Abstract

RECOMMENDATIONS FOR SETTING A UTILITY'S FAIR RATE OF RETURN

New technologies are breaking down barriers to entry in formerly natural monopoly markets, and this is forcing utilities to operate in an increasingly competitive environment. Traditional regulatory procedures have focused on cost-plus regulation, but as this paper demonstrates, now is the time for regulators to move away from traditional regulation toward a more flexible, incentive-oriented regulatory system.

We first discuss the advantages and disadvantages of the trend toward competition. Next, we address the rate of return methodologies that have been used by regulatory commissions--Comparable Earnings, DCF, Risk Premiums, and the CAPM. In this discussion, we show that a clear distinction must be made between the market value cost of equity and a fair rate of return on equity: The market value cost of equity is the rate of return investors require in order to supply new equity to the company, while the fair rate of return on equity could be above or below the market value cost of equity, depending on the company's operating efficiency.

We also discuss the fact that traditional cost of capital regulation does not provide economic incentives for high level performance, and we demonstrate that under strict cost of capital regulation utility investors would bear essentially no risks (other than those related to imprudence), while utility customers would bear essentially all normal business and capital market risks.

The paper concludes with the following two recommendations: (1) Regulators should not focus on a single "fair rate of return." Rather, to improve economic incentives, they should establish bands above and below the target rate of return, leave service rates in place as long as the earned rate of return remains within the bands, and use a partial adjustment procedure which leads to a sharing of excess or deficit returns if the earned rate of return moves outside the predetermined range. (2) Since utilities are facing more and more competition in their markets, they should be permitted to price to meet the competition. This requires greater scope for adjusting prices to customers who have choices as to the type and quantity of service they purchase from the utility. The adoption of these two recommendations would lead to lower customer costs, better service, and a stronger utility system.

July 15, 1988

RECOMMENDATIONS FOR SETTING A UTILITY'S FAIR RATE OF RETURN

Eugene F. Brigham and Dana A. Aberwald

The electric, gas, and telephone industries are in a state of transition. New technologies are breaking down barriers to entry in markets which were formerly natural monopolies, forcing the utilities to operate in an increasingly competitive environment. This new environment is, on balance, desirable, because competition both stimulates cost reductions and encourages the introduction of new services. However, traditional regulatory procedures are inadequate to deal with a partly competitive, partly monopolistic situation, and both utilities and regulators are faced with the challenge of adapting to the new environment.

If all the markets utilities serve were still monopolistic, the solution would be simple--continue regulation in its traditional form. If all the markets were competitive, the solution would be equally simple--deregulate and let market forces set prices. Even in a partially competitive environment, the solution would be simple if assets employed in competitive and monopolistic markets were separable--separate the businesses and continue to regulate prices only in the monopoly markets, as was the plan when AT&T was broken up. In fact, however, utility assets are often used to serve two or more markets which are subject to different degrees of competition, and in this situation no simple solution exists.

Our study focuses on one aspect of the total problem, setting the fair rate of return on invested capital in a partially competitive environment. Our conclusion is that regulation should move further away from a cost-plus system and toward one which provides both the economic incentives needed for improved performance and the pricing flexibility needed to operate in increasingly competitive markets. The changes we propose would serve both purposes.

SHOULD THE TREND TOWARD COMPETITION BE RESTRAINED?

Most utilities today provide service to different classes of customers and/or provide several different products. For example, the electrics serve residential, commercial, and industrial customers, while the telcos serve business and residential users and also provide different services such as local or long distance, call waiting/forwarding, and so forth. These various markets are exposed to differing degrees of competition, and the general trend is toward still more competition. However, the degree of competition differs from market to market--it is currently small or even nonexistent for such core customers as residential electric or telephone users, but significant for large industrial electric and telecommunications users, for such optional telephone services as "call waiting," and for long-distance service. Generally, it is technological developments which are breaking down natural monopolies and giving rise to competition. Good examples are the development of microwave, fibre optic, and satellite technologies, which have brought competition into the long-distance telecommunications markets, and cogeneration technology, which has given certain electric customers the option of producing their own power versus buying it from a utility.

Although most economists regard the trend toward competition as being "good," not everyone agrees. We present below a listing of the advantages and disadvantages of a regulated monopoly:

Advantages of Maintaining a Regulated Monopoly

1. Favored customers. If a monopoly exists, certain customers can be favored over others. For example, in the telephone industry a disproportionately large percentage of common costs were traditionally allocated to long-distance operations, and this resulted in low assigned costs and consequently prices charged to local customers. Similarly, relatively high prices were charged to business customers and to users of such optional items as designer phones. These pricing decisions favored local residential customers, who were in a sense being subsidized by long-distance and business customers.

   Note that such pricing policies cannot exist in the absence of monopoly: If competition exists, then competitive firms can and will enter the market, offer lower prices to customers who are being "overcharged," and thus take away that business. Indeed, MCI began by setting up a microwave link between Chicago and St. Louis and taking away much of AT&T's business in that market; this was called "cream skimming." Similarly, Japanese, European, and Canadian equipment suppliers began eroding AT&T's equipment market as soon as they were given permission to do so. Obviously, as AT&T lost business in its most profitable markets, it was forced to raise

prices to local residential customers. Thus, to the extent that it was desirable for local residential markets to be "subsidized," the introduction of competition to the telephone market produced undesirable consequences.

2. Research. It has been argued that there are economies of scale in research, and that the existence of monopolies enables utilities to attain the size needed to do research most effectively. This point cannot be proved, but certainly AT&T and its Bell Labs were incredibly successful when AT&T had a monopoly on telephone service. Similarly, the French nuclear industry, which is a government monopoly, has been more successful than the fragmented U.S. nuclear industry.

3. Free Flow of Information. The electric utilities have traditionally exchanged cost-saving information and technology. Since they did not compete with one another, benefits without corresponding costs could be gained from helping one another. However, this situation does not exist in competitive industries--"trade secrets" are guarded closely, and no firm would dream of passing along to its competitors tips about how to cut costs. Thus, as the utility industries become increasingly competitive, the companies will be more and more reluctant to share knowledge freely with one another.

4. Pricing Problems. As we move toward greater and greater competition, some difficult pricing problems are emerging. To illustrate, electric utilities serve a spectrum of customers who have varying degrees of flexibility with regard to where they obtain energy. At one end of the spectrum are such "core customers" as residential and small business users, who have no choice but to buy electricity from their local utility. At the other extreme are certain large industrial customers who can generate their own power, transfer production from one region or even country to another, switch from electricity to fuel oil, and so on. If the utility has built generating capacity sufficient to serve all of its customers, but then certain large customers leave the system, excess capacity will exist, and more of the fixed costs will have to be passed on to the remaining customers. Those higher costs will create an incentive for still more customers--say large hospitals or shopping centers--to leave the system, and this will exacerbate the problem. In such an environment, the utility should, in the best interests of all its customers, be allowed to set prices low enough to retain those customers who might leave the system, yet not be unfair to the core customers who cannot leave the system. Similar problems exist in the telephone industry due to potential "bypass." Neither the electrics' nor the telcos' problems were serious before the natural monopoly began to break down, but if current trends continue, companies' abilities to adjust prices in response to competitive pressures will become increasingly important.

Disadvantages of Regulated Monopoly

1. Administrative Costs. Regulation is expensive--the costs of record-keeping, regulatory audits, and hearings are far from trivial.

2. Reduced Economic Incentives to Minimize Costs. As a regulated monopoly, the economic incentives for a utility to minimize costs are diminished. Indeed, traditional price regulation resembles a cost-plus system, and where all costs are simply passed

on to customers, there is less incentive to minimize costs than under a competitive system, where cost reductions can result in higher profits.[1]

3. Reduction of Incentives to Innovate. Regulation may also lessen the incentive to innovate--if the fruits of innovation cannot be retained by the innovator, why innovate? Certainly regulated firms have innovated, but not to the same extent as they would have under competition. Also, in a regulatory climate where utilities are penalized for unsuccessful actions but not rewarded correspondingly for successful actions, which seems to have been the case during recent years, innovative behavior is even less likely to occur.

One can debate whether the economy was better off when all utilities operated under the old "pure regulated monopoly" situation or under the current increasingly competitive situation. One can also debate the pros and cons of permitting technology to continue breaking down the natural monopoly barriers versus shoring up those barriers with legal restrictions to entry. However, while competition can be slowed down by restrictions, attempts to maintain an "unnatural monopoly" over the long run will probably fail, and even if these efforts were successful, the inefficiencies and other undesirable consequences of monopoly would more than offset any benefits that continued monopoly might produce. Therefore, regulators and regulated companies should work together to establish a set of ground rules that will foster efficiency yet still protect the utilities' core customers.

