic test year, it is the actual cost of long-term debt and annual dividend requirements for preferred stock. For a future test year, the cost is the actual cost for existing debt and the estimated cost for projected debt.[3]

Estimating the cost of equity capital, however, is more problematic. Historically, two general criteria for establishing a fair and reasonable return on equity emerged out of the well-known 'Bluefield' and 'Hope' cases in the

1/ Regulation only applies to the elements of a utility which comprise a virtual monopoly. Utilities often have other lines of business which are excluded from regulation.

2/ These costs may be adjusted for an appropriate capital structure as well as for Funds Used During Construction (AFUDC) or Construction Work in Progress (CWIP).

3/ The inclusion of short-term debt often depends on whether the proportion of short-term debt remains reasonably constant over time. If it does, the exclusion of short-term debt will bias the overall cost of capital upwards as long as the cost of short-term debt is relatively low. However, short-term debt may represent a small enough proportion of total capital as to be insignificant.

United States. These were comparability of earnings with firms of similar risk and the ability of the utility to attract sufficient capital.

A large number of techniques have been developed and used to apply these general criteria. All these techniques, however, have practical and theoretical weaknesses, and there is no agreement among experts on which methods are preferable.

Discounted Cash Flow (DCF) analysis is based on the assumption that the market price of a stock is equal to the present value of the future income stream derived from holding the stock. The model makes the simplifying assumptions that the discount rate (the cost of capital) remains constant in perpetuity; that the relevant cash flows are the dividends; and that the dividends will grow in perpetuity.

Under these assumptions, the required cost of equity equals the expected dividend yield per dollar invested plus the expected constant growth rate. This can be stated as:

$p = d/(k - g)$ or alternatively, $k = d/p + g$
where:
- k = the expected return of the investor;
- d = the dividend per share;
- p = the market price per share;
- g = the expected growth rate in dividends per share in perpetuity.

To estimate this cost, the analyst requires the current stock price, an estimate of expected dividends over the next year, and the estimated long-term growth rate of dividends. Risk is reflected through the market price since investors for any given rate of return will pay less for a riskier stock.

Problems with the DCF model include the uncertainty and subjectivity involved in determining the growth rate; the assumption of constant pay out and dividend growth rates; and distortions in expected rates of return caused by inflation and regulatory lags.

The *Risk Premium (RP)* approach relies on the assumptions that common equity carries a higher risk than debt, and that the cost of debt is market-determined. The method estimates current equity return requirements by determining the historic spread between returns on debt and on common equity, and adding this risk premium to current debt yield. This can be expressed by the equation:

$k = k_d + RP$
where:
- k = required return on equity;
- k_d = long-term cost of debt;
- RP = the risk premium.

Note that RP is calculated either on the basis of historical differentials between equity and debt, or by survey results.

Problems with the Risk Premium approach include the definition of an appropriate time period, the variability of the debt/equity differential, and the selection of appropriate debt and equity instruments for comparative purposes.

The *Capital Asset Pricing Model (CAPM)* is based on the assumption that investors will choose to hold investment portfolios that either maximize expected returns for a given variance of possible returns (which equates to the level of risk) or minimize the variance for a given expected return. Therefore, the cost of equity capital (or expected return on a utility's common equity) equals the return of a riskless security plus some risk premium related to the utility's stock. This can be expressed as:

$k = R_f + \beta(R_m - R_f)$
where
- k = investor's expected return or utility cost of capital;
- R_f = current risk free return;
- β = beta coefficient for the utility-specific risk relative to the market;
- R_m = expected return on a stock market portfolio.

The beta coefficient encompasses both the standard deviation of a particular security's returns relative to a portfolio of securities and the correlation of the selected asset's movement relative to that of the portfolio. In practice, the beta coefficient is usually based on linear regression of the security's realized return against a market index return, expressed as the slope of the regression line. A beta value of less than one indicates a low level of risk relative to the market and a value of more than one represents a higher risk.

Problems with the CAPM approach include the inability of the beta coefficient to capture all the determinants of the cost of capital and the volatility of beta estimates. Although a number of variants of the CAPM model have been developed to address these problems (e.g., Arbitrage Pricing Theory (APT) model), it has not been extensively used by utility regulators.

The *Comparable Earnings (CE)* Approach calculates an allowable rate of return on equity for a regulated utility by using a selected sample of regulated or non-regulated companies considered to be comparable in riskiness. Comparability of risk is generally determined with reference to stability of earnings, market price-book ratios, and relationship of earnings to broader market indices like *Standard and Poor's* or *Value Line.*

Because the CE method is easy to apply and avoids many of the subjective decisions required by other methods, it has been used widely in regulatory rate hearings. However, problems include the possibility that comparable firms may earn more or less than the true cost of capital in a given period, the difficulty of choosing comparable firms, and accounting differences between regulated and unregulated firms.