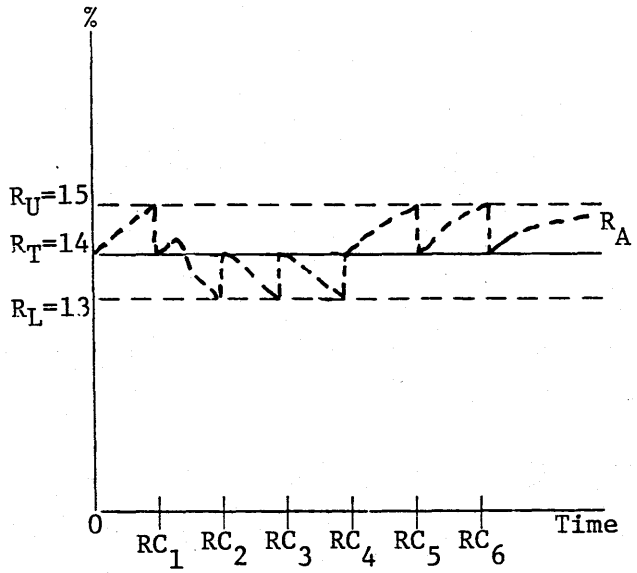
ALTERNATIVE REGULATORY POLICIES

Figure 1 shows how the earned rate of return can vary over time, and some alternative ways in which rate cases can be used to bring the earned ROE back in line with the

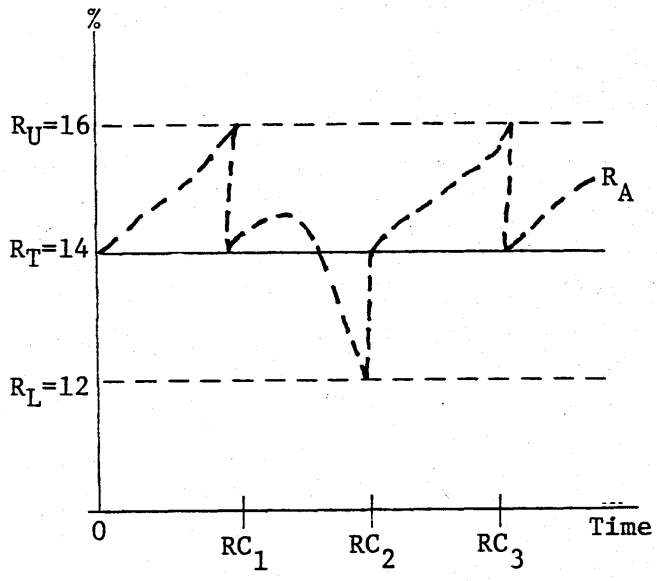
[1]These points were recognized long ago, and regulators have attempted to deal with them in various ways, including (1) the conscious use of regulatory lag, during which time utilities can keep the benefits of better-than-anticipated cost control and/or revenue increases but must suffer the consequences of adverse trends, (2) the use of partial rate adjustments, set up in such a way that cost increases and/or decreases are not fully passed through, thus causing customers and investors to share cost and revenue changes, and (3) the use of yardstick comparisons, under which utilities are compared with their peers and either rewarded or penalized depending on how they stack up against the comparative companies. Prudence reviews could be included in the last category. All of these factors have moved regulation away from pure-form cost-plus regulation. However, because of severe implementation problems, these procedures are far different from--and inferior to--the types of economic incentives provided by the profit motive in a free market economy. See P. L. Joskow and R. Schmalensee, [6].

Figure 1
Alternative Regulatory Policies

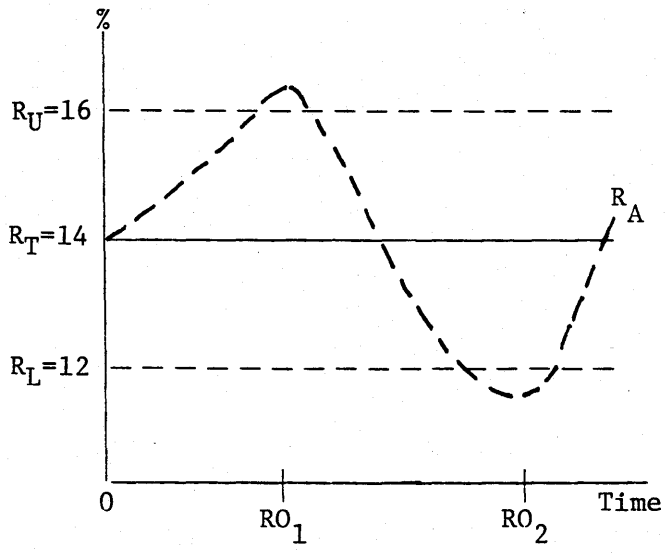
A. Narrow Bands, Full Adjustments



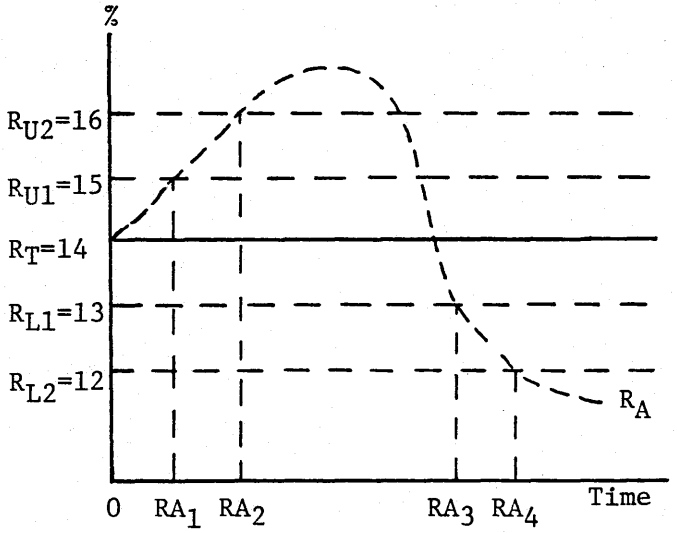
B. Wide Bands, Full Adjustments



C. Wide Bands, Slower Adjustments



D. Variable Bands, Sharing



authorized ROE. For example, the upper and lower bounds in Figure 1 (the horizontal dashed lines) could be raised or lowered, the authorized target rate of return could be set at a higher or lower level, and rate orders could be designed to cause the earned rate of return to move immediately back to the target or to adjust over a period of time. As a review of the Hope and Bluefield decisions makes clear [2], commissions have a great deal of scope in determining what constitutes a "just and reasonable" rate of return. Still, constraints exist. For example, if its earned ROE is below some threshold limit, a utility will be unable to attract and retain capital over the long run, and earned ROEs that are significantly below the level being earned by comparable companies might lead to charges of confiscation of investors' property. Conversely, if the earned ROE is substantially above the level being earned by comparable companies, both political and economic processes (voters and system bypass) will operate to drive the earned ROE down to a more reasonable level. Still, service rates and consequently earned rates of return can be set within fairly broad limits, so any of the patterns set forth in Figure 1 would be feasible.

In Figure 1 R_U and R_L designate upper and lower bounds set so that if the earned ROE hits the bound, a rate case or some other action occurs which causes the earned ROE (designated R_A) to move back toward R_T, the target (or authorized) ROE. For illustrative purposes, we assume that the target rate of return, R_T, is set at 14 percent, and the permitted ROE range is 13 to 15 percent. Here are some thoughts on the four different policies:

1. Panel A: Narrow Bands, Rapid Adjustments. The upper left graph depicts a situation where the commission initiates a rate case if R_A departs even slightly from R_T. As a result, rate cases occur frequently, and the earned rate of return is always close to the authorized return. Such a policy might be deemed "fair" to both customers and investors, but it would also be close to a pure cost-plus system, and as such it would score low in terms of providing economic incentives for efficiency and innovation.

2. Panel B: Wide Bands, Rapid Adjustments. The upper right panel is similar to Panel A, but due to its wider bands, rate cases occur less frequently. Such a policy would give companies more incentive to cut costs, to boost demand, and to offer new services, because the company could enjoy the benefits of such activities for a longer period. At the same time, though, if the company's earned ROE were approaching the upper limit, it would have no economic incentive to cut costs or expand revenues--indeed, it would even have an economic incentive to increase costs and thus to avoid the rate cut trigger. Similarly, if the company were earning less than its authorized ROE, and if it saw no realistic chance of improving things in view of

the economic climate, it would have an incentive to push costs up so as to trigger a rate case.

Since the earned rate of return would deviate substantially from the authorized level for a long time, either consumers or investors could complain that such a system was "unfair," depending on whether the company was earning more or less than its authorized ROE at a particular time.

3. Wide Bands, Slower Adjustments. Panel C is similar to B except that service rates are set in a manner which causes a slower adjustment in earned ROE. For example, rate increases or decreases could be implemented in steps over time, or new assets could be phased into the rate base (or out of the rate base, as would be true if depreciation rates were increased). This type of policy would provide better economic incentives than the Panel B policy, but the incentive system still would not work correctly when the earned ROE was approaching either R_U or R_L.

4. Variable Bands, Cost/Benefit Sharing. Panel D depicts a regulatory policy under which there are two upper bands, R_{U1} = 15% and R_{U2} = 16%, and two lower bands, R_{L1} = 13% and R_{L2} = 12%. When the earned ROE hits one of the bands, rates are not adjusted in a manner designed to drive R_A back to R_T. Rather, the adjustment is designed to cause the customers to share in further cost savings in the upper region and to force stockholders to share in further cost increases in the lower region. For example, with R_T set at 14 percent, and with a one percentage point interval separating the bands, then a rate adjustment (RA) would be triggered whenever R_A penetrated a band, but the adjustment would not cause R_A to return to R_T. Rather, the adjustment would be designed to slow down the rate of increase or decrease in R_A and, thus, to produce a sharing of costs or benefits between consumers and investors.

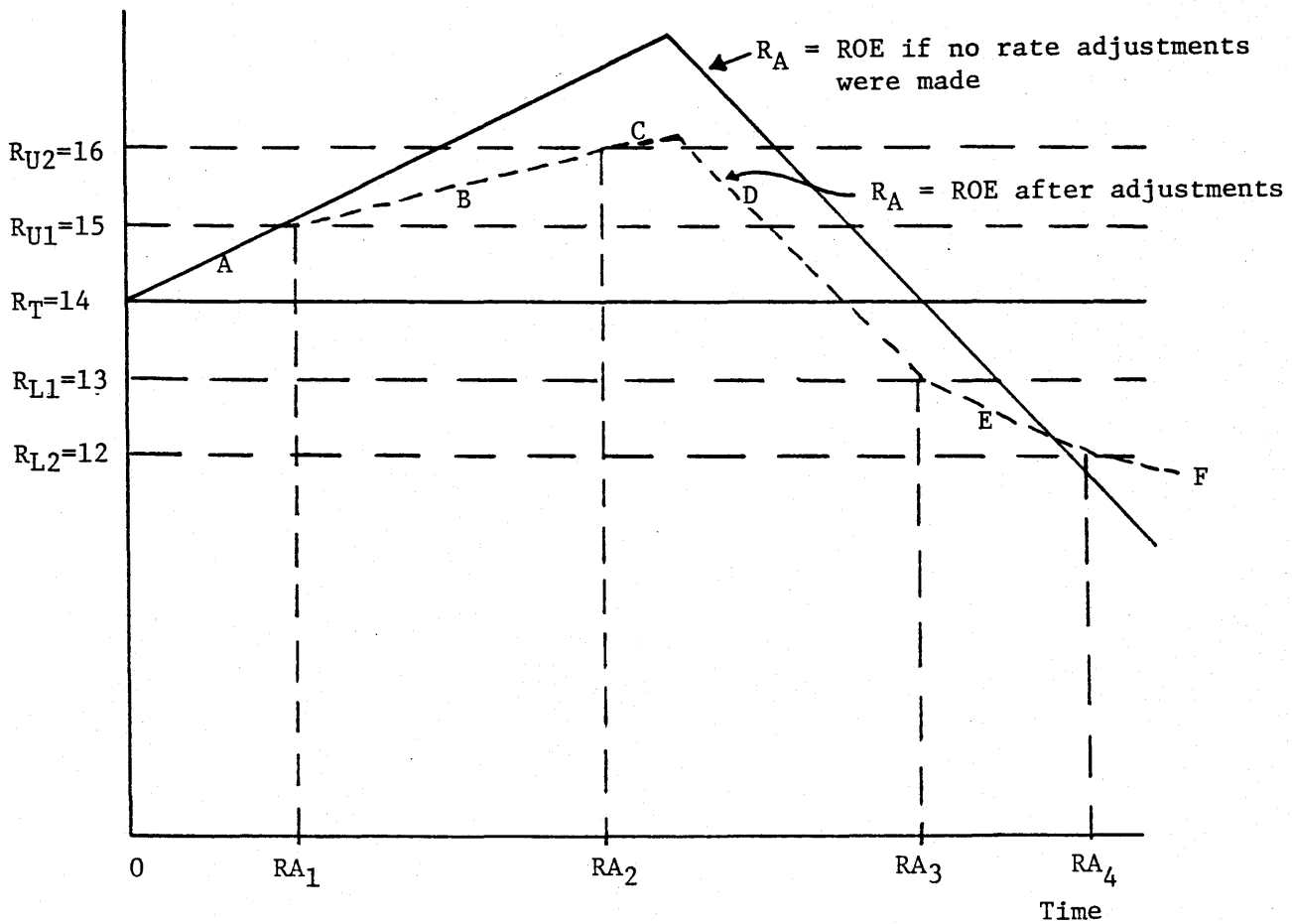
Figure 2 takes a more detailed look at the variable band/sharing approach. The solid line shows what the earned ROE would do if there were no rate adjustments over the entire period. We assume that productivity improvements would lead to lower costs over the first half of the period, but that inflation would more than offset productivity gains and thus lead to higher costs in the second half. Service rates would first be adjusted at RA_1, and the adjustment would be designed to give half of further cost savings to stockholders and half to customers. As a result, the rate of improvement in the earned ROE would be halved during the second period, and the earned ROE would lie on segment B of the curve. At RA_2 the earned ROE penetrates the second upper limit, R_{U2} = 16%, and this triggers a second rate adjustment which again slows the rate of ascent of the earned ROE line to the level indicated by line segment C.

At the point where inflation more than offsets productivity gains, the earned ROE begins to drop, following line segment D. At RA_3 lower limit R_{L1} = 13% is penetrated, thus triggering a rate increase designed to slow the rate of descent, and ROE changes to segment E. Yet another limit is penetrated at RA_4, and another rate increase is authorized.

Such a system would be far superior to the other three from the standpoint of providing economic incentives for efficiency--companies would always have an incentive to decrease costs, and they would never have an incentive to increase costs.

If fundamental, long-run trends in inflation or productivity improvements were present, it would be useful to take them into account through an indexing procedure when rates were initially established. Also, the period over which the plan was to be in effect would need to

Figure 2
Detailed View of the Variable Band/Sharing Approach



be established, because neither consumer representatives nor utility managements would agree to an indefinite departure of R_A from R_T. Further, if costs rose more than was anticipated, causing R_A to fall below some critical level, the company would not be able to attract capital, and this would be harmful to customers as well as investors.

IMPLEMENTING A VARIABLE BAND SYSTEM

The variable band system is clearly superior to the others in terms of its incentives for efficiency, but such a system would require that additional decisions be made at the time it went into effect. Here is a listing of some specific decisions that would have to be made under the traditional and proposed approaches:

Decisions in a Traditional Rate Case:

1. Authorized target ROE (R_T). This is generally set equal to the estimated cost of equity capital (k), but, as discussed later in this paper. The cost of equity is not necessarily the only (or even the best) figure to use as the fair rate of return on equity.

2. Service rates for each customer class.

3. Forecasted demand and cost schedules over some fairly short period.

Additional Decisions If a Variable Band/Sharing Approach Is Taken:

4. The number of bands above and below R_T, and the distance of each band from R_T.

5. The adjustment process that would occur when R_A penetrated a band, that is, the formula for sharing benefits or costs. If a company agreed, as part of the plan, not to ask for a rate increase for a specific period even if costs increased and the earned ROE declined, then the company's risk would increase vis-a-vis its risk under traditional regulation.

6. The length of time the plan would be in effect. The longer the time, the greater the incentives for efficiency, but the greater the danger of unfair treatment of either customers or stockholders. There would also have to be some procedure for adjusting rates in the event of extreme changes in market or operating conditions. For example, if an electric utility experienced a major accident, it would need a force majeure provision to enable it to adjust rates in order to stay in business.

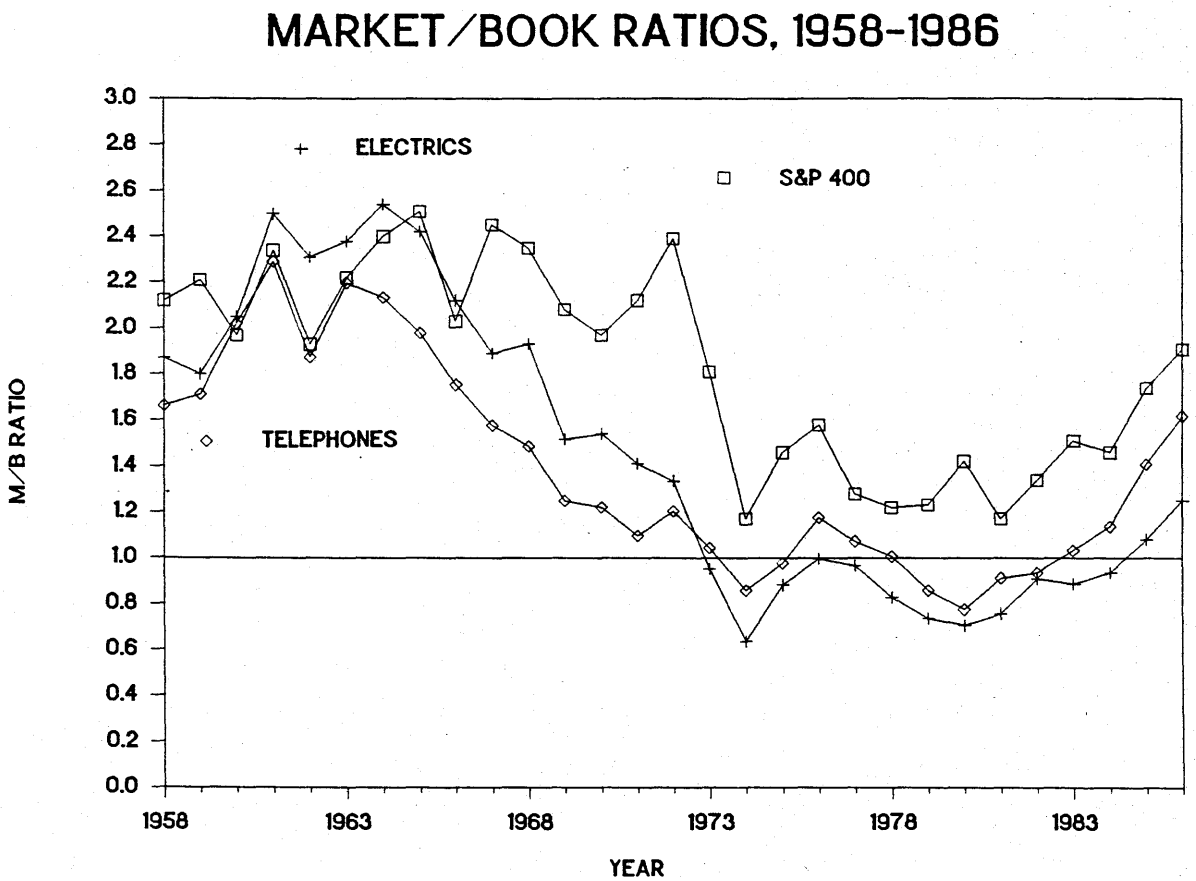
7. Expected changes in demand and cost conditions over the period when the plan was to be in effect. If the plan were scheduled to be in effect for a fairly short time, say 2 or 3 years, then it might not be necessary to index service rates. However, if the plan were to run for 4 or 5 years, it would probably be necessary to index service rates to reflect inflation and expected productivity changes.