The *Market Price-to-Book Value Ratio (M/B)* approach examines the market price of public utility shares relative to the book value of those shares (Bierman, 1984). General agreement exists that, in theory, a market rate of return in a perfect capital market would result in an approximate equality between the market price and the book value of a regulated utility's stock.

This equality occurs because the market value (MV) of the regulated utility's stock equals the present value of the expected cash flows (CF) to the shareholder, which if treated as a perpetual annuity, equals CF/r (where r equals the cost of capital). Moreover, utility earnings are equal to the allowed rate of return (ROR) times the rate base (which is assumed to be approximately equal to the book value (BV)). If all earnings are paid out to investors, the relationship can be expressed as follows:

$$MV = CF/r = (ROR \times BV)/r.$$

Thus $MV/BV = ROR/r$, and if the rate of return is set equal to the cost of capital, then:

$$ROR/r = 1 = MV/BV$$

(Kolbe and Read, 1984, pp. 26-27).

Despite the soundness of the underlying premise, the application of the M/B approach as a regulatory tool runs into the problem of circularity (Kolbe and Read, 1984). Once investors understand that regulators will adjust the rate of return until the M/B ratio equalled unity, they will adjust the market price they would be willing to pay for the utility's shares.

While the M/B approach has not been used by regulators to set rates of return, the ratio has been used to adjust the results of other tests, such as Comparable Earnings and Risk Premium. The argument is that certain transaction costs and market imperfections may lead to the calculation of a rate of return on equity that is too low. Therefore an M/B ratio in the range of 1.1 to 1.2 is sometimes used by regulators to ensure a return which protects the financial health of the regulated utility.

2.2 Effectiveness of Utility Rate-of-Return Regulation: Other Studies

Despite the increasing sophistication of utility rate regulation calculations, there is some evidence that the regulatory process has been ineffective in equating the rates of return earned by utilities to a market-based cost of capital. Waters (1987), in a study for the Ontario Ministry of Energy examined rates of return on common equity for gas utilities, and investor reaction to regulatory treatment of utilities. The study concluded that: "utilities clearly outperformed the industrials in recent years, implying that investors in Canada have been well treated by the regulatory process in the face of significant and sustained inflation" (Waters, 1987, p. 43). Based on analysis of market/book ratios, the study concluded that Canadian regulatory agencies have allowed more than adequate rates of return to investors.

Fitzpatrick et al. (1988) examined the effectiveness of rate-of-return regulation in the US

electric utility industry between 1971 and 1982. The study investigated the relationship between requested, granted, and market returns of equity capital in all regulated states. It concluded that, although significant resources are spent on determining utility-specific rates of return, "...requested and allowed returns on equity are evidently not based on specific market cost of equity criteria and do not appear to be affected by the company-specific regulatory adjustments" (Fitzpatrick, et al., 1988, p. 43).

Finally, Scotia McLeod (1990, pp. 4-5) compared the performance of the Canadian banking sector and Canadian utilities as defensive holdings against market declines. The study noted that utilities had 'fulfilled their traditional role' by declining less than the market over the short term, and by outperforming the market in the longer term. It also concluded that utilities consistently traded at a "significant but variable yield premium to banks."

3.0 The Case of the Canadian Natural Gas Sector

3.1 Patterns of Regulatory Decision Making

The natural gas sector in Canada is regulated at both the federal and provincial level. Natural gas pipelines which cross provincial boundaries are regulated by the federal National Energy Board (NEB), an independent regulatory agency. The two largest natural gas pipeline companies under NEB regulation are TransCanada PipeLines Limited (TCPL) and Westcoast Energy Inc. (Westcoast).

Because large corporations represent a significant part of a transmission pipeline's supplier and customer base, intervenors have been strongly represented at NEB rate hearings. These producer and consumer organizations have a large stake in regulatory outcomes and control sufficient resources to provide a reasonable balance of evidence.

Natural gas distribution utilities operating within provinces are generally regulated by independent provincial government agencies. In Ontario, for example, the Ontario Energy Board (OEB) regulates three large gas distribution utilities – Consumers' Gas, Centra Gas (previously, ICG Canada), and Union Gas. The consumer interest is not as strongly represented by large organizations at the provincial level in Ontario. For this reason, while large industrial consumers participate in some hearings, most of the rate-of-return evidence and arguments on behalf of consumers are provided by the OEB's own staff.