8. In view of the increasing competition utilities are facing for non-core business, provisions should be made to permit flexible pricing in those markets where prices are set by competitive forces. Indeed, flexible pricing will be needed even if the traditional rate case process is maintained. Otherwise, some customers will leave the system, and their share of the fixed costs will have to be borne by the remaining customers. Still, flexible prices would be especially important if an incentive rate system were employed.

It would probably be difficult to persuade all parties to agree to a variable band/sharing plan that extended more than 3 to 5 years into the future, even though all parties should recognize that the longer the plan's life, the greater the expected incentive-induced efficiencies. However, the use of a force majeure clause would permit either side to reopen the case if conditions changed drastically. Note also that the best time to put a variable band/sharing plan into effect would be when economic conditions were reasonably stable. It would be almost impossible to get agreement to such a plan if a company were in the middle of a major construction program and was unaware of (1) the ultimate plant cost, (2) how efficiently the new plant would operate, and (3) what demand would be for the plant's output. Thus, if a fairly short-term plan (say 3 years) were proposed during a stable period, if factors such as inflation beyond some level and expected productivity gains were indexed, the plan would have a much better chance of being accepted than would a longer term plan proposed during turbulent times.

Setting service rates and leaving them in place while letting the earned ROE deviate significantly from the cost of capital may seem strange. However, this procedure is actually more consistent with what has happened in the past than is traditional regulatory theory. This point is demonstrated in Figure 3, which shows market/book ratios for the electrics, the telcos, and the S&P 400 industrials over the period 1958-1986. Prior to the mid-1960s, commissions generally used the comparable earnings method to establish the authorized ROE. Under this procedure, the utilities were allowed to earn ROEs that were close to those earned by high-grade industrial companies, and as a result, the utilities sold at M/B ratios that were close to those of the S&P 400. Beginning in the mid-1960s, however, regulators began to employ DCF and other market-based cost of capital methodologies to establish the authorized

Figure 3
Actual Market/Book Ratios
Electrics, Telephones, and S&P 400



ROE. As we discuss elsewhere [1], use of a market value cost of capital as the fair rate of return will cause the M/B ratio to move toward 1.0. Figure 3 shows that this did happen--the electrics' and telcos' M/B ratios departed from those of the S&P 400 after 1965, approximated 1.0 by 1973, and then fluctuated in the vicinity of 1.0 from 1973 to about 1983. Quite recently, most companies' M/B ratios have moved above 1.0.

Setting the Initial ROE

If a utility were just commencing operations, a commission could establish a target rate of return based on the company's cost of capital, set bands at say one percentage point above and below that rate, decide upon any indexing that should be used, specify the adjustment procedure to be used if the earned ROE crossed a band, and then specify the length of time the plan was to remain in effect. The situation is somewhat different for an ongoing utility, where the choice of the initial ROE is less obvious. Here are some points that should be considered:

1. The cost of capital. One possibility would be to conduct a cost of capital study as in a traditional rate case and then use the estimated cost of equity as the target ROE. While that could be done, it is not necessarily the best approach.

2. Midpoint of the range. The commission could also set service rates to produce an earned ROE equal to the midpoint of the authorized range. If the range were established as the estimated cost of equity plus or minus one percentage point, then the result would be the same as if the cost of equity had been used as the target.

3. The initial rate adjustment. There are good reasons to minimize the number and size of rate adjustments. Therefore, if the current ROE is within the prescribed range, one could argue that no service rate adjustment should be made initially, while if the current ROE is outside the range, the initial adjustment should move the projected ROE to a point just below the upper limit or just above the lower limit rather than to the midpoint of the range.

4. Operating performance. If a company is judged to have operated efficiently, it would be reasonable to set its initial ROE toward the upper end of the range. Although one could argue that since the company is of above average efficiency, it will be able to cut costs even further, and, hence, could suggest that the initial ROE should be set in the lower end of the range, such a position would not be reasonable: It would penalize past efficiency, and, hence, not give a good signal that the commission plans to reward efficiency. Also, an efficient company by definition has less "fat" to cut out of its operations, hence less scope for improving efficiency.

5. Recent history. If a company's past earnings have been "excessive," where excessive is defined as a percentage point or two above its authorized earnings, then a case could be made for setting the initial target ROE in the lower end of the range.

Conversely, if past ROEs have averaged less than the authorized ROE, a case could be made for setting the initial ROE toward the top of the range. Of course, consideration should be given to why the actual and earned ROEs deviated, and also to the size of the initial rate adjustment and the desirability of keeping adjustments small.

A graph of an illustrative plan is shown in Figure 4. First, in the section to the left of the vertical dashed line, we show assumed actual and authorized ROEs. The historical data were taken from Table 1, and they represent the situation for an average electric utility. Note that the typical company earned less than it was authorized to earn in 11 of the last 12 years--only in 1987 was the average earned ROE above the authorized level.[2]

We assume that the currently estimated cost of equity for the illustrative company is 14 percent, that a "basic range" of 13 to 15 percent has been established, and that the agreed-upon duration of the plan is 5 years, barring conditions which evoke a force majeure clause. Further, we assume that the company is judged to be well run on the basis of whatever criteria the commission uses to evaluate companies. Finally, we assume that the commission has concluded that inflation will be offset by productivity gains and higher usage rates during the next five years, and, hence, that any ROE increases or decreases will be due to good or bad management, or to luck.

The question we now face is this: Should service rates be adjusted when the plan is put into effect, and if so, what ROE should service rates be designed to produce? Given the facts of our illustrative case, service rates should not be adjusted, because (1) the company has earned significantly less than it was authorized to earn for many years, even though it operated with reasonable efficiency; and (2) the current ROE is well within the agreed-upon range, so it is by definition "fair" even though it is above the midpoint of the range.

Under different conditions we would reach different conclusions as to the initial ROE. In particular, if the current ROE were outside the range, an initial adjustment would be required. Further, we would tend to target on a return in the upper end of the range to

[2]Figure 3, presented earlier, showed that the average utility's M/B ratio was below 1.0 most of the time during those years, which is consistent with the conclusion that most electric companies were not earning their cost of capital during most of that time.