This section examines the regulatory process for Ontario natural gas utilities in more detail – assessing the way in which the theoretical approaches to utility rate regulation have been used in practice. The appendix summarizes key data on 26 OEB rate hearings between 1982 and 1992.

Over the nine-year period considered, the three major gas utilities regulated by the OEB have consistently used the Risk Premium and Comparable Earnings approaches to support rate-of-return applications. Most often these methodologies were advanced with equal weight, with the requested rate of return based on an average of the results. Occasionally, one approach has been given primary weight over the other. The DCF approach was advanced as a secondary test in less than one-half of the rate hearings.

Intervenors and OEB staff advanced the same two approaches as the applicants to support their rate-of-return proposals. As might be expected, the rates of return proposed by intervenors were consistently lower (an average of 10% lower) than those proposed by the applicants. This difference was due to different results using the same methodologies, not a different mix of methods.

In making its decisions, the OEB has pursued a relatively conservative approach based on incremental adjustment and the use of judgement. Rate decisions have tended to strike a balance between the positions put forward by the applicants, intervenors, and OEB staff.

In 19 of the 23 cases for which full data were available, the OEB's decision fell between the positions advanced by the parties to the hearings.[4] Overall, decisions showed relatively

4/ Of the remaining four cases, one favoured the

little variability. In 19 of the 23 cases considered, the OEB's rate decision ranged between 92 to 96% of the regulated utility's request.

Most of the OEB's reasons for decision tended to give explicit consideration to the evidence of at least one of its two favoured rate-of-return methods (RP and CE). In many of these cases the Board applied its own judgement in the face of the different results from these tests submitted by parties to the hearing. In about one-half of the cases, the Board made its decision wholly or partially on the basis of changes in real interest rates (i.e., previous or projected changes in interest rates and inflation).[5] The OEB has tended to give little credence to evidence based on DCF methods, and there is little evidence that the Board has encouraged parties to use any other new or innovative alternatives to its two favoured approaches.

3.2 Evaluating Rates of Return

Despite the apparent balance in the decisions of the NEB and OEB between the positions of utilities and their consumers, there is considerable evidence that the rates earned by the regulated utilities have exceeded a market-based cost of equity capital. These above-market returns are evaluated by using three *ex post* measures of the opportunity cost of equity capital to utilities: historical rate of return comparisons; market-to-book ratios of regulated utilities; and analysis of recent utility acquisitions.

OVERALL RATE OF RETURN COMPARISON

The widely used Comparative Earnings and Risk Premium approaches suggest that a rate of return approximates a market-based opportunity cost of capital when it is comparable to the return for industries with a similar degree of risk.

The following table shows that, on average, the aggregate return on equity for gas utilities was 20% higher than that for non-financial industries during the 1980-1990 period. Gas utility returns were less than those for industrials in only two of the eleven years considered. Returns for the industrial sector were also considerably more variable, indicating higher risk.[6] These trends are directly contrary to the pattern that one would expect, supporting the proposition that regulated utilities have been able to earn more than a market-based return.

Table 1: Comparative Rates of Return on Shareholders' Equity

	Non-Financial Industries	Pipelines	Gas Utilities
Average Rate of Return (%) 1980-1990	10.09	10.16	12.14
Standard Deviation of Returns	2.75	2.35	1.33

Source: Statistics Canada, *Catalogue 61-003*

MARKET TO BOOK RATIOS FOR MAJOR ONTARIO UTILITIES

As discussed in section 2.1 above, the market rate of return in a perfect capital market would result in a price-to-book value (M/B ratio) approximately equal to one. The use of the M/B ratio in prospectively setting allowed rates of return runs into the problem of potential circularity; but this shortcoming is not present when the method is used retrospectively to examine past earnings during a period when the allowable rate of return was not set by this method. Therefore, the M/B ratio can be used as a viable indicator of appropriate rates of return, even if values other than one are considered justifiable. In that regard, Bonbright et al. (1988) suggest that the cost of capital implied by a M/B ratio of one represents a minimum allowance, which should be granted some 'reasonable upward adjustment' – allow-

applicant and three favoured the intervenor.

5/ The implicit assumption in these decisions is that the previous rate-of-return is based on a reasonable risk premium and that adjustments need only be made to the cost-of-debt term of the RP equation.

6/ This trend is particularly striking given the fact that the aggregate industrial sector is much larger than the gas utility sub-sector. All other things being equal, variability is inversely related to the size of a sample or universe being considered.

ing for M/B ratios in the range of 1.1 to 1.2.[7]

For the 1985-1990 period, the M/B ratios of the two largest Ontario utilities for which data are available are summarized in the following table. These ratios are both significantly greater than 1, and greater than the adjusted ratios of 1.1 to 1.2 sometimes used by regulators. The results clearly suggest that the market places a significant premium on these utilities relative to book value, and that investors are willing to accept a lower rate of return than that allowed by the regulatory authorities.

Table 2: Market-to-Book Ratios for Major Ontario Utilities, 1985-1990

	Highest	Lowest	Average
Consumers' Gas	1.63	1.34	1.43
ICG/Centra Gas	1.87	1.21	1.59

Source: Report on Business, *Canada Companies Handbook*

RECENT ONTARIO UTILITY ACQUISITIONS

The sale or merger of a regulated utility represents another opportunity to measure the value placed on it by investors and to calculate a market-based cost of equity capital. It can be argued that these transactions better represent the value placed on the total assets of a utility than do share transactions at the margin. As with other measures of the M/B ratio, the purchase price, theoretically, should not exceed the book value.

In Ontario, ICG Canada (now known as Centra Gas) and Consumers' Gas changed ownership in 1990. Westcoast Energy Inc. purchased the shares of ICG Canada for a total estimated value of $25/share (OEB, 1990a, p. 42). An analysis by the investment broker, Scotia McLeod (1989), estimated that the ICG acquisition would be concluded at a 10 times earnings multiple and a 1.45 M/B ratio.

An implicit opportunity cost of capital for ICG can be estimated, based on the purchase price Westcoast was willing to pay for the ICG shares, using two methods. First, as Kolbe and Read (1984, p. 56) note, the earnings-price ratio is a variant of the DCF ratio which can be used to roughly estimate the cost of capital. Using the estimated purchase price of $25 per share and the 1989 earnings per share of $2.21 (*Report on Business*, 1990, p. 272), the cost of capital is 8.8%.

A second method uses the relationship between the M/B ratio and the allowed rate of return to estimate the cost of capital (Kolbe and Read, 1984, p. 85). This relationship is given by the formula:

$$M/B = ROR/r$$

which can be rearranged as

$$r = ROR \times B/M$$

where:

M/B = the market/book ratio;
ROR = the allowed regulatory rate of return;
r = the market-based cost of capital.

Using the M/B ratio of 1.45 reflected in the Westcoast offer for ICG and the 1990 allowed rate of return of 13.5%, provides an estimated cost of capital of 9.3%. Adjusting upward to reflect a M/B ratio of 1.2 would produce a cost of capital of 11.2%, still well below the 13.5% allowed by the Ontario Energy Board.

In 1990, British Gas plc acquired all the common shares of Consumer's Gas Company (OEB, 1990b). The price of approximately $34.26/common share was about 1.75 times book value, and represented a premium of about 20% over the trading value of the shares. An analysis by RBC Dominion Securities indicated that Consumers' had generally traded at the high end of M/B ratios compared to other utilities, "... reflecting the market's perception of Consumers' as a...premier Canadian gas distribution utility" (Consumers' Gas, 1990, Schedule A, p. 7).

Using the same earnings-price method applied above, the offer price of $34.26 and earnings of $2.82/share imply a cost of capital of 8.2%. Alternatively, using the M/B ratio of 1.75 and the allowed 1990 rate of return of

7/ Some have gone further and argued that utilities should be able to earn rates of return that generate M/B ratios equal to those of unregulated firms. However, an MB ratio of 1 is a direct result of regulation, and there is no theoretical basis on which to expect that the ratio should be comparable in regulated and non-regulated firms (Kolbe and Read, 1984; Gordon, 1974).

13.5% yields a cost of capital estimate of 7.7%. Adjusting for an M/B ratio of 1.2 provides a cost of capital estimate of 9.2%.

ESTIMATES OF ABOVE-MARKET RETURNS

Based on the difference between the actual opportunity cost of capital estimated on the basis of market behaviour and the utilities' actual returns, it is possible to estimate above-market returns on equity. For the Canadian natural gas utility sector as a whole, above-market returns can be approximated by applying the rate of return differential between the natural gas utility sector and the non-financial industrial sector as a whole (see section 2.1 above) to the earned income of Canadian gas utilities. This method produces an average above-market earnings estimate of $42 million a year between 1980 and 1990.

The following table estimates above-market annual returns for the three large Ontario gas utilities analyzed above. The first method uses a comparison between the rate of return earned by these companies and that earned by the non-financial industrial sector between 1980 and 1990. The second method uses the allowed rate of return on common equity, the actual M/B ratios, and a market rate implied by an M/B ratio of 1.1 to estimate average annual above-market returns between 1985 and 1990. The third method uses the difference between the cost of capital estimated on the basis of the ICG and Consumers' Gas purchases and the allowed 1990 rate of return for those two utilities.