Figure 4
Rate of Return Graph

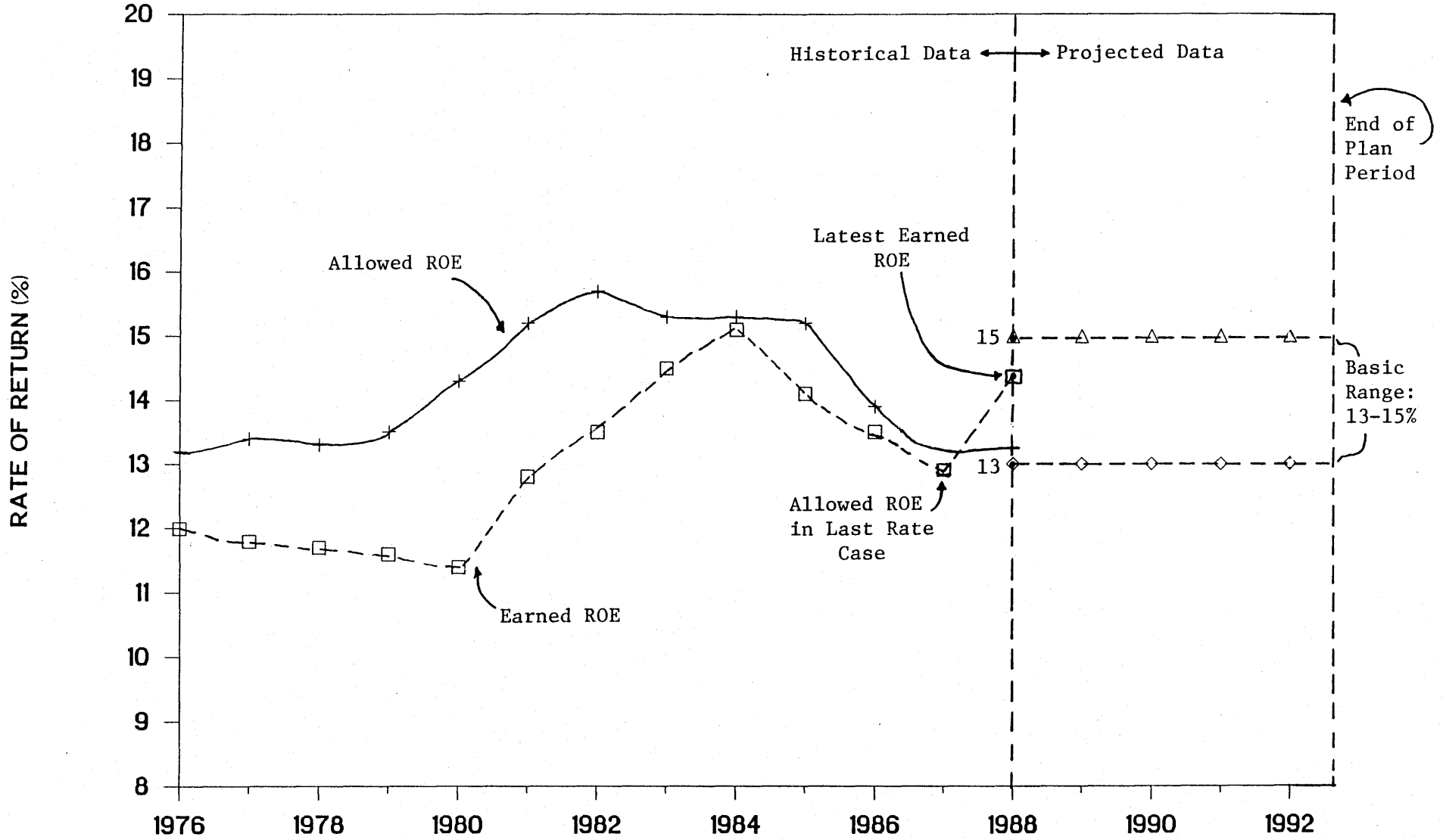


Table 1
Allowed and Earned ROEs
for the Average Electric Utility, 1976-1987

	Earned ROE	Allowed ROE	Excess or (Shortfall)
1976	12.0	13.2	(1.2)
1977	11.8	13.4	(1.6)
1978	11.7	13.3	(1.6)
1979	11.6	13.5	(1.9)
1980	11.4	14.3	(2.9)
1981	12.8	15.2	(2.4)
1982	13.5	15.7	(2.2)
1983	14.5	15.3	(0.8)
1984	15.1	15.3	(0.2)
1985	14.1	15.2	(1.1)
1986	13.5	13.9	(0.4)
1987	13.2	13.0	0.2
Average	12.9	14.3	-1.3

Source: Salomon Brothers, Electric Utility Regulation--Semiannual Review, September 1, 1987.

reward an efficient company, or a company that had in recent years been earning less than its authorized return, and vice versa for an inefficient company or one that had been over-earning. Judgment and negotiations would clearly be required when setting the initial target ROE.

Adjustment Procedures

As we noted earlier, a good plan would call for a sharing of profits if the earned ROE goes above the upper control limit, and for a sharing of earnings deficiencies if the ROE drops below the lower limit. There is no magic sharing formula--50/50 is probably as good as any other. However, some type of adjustment could be used as a safeguard to keep the earned ROE from getting "too high" or from falling "too low." For example, multiple bands, each set at one percentage point, might be used, and the adjustment formula might vary within each band, as shown below:

Earned ROE	Company's Share of Additional Savings (% Company Keeps)
Over 20%	5%
19-20%	10%
18-19%	20%
17-18%	30%
16-17%	40%
15-16%	50%
13-15%	No adjustment

Earned ROE	Company's Share of Additional Shortfalls (% Company Keeps)
12-13%	50%
11-12%	40%
10-11%	30%
9-10%	20%
8-9%	10%
Below 8%	5%

It is unlikely that the earned ROE would rise much above or fall far below the upper range of the basic band (15%) over a 3 to 5 year period--inflation and productivity gains will probably come close to offsetting one another. However, it is possible that a problem such as a nuclear accident could occur and drive the earned ROE down, and if this in turn prevented the company from raising the capital needed to correct the problem, this would be grounds for evoking a force majeure clause. It is in no one's interest for a utility to be driven down to the point where it cannot raise the capital needed to provide service.

Fair Rate of Return versus Cost of Capital

In connection with establishing the bands and the initial target ROE, it is important to distinguish between the cost of equity capital and a fair rate of return on equity. As the term is used in finance and economics, the cost of capital means the rate of return investors require in order to induce them to supply new capital to the company.[3] It is an opportunity cost concept. For example, in May 1988 the rate of interest on 30-year Treasury bonds was 9.3 percent, so the cost of capital to the U.S. government was 9.3 percent. Long-term Aaa corporate bonds yielded about 10.2 percent, so the cost of Aaa debt capital was about 10.2 percent. Lower rated, riskier bonds carried higher yields, so the cost of debt capital was higher for lower rated companies. Preferred stocks are riskier than bonds, so tax-adjusted yields on preferred stocks were still higher, and common stock, which is the riskiest security issued by a firm, had the highest cost of capital. Note also that as interest rates change, the cost of debt capital changes, and this change induces similar changes in the costs of preferred and common equity.

Utilities (and other companies) issue securities when they need capital, and they must pay the going market price for capital as they raise it. However, the rates on debt and preferred stocks are fixed at the time of issue, so even though interest rates move up or down after issue, the amount of money required to service outstanding debt and preferred stock remains

[3]For an excellent discussion on the cost of capital, see Morin [8].

fixed. Thus, the costs of new debt and preferred vary as capital market conditions change, but the costs of previously issued debt and preferred, or the "embedded" costs of outstanding debt and preferred stock, are fixed.

Now consider common equity. Some equity is raised by selling new shares and some is raised by retaining earnings. Theoretically, it would be possible to determine the cost rate that existed at the time the company raised each increment of common equity and then to call that the "embedded cost of common equity," but this would not be practical. What could be done, though, is to determine the cost of new equity each time a rate case is held, to define this as a fair rate of return, and then to use this market-determined cost as the allowed rate of return on equity. Note, though, that the fair return on equity could also be established in other ways, and in many respects an alternative definition is preferable. The concept of a fair rate of return represents a balancing of consumers' and investors' interests: customers should not be overcharged for their use of capital, and investors should be paid as much as they could have earned on other investments of comparable risk. Further, the return to investors should reflect the company's performance, for otherwise there will be no economic incentive to improve performance.

If the market cost of equity were used as the fair rate of return on equity, and if rates were actually set to produce it, then the regulated company could always raise new equity capital. Thus, use of the market cost of capital would meet the capital attraction standard set forth in Hope and Bluefield, and there would be a definite standard, even though the standard might be hard to measure. However, there are several disadvantages to basing the authorized rate of return strictly on the market cost of equity: (1) The market cost of equity cannot be measured precisely--at best, it can be estimated to within about one percentage point. (2) As noted earlier, traditional regulatory practice resembles cost-plus regulation, and, to promote efficiency, some type of incentive system ought to be used. Therefore, operating performance ought to be reflected in authorized and earned returns. However, if the market cost of equity were used as the standard for a fair rate of return, exactly the opposite result--efficient, low-cost companies would be authorized to earn a low rate of

return. (3) Using the market cost of capital along with traditional regulation transforms a utility's common stock into the economic equivalent of a floating (or adjustable) rate bond or preferred stock. Then, the risk of capital market fluctuations would be transferred from investors, who are supposed to be in the business of bearing capital market risks, to customers, who are not in that business.

Quantifying the Fair Rate of Return on Equity

A fair rate of return is a judgmental estimate, not a number that can be produced by a formula. Even so, judgment should be supported by quantitative evidence. Until the late 1960s, the fair rate of return on equity was virtually always quantified by use of the Comparable Earnings approach. A second method, the Discounted Cash Flow (DCF) approach, was introduced in the 1960s, and two additional methods, the Risk Premium approach and the Capital Asset Pricing Model (CAPM) approach, were introduced during the 1970s. Today, all four methods are used, but DCF is reported to be given the most weight.[4]

There is a fundamental difference between the comparable earnings method, on the one hand, and the DCF, risk premium, and CAPM methods, on the other. The comparable earnings method produces an accounting rate of return on book value, while the other three methods produce an estimated market cost of capital. The accounting rate of return shows how much a company has earned on the capital its stockholders invested in the past, while the other three methods estimate stockholders' expected future rate of return on capital committed to the firm.