Although the estimates of above-market returns vary by method for each utility, all estimates show that they are significant. Based on averages for the three utilities, their total above-market returns are $42.7 million per year. Based on the highest and lowest estimates, total returns range from $28 to $55 million.[8]

Table 3: Estimates of Annual Above-Market Returns ($Millions)

Method of Estimation	Consumers' Gas	ICG/ Centra	Union Gas
Comparable earnings with non-financials	36.2	1.3	8.7
M/B Ratios	17.7	10.0	n.a
Purchase analysis	29.0	7.9	n.a
Average	27.6	6.4	8.7

4.0 Alternative Approaches to Regulatory Rate Setting

The above results reinforce existing doubts about the ability of current rate-of-return regulation to achieve its central goal – the setting of return levels comparable to those of unregulated firms with similar investor risk. This section considers a number of approaches which have been advanced as alternatives to traditional rate-of-return regulation.

Comprehensive Evaluation

In this approach, regulators would assess the reasonableness of past returns by undertaking a historical evaluation of utility regulation similar to the one used in this study. If the analysis showed above-market returns, then future returns would be appropriately lowered.

Although this approach would establish a more concrete link between regulatory and market rates of return, it is prone to circularity problems similar to those associated with some of the methods currently in use.[9] In addition, it has been argued that a fair rate of return is one which equals the current cost of capital to the utility or comparable firms, rather than to past costs.

Formula-Based Rate-of-Return Guidelines

Another alternative is to set an overall formula

8/ Because the definition of income for the three gas utilities may not be the same as the Statistics Canada definition, these utility-specific estimates are not directly comparable to the above estimates for the natural gas distribution sector as a whole.

9/ For example, if retrospective M/B ratios are used, investors' expectations of a changed rate of return based on their own retrospective analysis would change the price they would be willing to pay and therefore the M/B ratio used in the analysis.

to be used to determine the rate of return over time, rather than setting a specific rate-of-return requirement for each utility. For example, a utility's rate of return could be tied to a moving average of the rate of return of all non-financial industries.

Such an approach offers two major advantages over more traditional methods. First, it lowers the cost of regulation, since a lengthy hearing for each rate application is eliminated. Second, it is less vulnerable to agency capture because the allowable rate of return is determined with reference to an external criteria rather than the subjective judgement of regulators. The major disadvantage is that most formulas which avoid subjective judgements are based on historical data which may not correctly specify a fair market return during times of rapid economic change (e.g., rising inflation or falling interest rates).

A variant of the formula approach is used by the Interstate Commerce Commission in the US, where utilities have the option of using a generic return or applying for an individual rate, as circumstances warrant.

Price Cap Regulation

Price Cap regulation takes a fundamentally different approach. Rather than determining an appropriate rate of return on the rate base, it employs incentives designed to encourage fair and efficient pricing and other desired utility behaviour (e.g., cost minimization, technological innovation). Typically, Price Cap regulation ties allowable price increases to a formula related to general price increases in the economy – possibly offset by some adjustment for productivity.

The principal advantages of this approach are that it eliminates the need to set a rate of return altogether and avoids the costs of regulatory oversight associated with rate setting. It also avoids other distortions which accompany rate-of-return regulation. These include the incentive to use capital over labour, the tendency to use average rather than marginal cost pricing, and a disincentive to technological innovation.

The price-cap approach has a number of disadvantages. It lowers the level of consumer protection from unfair or predatory pricing – unless inefficient caps are placed on each good or service offered by the utility. There are also difficulties in accounting for extreme cost changes for inputs which are of particular importance to the utility (e.g., natural gas commodity prices, interest rates). Price cap regulation has found the most favour in the telecommunications industry, which has been characterized by rapid technological change and increased competition.

Hybrid Approach: Price Cap with Regulatory Oversight

Under this approach, which has been used by some regulators in the US, a utility would be regulated primarily on the basis of a rate cap, but would continue to report profitability indicators to the regulator. If profitability was excessive under the cap, the regulator could initiate a rate-of-return based hearing. Similarly, if profitability was insufficient, the utility could initiate such a hearing.

The advantage of this approach, in theory, is that it achieves some of the benefits of price cap regulation while protecting both utility and consumers from any unanticipated distortions. In practice, however, the regulated utility has a larger and more concentrated stake in regulatory outcomes than either the regulator or most individual consumers. This could give an upward bias to rates of return because utilities would be more aggressive and better prepared to initiative rate-of-return hearings if price cap outcomes were unfavourable to their interests.

5.0 Conclusions and Recommendations

The evidence presented in this paper suggests that the natural gas utilities in Ontario have consistently earned above-market returns despite a regulatory process with a stated objective of ensuring that returns are normal. This finding is consistent with both theoretical studies on agency capture and empirical studies on industry financial performance.

There is no easy solution to this problem. Although improvements in techniques to estimate market returns will continue to be made, most of these techniques require assumptions or forecast of future financial indicators which inevitably involve judgements that can not be verified. Other techniques rely on past indicators which may not be relevant in the future.

While there is no way of resolving these problems, several mitigative measures warrant consideration. First, continuing research on the validity of alternative methods is important. Variations on techniques and better forecasting methods can produce improved results. Second, funding for intervenors is important to ensure consideration of a broad range of evidence. Third, the frequency of hearings could be reduced by relying more on a formula-based approach. This would reduce costs of hearings and opportunities for agency capture. Finally, efforts should be made to increase competition between competing energy suppliers. Although this is constrained by natural monopoly characteristics of the industry, there are opportunities for deregulating parts of the utilility sector and energy markets which have been implemented with some success.

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Appendix: Summary of OEB Rate of Return on Common Equity Decisions, 1982-1992

Table 1: Consumers' Gas Company Ltd.

Year	Hearing Number	Applied for Rate	Methods	Weight Applied (%)	Intervenor Suggested Rates	Methods	Weight Applied (%)	OEB Allowed Rate (%)	Basis for Decision
1991	EBRO 465	14.0						13.125	• slightly lower business and financial risk
1990	EBRO 464	14.0			OEB staff 12.95 IGUA 13.0	(on 33% com.equity component) (on 33% com.equity component)		13.25	• on 35% Common Equity component • market to book ratios; • experience with deregulation and diversified gas portfolio are decreasing business risk.
1989	EBRO 452	14.375 14.25-14.8	Overall CE (adjusted to M/B target of 115%)		OEB staff 12.45-12.7			13.50	• Board placed 'dominant reliance' on Comparable Earnings test; • adjustments based on different risk and M/B ratios should be considered.
1987	EBRO 414	15.0	(on 36% equity) CE with RP as a check		Special Counsel 13.25-13.5 13-13.5	(on 34% equity) (on 36% equity) Both based on CE and RP tests		14.0	• Primary reliance on CE; • Judgement used in applying a test can outweigh technical considerations.
1986	EBRO 403	15.5	(on 39.4% equity) witness A: RP DCF witness B: CE RP and DCF	 primary support primary secondary	Special Counsel 14-14.5	(on 35% equity) CE RP	 50% 50%	15.0	• on 36% Common Equity component • primary reliance placed on Comparable Earnings test, because both applicant and intervenor witnesses got similar results.

1984	EBRO 395	16.0 15.75-16.25 (16.25) (15-15.5) 16.25-16.5 (16.25-16.5) (15.25-15.5)	(on 37% equity) Witness A: CE RP DCF Witness B: RP DCF (included major banks in sampling)	 primary primary secondary 50% 50%	OEB staff 14.25-14.75 (13.21-14.06) (then adjusted upwards to reflect a M/B ratio of 1.1 or more) IGUA 15.0 or less	 RP DCF	 primary secondary	15.30	• Greatest emphasis placed on results of CE and RP tests; • Little weight placed on results of DCF test; • The Board noted the wide variation in results produced by the various CE analyses; • The board has never used M/B ratios as a target, "but recognizes the desirablility of maintaining a positive ratio" to support financial integrity.
1983	EBRO 386	17.0 17.25 (16.5-17.5) 17.3 (16.75-18.25) 17.5-18.0	 Witness A: CE DCF RP Witness B:		OEB staff 15.8-16.0 (15.5-16.6) (15.5-16.0) IGUA 15.8-16.0	 CE RP Based on Board Staff witness evidence		15.75	• Consumers' is less risky than the average utility (Beta value less and 0.75); • Interest rates had fallen below the lowest forecast of any expert witness; • Use of utilities as a basis of comparable earnings test is circular.
1982	EBRO 381	16.25 16.0-16.75 (16.0-17.0) (16.0-17.0) (16.75) 17.5-18.0	 Witness A: CE DCF RP Witnesses B&C: M/B of new issues = 1;	 primary	OEB staff 14.0-15.0 (14.0-14.5) IGUA 15.0	 CE (final result adjusted to reflect high interest rates) to resist inflation and undue expansion.		16.25	• The Board viewed the CE test as the most useful. • The Board felt it was being asked to ignore the CE test in favour of the 'spot' cost of equity (as evidenced by the request to increase the M/B ratio to 1 or more).