Very different results would occur under comparable earnings regulation and under market cost of capital regulation:

1. Comparable Earnings. If a commission focused on the comparable earnings method, and if it allowed a company to earn the same rate of return as a group of truly comparable companies, then the utility's stock price would fluctuate over time, and

[4]For example, in their generic rate of return proceedings, the FCC and the FERC both rely primarily on DCF to set their benchmark rates. Also, Dukes and Chandy [3], reported in 1983 that 97 percent of the state commissions used DCF, 70 percent used comparable earnings, and 64 percent used the CAPM, and that when multiple methods were used, the greatest weight was given to the DCF estimate.

its market/book (M/B) ratio would track the average M/B ratio of the comparable companies. Figure 3, presented earlier in the paper, supports the contention that the comparable earnings method was used prior to the mid-1960s, but that after 1965 more reliance was placed on DCF and other market cost of capital methods.

2. Market Cost of Capital. If a commission (1) set a utility's authorized rate of return equal to its market value cost of capital, (2) estimated the market value cost rate accurately, and (3) set service rates which actually caused the company to earn its authorized rate of return, then the company's stock price would always equal its book value.[5] Thus, the utility's common stock would be transformed into a security that would resemble a floating rate bond or preferred stock rather than a share of common stock. As capital costs changed, the authorized rate of return would be adjusted so as to keep the market price of the stock equal to its book value, just as periodic adjustments to interest rates and preferred dividends cause floating rate bonds and preferred stocks to sell at close to their par values. Therefore, the use of a market value cost of capital standard for setting authorized rates of return would remove the risk of capital market changes (stock market risk) from utility stockholders and transfer it to ratepayers.

Note also that under traditional ratemaking procedures, utilities are supposed to be allowed to recover all prudently incurred operating and plant costs. Thus, if the costs of fuel, labor, materials, and taxes rise, then customers must pay those costs. Finally, if the costs of constructing plants rise, customers must also pay for those cost increases. Thus, under traditional regulatory theory, customers bear all operating risks except risks associated with "imprudence."

If a commission were to combine traditional theory's treatment of operating costs with a market value cost of capital, then a utility's stockholders, who are supposed to be in the business of bearing risks, would be insulated from all risks except the risk of imprudent management, while its customers would have to bear all normal business and financial risks. This would be an undesirable situation. However, data such as that shown in Figure 3 above demonstrates that regulators have never operated in this manner--commissions have in recent years given some weight to the market cost of capital, but other factors have clearly entered the decision as to the fair rate of return.

[5]Also, note that all three market value cost of capital estimating techniques (DCF, risk premium, and CAPM) would, in theory, produce the same cost rate estimate, so the use of any of these methods would, in theory, cause the market/book ratio to equal 1.0.

The Rate of Return Situation for Competitive Firms

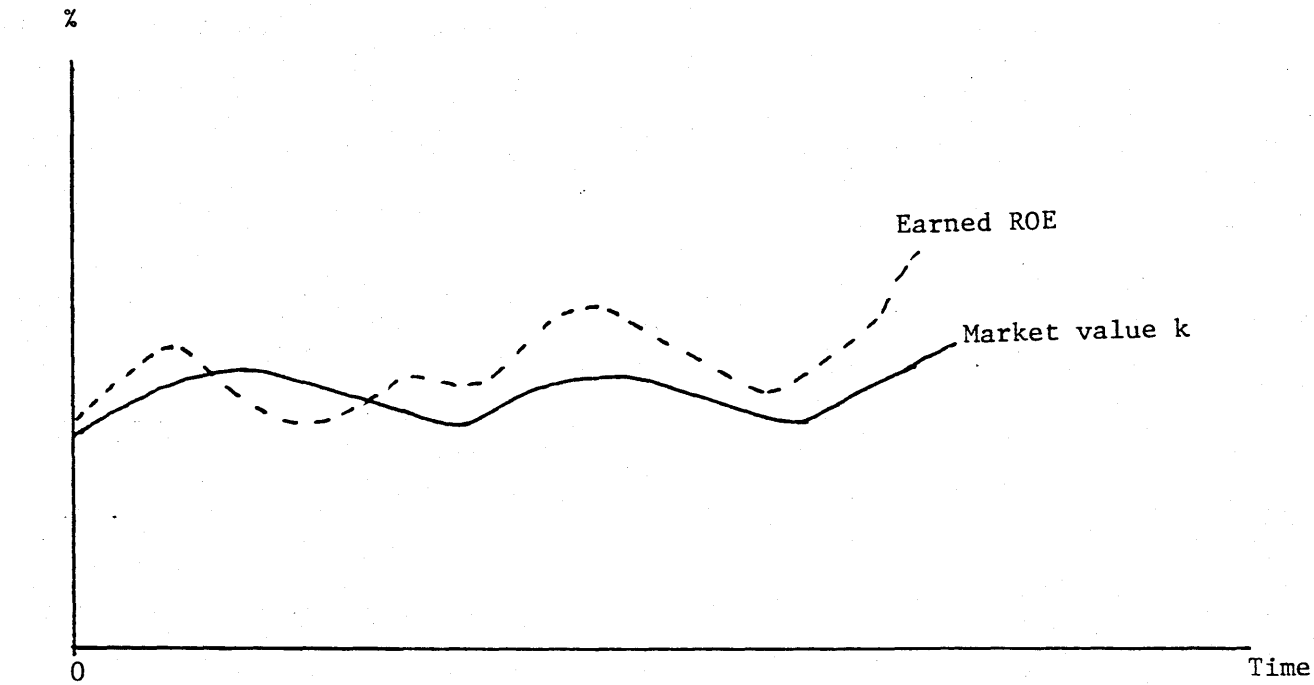
Competitive, unregulated firms must, on average and over the long run, earn a "normal, risk-adjusted" rate of return on their invested capital. This rate of return will attract the right amount of capital to each industry: If returns were higher, then additional capital would be attracted, output would expand, product prices would be driven down, profits would fall, and the earned rate of return would decline to the normal level. The reverse would hold if returns were too low--capital would exit the industry, capacity and output would decline, and eventually the rate of return on the remaining capital would rise to the normal level. Of course, short-run fluctuations in demand and costs will cause competitive firms' earned rates of return to depart from the equilibrium (or "normal") rate of return, so capital will flow into or out of an industry only if deviations between earned returns and the normal return persist for a fairly long period, with the period varying from industry to industry depending on asset lives and barriers to entry. Further, unregulated firms generally invest in new projects if and only if they expect to earn <u>more than</u> the cost of capital. Therefore, for well managed industrial firms, the average rate of return on investments tends to exceed the cost of capital.

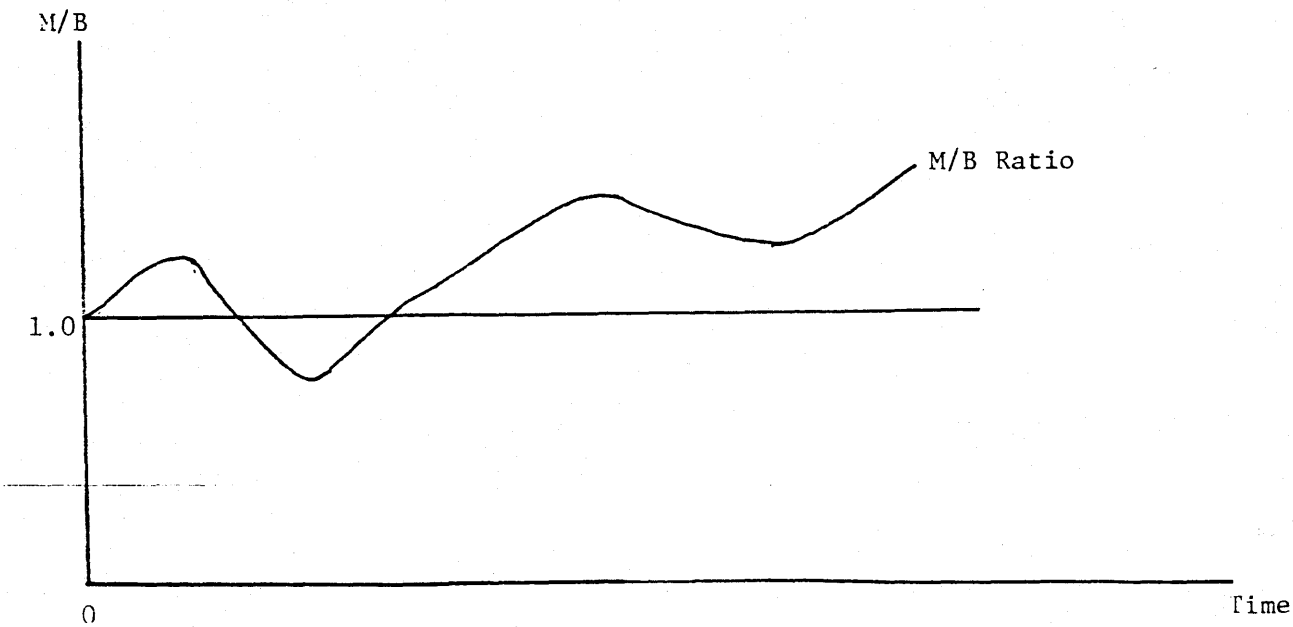
If the average earned rate of return exceeds the market value cost of capital, then a company's market/book ratio will exceed 1.0. Therefore, we would expect to see the situation depicted in Figure 5 for a set of unregulated companies such as those in the S&P 400. As shown in the top panel, the earned ROE will tend to rise above the market value k over time, which will cause the M/B ratio as shown in the bottom panel to rise above 1.0 over time. This tendency will exist because of the standard investment decision rule: Invest only in those projects whose expected ROE exceeds k. This rule causes competitive firms to have a greater and greater proportion of assets with ROEs greater than k as time goes by, and hence leads to a situation where ROE generally exceeds k and M/B ratios generally exceed 1.0. Figure 3 above suggests that this is, indeed, the case for actual companies.[6]

---

[6]Industrial firms' M/B ratios and earned ROEs would both be much higher than reported if it were not for mergers. In a merger, the acquiring firm generally marks the assets of the acquired firm up to its market value before consolidating balance sheets. To

Figure 5
Earned Rates of Return, Market Cost of Capital, and M/B Ratios: Unregulated Firms





If regulators used the comparable earnings standard to establish the fair rate of return, then utilities' earned rates of return would rise and fall along with those of unregulated firms, and their M/B ratios would fluctuate similarly. Thus, ROE and M/B graphs for utilities would resemble those shown in Figure 5 for unregulated companies.