Table 2: Northern & Central Gas Corporation Limited/ICG Utilities (Ontario) Ltd/Centra Gas

Year	Hearing Number	Applied for Rate	Methods	Weight Applied (%)	Intervenor Suggested Rates	Methods	Weight Applied (%)	OEB Allowed Rate (%)	Basis for Decision
1991	EBRO 467	15 14.55 15.3	Overall CE RP	50% 50%	Board Staff 12.0-13.0 11.0-13.0 11.54-12.04 IGUA 13.0	overall CE RP		13.75	• Centra' s business risk has increased since the EBRO 440 Decision in 1988; • The Board gas equal weight to the CE and RP tests; • The Board accepted that for the RP test an adjustment to the M/B ratio should be made for the selected industrials, and that those M/B ratios are generally higher than necessary for an LDC to earn adequate return.
1988	EBRO 440	14.5 14.5-14.75 14.6	Overall CE RP		Board Staff 13.0-14.0 11.0-14.0 11.5-12.5	 overall CE RP		13.50	• ICG's risk was not found to have changed materially since EBRO 430; • The Board expected the cost of capital to increase in 1988, and given recent declines in M/B ratios, the required rate of return will increase.
1987	EBRO 430	14.75 14.75 12.6-12.8	overall CE (primary) RP (check)		Special Counsel 13.0 13.0-14.0 10.3-11.8 IGUA 13.8	 overall CE primary RP (check) overall		13.25	• ICG's business risk had not changed since EBRO 408, but its financial risk had decreased due to an increase in the common equity component of its capital structure to 37%; • The Board saw a target M/B ratio of 100 to 120 percent as appropriate; although other firms might experience highe M/B ratios, they might do less well than regulated firms in unfavourable economies.

1986	EBRO 408	16.0 Dr. Evans 15.75-16.25 Mr. Venn 16.0 15.5-16.0	overall Primarily CE with RP check judgemental, checked against DCF, RP and M/B analyses. RP		Board Staff 14.5-15.0 < 15.0 13.6-14.6 IGUA 15.0-15.25	overall CE RP	primary	15.00	• The Board relied on the CE test; • All experts had reduced their recommendations by 0.75% since 1985; • The Board found that the overall risk premium had declined since EBRO 399.
1985	EBRO 399	16.5 Dr. Evans 16.5-17.0 16.6-17.3 Mr. Venn 16.75	 CE RP Interest coverage		Special Counsel 15.25-15.75 15.0-16.0 14.5-16.0 IGUA 15.75 INCO 15.6	 overall CE RP		15.75	• The investment risk of the applicant was unchanged since EBRO 396; • The Board agreed that utilities have historically required a lower rather than higher return on equity to maintain a M/B ratio of 1.1 to 1.2 than unregulated utilities; • The Board found the RP test to be of limited usefulness.
1984	EBRO 396	16.25 Dr. Evans 16.25-16.75 16.25-16.75 16.3-16.7 Mr. Venn 16.25	 overall CE RP Comparable investments	primary	Board Counsel 15.25-15.75 15.25-15.75 14.5-15.5 IGUA <15.5	 overall CE RP	primary	15.75	• Northern had a slightly higher business risk than either Consumer's or Union; • Utilities have lower investment risk than unregulated industries; • The Board accepted the desirability of a M/B ratio of 1.1 to 1.2
1983	EBRO 384	Dr. Evans 17.0-17.5 Mr. Venn 17.0	 CE,RP,DCF capital markets		Board staff 15.0-16.0 IGUA <15.85	 CE,RP,DCF		16.00	• The Board relied primarily on the CE approach, although it saw the RP approach as useful; it gave little weight to the DCF approach.
1982	EBRO 384	15.1						15.10	• The Board was satisfied that 15.1 was "at the low end of any range of reasonableness in the current economic circumstances"

Table 3: Union Gas Ltd.

Year	Hearing Number	Applied for Rate	Methods	Weight Applied (%)	Intervenor Suggested Rates	Methods	Weight Applied (%)	OEB Allowed Rate (%)	Basis for Decision
1992	EBRO 470	14.75 (14.3-14.4) (15.0-15.3)	 CE RP		Consumers' Coalition 12.0-12.5 (12.5) (11.44-12.5) Board Staff 12.0-12.5 (12.0-13.0) 11.35-11.85)	 CE RP CE RP		13.5	• The Board noted that neither the hypothetical capital structure of 29% common equity, nor the business risk for Union had changed since the last hearing; • The Board also noted the controversy over adjustments to CE results for M/B ratio; • The Board gave more weight to the M/B adjusted CE tests and the RP tests; • The Board thought that with further refinement the DCF test might offer comparable value to the CE and RP tests.
1991	EBRO 462	14.5 (14.5) (14.25)	 CE RP		Board Staff 12.5-13.0 (12.5-13.0) (11.45-11.95) IGUA 13.75 Kitchener <13.75	 CE RP		13.50	• The company's risk are un-changed since the last hearing; • The fundamental difference between Union and Board Staff was the M/B ratio adjustment for the comparable earnings test results; the Board believed such an adjustment was appropriate; • An economic downturn seemed very likely.
1990	EBRO 456	14.75 (14.5-15.0) (15.0-15.3)	 CE RP		Board Staff 13.25 (13.0-14.0) (11.5-11.75) IGUA 13.0	 CE RP	 primary secondary	13.75	• All parties have lowered their rate of return recommendations since EBRO 405-2 when the Board awarded a 14.75% return for 1987. • The Board allowed 13.75% for 1989; thus the requested 14.75% is excessive; • A downward adjustment to comparable earnings data to reflect a M/B ratio of 115% is justified; • The Board placed equal weight on the CE and RP tests.

1989	EBRO 456	14.75 (14.5-15.0) (15-15.3)	CE RP		Board Staff 13.25 (13.0-14.0) (11.5-11.75)	CE RP	primary secondary	13.75	• The Board placed primary emphasis on the CE test; • The Board would not reduce the allowable rate of return overearnings; • Since EBRO 405-2 both Union's and the Board Staff's witnesses have lowered their return recommendations; therefore the previously allowed rate of 14.75% is too high.
1987	EBRO 405	16.0 Wilson & Carmichael (15.8-16.0) (15.2-15.8) (15.25-15.95) Sherwin (15.75) (15.1-15.5) (15.4-15.8)	 CE DCF RP CE RP DCF		Special Counsel 14.25 (13.5-14.5) (13.5-14.5) (12.95-13.95) C-I-L Less than 15.6 IGUA 15 or less Kitchener 14.35	recommended overall CE RP		14.75	• Inflation and interest rates declined considerably since the previous rate case (EBRO 397); • Lower returns on equity will be required to produce M/B of 110 to 120 percent; • The high end of the experts recommendations have fallen since the last rate case;
1986	EBRO 405-1							15.60	• Based on rate approved in EBRO 397.
1985	EBRO 397	16.25 Dr. Sherwin 16.25 >16.25 16.5 or more Klerans & Carmichael 16.25 16.35-17.5	 CE RP DCF CE IRR, RP	 (primary) (primary) (less)	Board Staff 15.5 15-16 14.85-15.85 IGUA 15.5 or less Kitchener 14.75 C-I-L 15.3-15.6	overall CE RP		15.60	• The Board believed company witnesses unduly emphasized negative risk elements thereby overstating their CE results; • M/B ratios in the previous business cycle were higher than needed to maintain financial integrity.

1984	EBRO 388	17.0 Dr. Sherwin 16.0-17.0 16.5-17.0 Mr. Kierans 16.7-17 16.42-18.36	 CE RP RP DCF	Board Staff 15.5 15.0-16.0 IGUA 16.0	 recommende d CE, DCF	15.60	• The Board considered changes which had occured since the previous hearing; • The Board used the CE and RP tests in its Decision, but gave th DCF test little weight; • The Board considered Dr. Sherwin's risk premium to be too high; • The Board considered a M/B ratio of 110 to 120% to be an appropriate range.
1983	EBRO 382	17.0 Dr. Sherwin 16.5-17.5 17.0 Mr. Kierans 17.0	(32% equity) CE, RP DCF CE	Board Staff 15.1 IGUA 15.6 Kitchener 15.1 or less	 (28% equity)	16.75	• The Board allowed 29% common equity in Union's capital structure; • The Applicant, in requesting 17%, under-assessed the benefits of several factors; thus 17% is too high; • Given the difficulty of differentiating between the 'utility' and 'non-utility' portions of both market and book values of Union's shares, the Board gave little weight to target M/B ratios.
1982	EBRO 380	Mr. Kierans 15.75 Dr. Sherwin 15.75 15.5-16.0 15.6	 CE "Investors' required return" overall CE capital attraction test"	Board Staff 14.0-14.5 14.3 Other intervenors 14.0-14.5	 CE DCF	15.10	• Business and financial risk have probably improved since the last hearing; • Since equity capital must compete with funded debt, and since interest rates are very high and may go higher, the usual risk premium for equity may be unrealistic; • The Board staff witness's estimate is too low in view of high interest rates; • Dr. Sherwin's sample of companies was too selective and therefore his recommendation is too high.