Utilities under Market Value Cost of Capital Regulation

If a commission determined that the fair rate of return should be set equal to the market value cost of capital, estimated that cost rate correctly, set rates that caused the earned ROE to equal k, and operated without significant lags, then the situation shown in Figure 6 would result. The market cost of capital would fluctuate, causing service rates to be constantly adjusted, but the company would always earn close to its DCF k, and, as a result, its M/B ratio would fluctuate narrowly about 1.0.

In the real world, regulatory lags exist, so in general a company's ROE will not equal its market value k. Figure 7 shows, using hypothetical data, what actually tends to happen. The upper panel shows earned ROE's and k's under favorable and unfavorable conditions. If costs were trending down, or if growth were causing revenues to expand more rapidly than had been anticipated, then the earned ROE would tend to rise between rate cases, the average earned ROE would exceed the market k, and the M/B ratio would rise above 1.0. On the other hand, if inflation were pushing costs up, or if revenues were falling, the situation would be reversed. Note also that in the graph the value of k is assumed to remain constant. Realistically, though, the DCF k would fluctuate, and those fluctuations would also cause the ROE to depart from k and, hence, the M/B to depart from 1.0.

---

illustrate, suppose Firm A had book assets of $100, earned $15, and was acquired by Firm B at a price of $200. Firm B, before the acquisition, also had book assets of $100, earned $15, and had a market value of $200. Thus, before the acquisition both firms had ROEs = 15% and M/B ratios = 2.0, so those values were included in the aggregate statistics. After the merger, though, B's consolidated balance sheet would show assets of $300, its earnings would be $30, and its market value would be $400. Thus, its ROE would be $30/$300 = 10% and its M/B would be $400/$300 = 1.33, so the merger would lower the aggregate ROE and M/B ratios.

Figure 6
Earned Rates of Return, Market Cost of Capital, and M/B Ratios: Utilities under "Perfect" Regulation

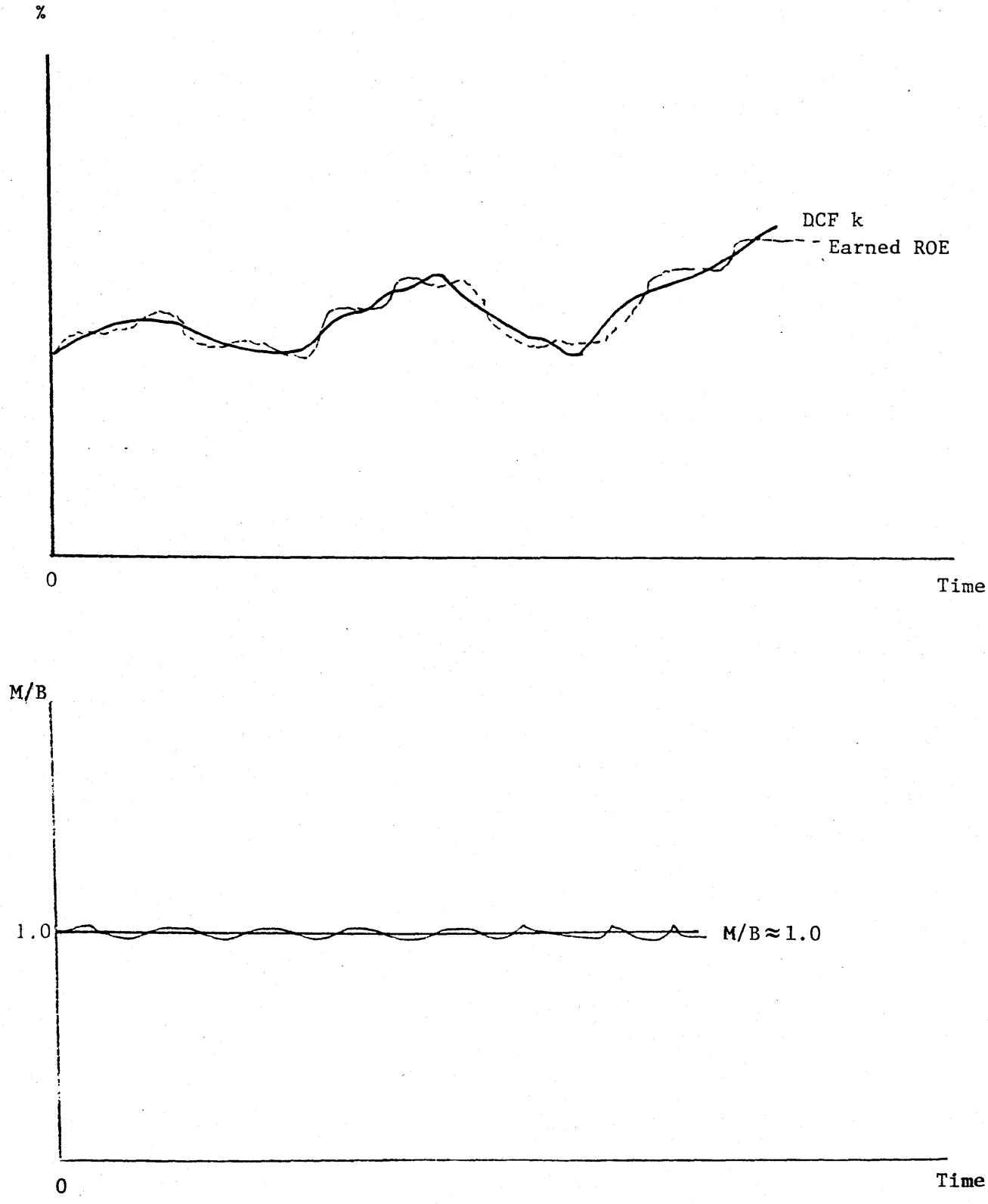
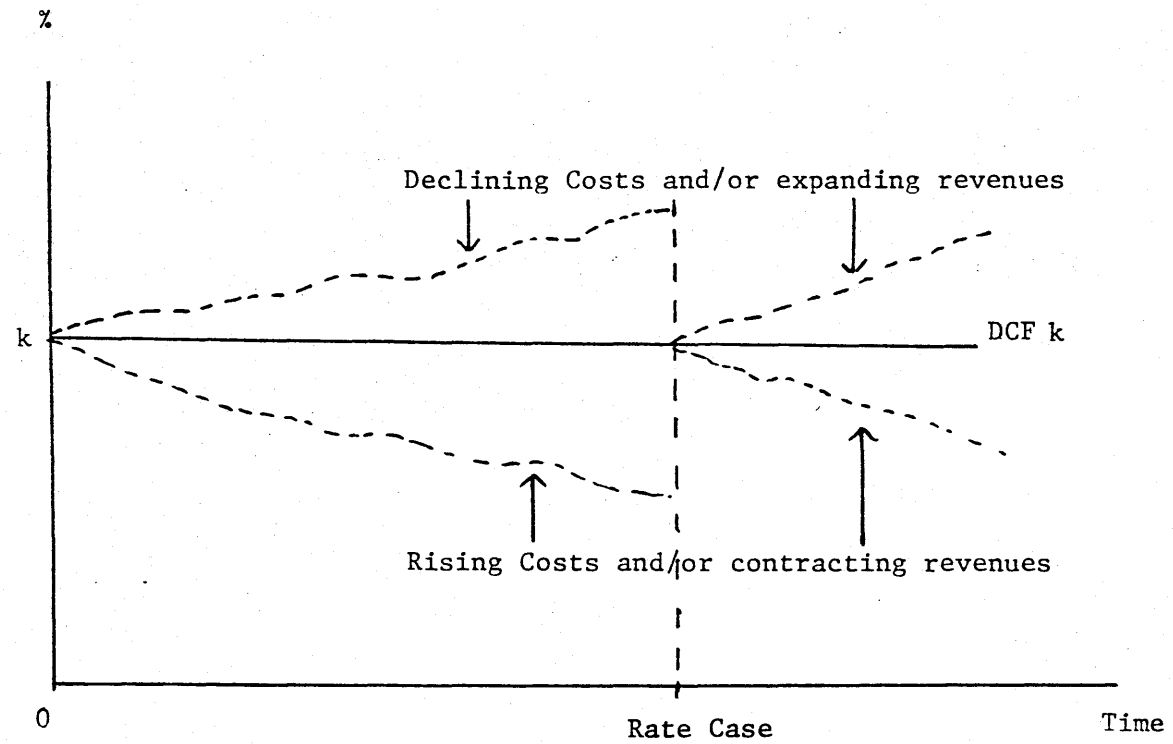
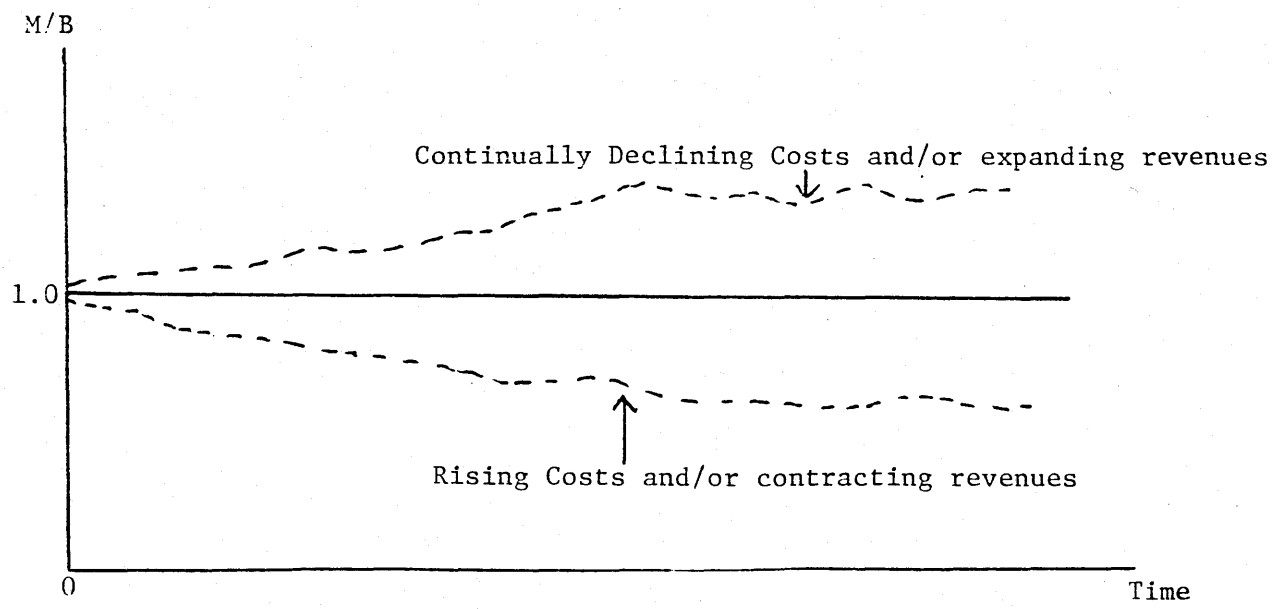


Figure 7
Earned Rates of Return, Market Cost of Capital, and M/B Ratios under "Typical" Regulation





If utility commissions correctly and consistently regulated in accordance with market value cost of capital methodology, utility M/B ratios would be equal to 1.0, or would fluctuate narrowly about 1.0. Has that situation occurred? As we saw earlier in Figure 3 and Table 1, the answer is clearly no. Utility M/B ratios, on average, have fluctuated about as much over time as have industrial M/B ratios, which indicates that commissions have not been regulating utilities in strict accordance with DCF or other market value cost of equity methods. One could perhaps argue that commissions have tried to follow DCF theory but were unable to estimate k with sufficient accuracy, that they were unable to force the earned ROE to equal k, or that investors simply did not believe ROE would equal k in the future. If any of these things were true--if regulators have tried to apply such market value criteria as DCF since it was first introduced in the mid-1960s but have been unable to do so--then this would indicate that DCF theory is simply unworkable. Still, regardless of whether commissions have not tried to regulate in strict accordance with DCF theory or have tried to but been unable to do so, it is clear that results consistent with DCF theory have not been achieved. It is our view that this result reflects an intuitive recognition by commissions that strict DCF regulation would lead to undesirable consequences. Thus, our proposal is not as far removed from current regulatory practices as it might appear.

SUMMARY AND CONCLUSIONS

The purpose of this paper is to suggest a procedure for improving rate of return regulation in an increasingly competitive environment. Our conclusion is that, to the greatest extent possible, competition should be allowed to replace regulation. However, some form of regulation which combines price protection with rate of return regulation--will continue to be necessary to protect core customers who have no option but to buy from the utility.

The major problem with regulation is that it does not provide the types of economic incentives that make a market economy so efficient. In effect, traditional regulation resembles a cost-plus system, and it fails to provide proper incentives which reward firms for superior performance and penalize them for inferior performance. Our conclusion is that the

traditional approach to regulation--namely, forcing the earned ROE to equal the cost of capital--should be abandoned in favor of a system under which a ROE range, or perhaps a whole series of ranges, is used. Then, service rates would not be adjusted as long as the earned ROE is within the basic range, while if the ROE rises above or falls below the control limits, service rates would be adjusted in a manner that would involve a sharing between customers and ratepayers of the profit shortfalls or surpluses. For pragmatic reasons, the plan would have to be limited to some specified number of years, but it should be recognized that the longer the time period, the greater the economic incentives for long-run cost control and revenue expansion (demand increasing) programs.

Depending on the situation, inflation and productivity gains might be expected to offset one another, and thus no indexing would be required. However, if the parties conclude that inflation is likely to outweigh productivity gains, or vice versa, then service rates should be indexed to increase or decrease at some scheduled rate. This would be important issues if a plan such as the one we propose were put into effect, but its resolution should depend on the specifics of the case at hand.

We also discussed the matter of service rate adjustments at the time the plan is put into effect. Under the plan, the commission would first define the basic "fair rate of return" range and the procedure for adjusting rates after the plan went into effect. If the current ROE was within the prescribed range, then current service rates should be left in place. However, if the current ROE was outside the range, then service rates should be adjusted to move the initial earned ROE to within the range. We discussed several factors that should be considered when setting the initial ROE target, including how efficiently the utility is judged to be operating and the company's past experience with regard to earning more or less than its allowed returns.

In addition, we addressed the question of whether the rate of return range, and the target ROE if service rates need to be adjusted to initialize the plan, should be based on the comparable earnings approach or on a market value approach. At this point, we cannot state categorically that one procedure is clearly superior to the others. However, it is clear (1) that

if a commission targets on the DCF or some other market value cost of capital and sets service rates such that a company normally earns its market value cost of equity, then the company's M/B ratio will fluctuate narrowly about 1.0, and (2) that as a result the company's common stock will be transformed into what amounts to a type of floating rate preferred stock. It is also clear from the historical record that few if any commissions have regulated in strict accordance with DCF methodology.

We also touched briefly on the matter of pricing flexibility. Some utility customers have the option of obtaining services from a source other than their regulated utility. If such a customer can obtain equivalent service elsewhere at a cost less than that charged by the utility, that customer will take its business elsewhere. If the utility has sufficient capacity, and if the customer is paying a price which covers variable costs and contributes to overhead and profits, then the utility should be free to negotiate a lower rate with the customer in an attempt to keep its business. So long as the customer contributes something to overhead and profits, the utility and its other customers would be better of with this customer on the system than not on it. However, the question of "fairness" in the rate structure sense inevitably comes up in these cases. If a plan such as the one we propose were in effect, so that rates for all core customers were capped, then the utility could negotiate with customers who might otherwise leave the system, and any price reductions allowed them would not harm the core customers because their rates could not be raised to offset revenue losses. Further, the company would have much stronger economic incentives to negotiate carefully than it would be under the current system, where revenue losses from departing customers or customers whose rates were reduced would be made up from the remaining customers. This situation is likely to become increasingly important in the future, and it can be handled better under our proposed plan than under traditional regulation.

For all these reasons, now is the time for regulators to move away from traditional rate of return regulation and toward a more flexible, incentive-oriented regulatory system. This would lead to lower customer costs, better service, and a stronger utility industry.

BIBLIOGRAPHY

[1] Brigham, Eugene F., "Rate of Return Methodology," University of Florida, Public Utility Research Center Working Paper, March 1988.

[2] _____, Aberwald, Dana A., "Setting a Utility's Fair Rate of Return," University of Florida, Public Utility Research Center Working Paper, June 1988.

[3] Dukes, W., and Chandy, P., "Rate of Return and Risk for Public Utilities," Public Utilities Fortnightly, September 1, 1983, pp. 35-41.

[4] Gordon, Myron J., The Cost of Capital to a Public Utility, Michigan State University, Institute of Public Utilities, 1974.

[5] Hyman, Leonard S., America's Electric Utilities: Past, Present, and Future, 3rd edition, Public Utilities Reports, Inc., Arlington, Va, 1988.

[6] Joskow, Paul L., and Richard Schmalensee, "Incentive Regulation for Electric Utilities," Yale Journal of Regulation, Vol. 4, No. 1, 1986, pp. 1-49.

[7] Kahn, Alfred E., The Economics of Regulation: Principles and Institutions, Vols. I and II, Wiley, New York, 1970.

[8] Morin, Roger A., Utilities' Cost of Capital, Public Utilities Reports, Inc., Arlington, Va., 1984.