The Use of Customer Discount Rates

THE USE OF CUSTOMER DISCOUNT RATE IN REVENUE REQUIREMENT COMPARISONS

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Good Morning. It is a pleasure and an honor to appear before you today and engage in this debate. I would like to thank Dr. Cowles and Dr. White for the invitation. I am a consultant specializing in public utility rate matters. I have presented testimony in a number of proceedings, generally on behalf of public utility customers and regulatory commission staffs.

Typically my testimony has presented alternative recommendations to a utility's revenue requirement filing. I have found that most issues in a public utility rate case revolve around conceptual “gray areas" amenable to debate. In fact, Dr. White and I have met in the past on the battlefield to discuss certain issues, and today, Dr. Howe and I debate another of the gray areas.

ISSUES

The issue I intend to explore today is the validity of the use of customer discount rates to evaluate revenue requirement comparison models. I will also consider the relationship between utility and customer discount rates. Finally, I will discuss some of the measurement problems in determining the level of the customers discount rate.

I conclude that the customers' discount rate is a relevant statistic in evaluating ratemaking models and that that rate will always be higher than the rate of the utility studied.

DISCOUNT RATE

A discount rate is a compound interest factor used to determine the net present value of a stream of future cash flows. It embodies the user's time preference, inflation, and risk expectations.

When a firm evaluated new investments, it must assume that they are as risky as current investments; hence, the appropriate discount rate is the firm's current cost of capital. Public utilities may use their last allowed overall rate of return, that is, the embedded cost of capital, or their perception of incremental capital costs taking into consideration anticipated trends in debt and equity cost rates.

There are broadly two classes of public utility customers - individuals and firms. The discount rate of a firm is hypothetically derived in the same manner as a utility's cost of capital, that is, through an analysis of the composite effect of business and financial risk. Large heavily capitalized utility customers will likely have composite risk characteristics not much different from utilities. Smaller firms, however, particularly those with limited capitalization will in all probability have a cost of capital, and hence discount rates, higher than the utility that serves them. The individual's discount rate is quite another matter.

In his text Financial Markets and Institutions (McMillan Publishing Co., Inc. 1983) Robert D. Auerbach states:

The interest rate individuals use to discount future expected income streams to obtain present values is not observed in the market place. It is the subjective real interest rate in each individual's mind that is fundamental to his or her valuation of securities." (p.147).

The problem with individual consumers' discount rates is that it is a spectrum, not a single number. Consider the extremes. At the low end of the income spectrum are consumers living at or below the poverty level. For such individuals the discount rate is practically infinity because the deferral of a dollar on income means that the consumer must forego basic necessities of life; food, clothing, shelter.

As income increase, the opportunity cost of the incremental dollar falls. For low to moderate income consumers, who are likely to be net debtors, it is the finance charge rate on consumer credit -- 18 to 24 percent. At the high income end of the spectrum, the discount rate becomes the marginal return from individual investments – stocks, bonds, real estate, tax shelters. One this is certain, the individual discount rate is not the discount rate of the utility. For the vast majority of individuals it will be substantially higher.

Hence, while it is possible to determine the current embedded cost of capital of utilities and large corporate customers through observation of published data, it is much more difficult – arguably impossible – to determine a composite individual and small firm discount rate. Nevertheless, individuals are highly sensitive to the impact of changes in their future cash flows, as evidenced by today's current wave of mortgage refinancings. The individual's discount rate, although subjective, is a very real factor in his or her economic behavior.

REVENUE REQUIREMENT COMPARISON MODELS

Revenue requirement comparison models are typically presented as evidence in utility rate proceedings to persuade regulators to adopt one or another of ratemaking alternatives having different streams of future costs and benefits.

A revenue requirement model presents an implied choice between the several alternatives that are often highly sensitive to the discount rate.

I have two examples of ratemaking models with me today. Both compare revenue requirement streams that differ as to their future timing. The one characteristic common to both of the models is that each presumes a constant rate of return throughout the period, and that rate of return is the utility's cost of capital. The equity component of the rate of return considers inflation, risks and the utility's investors expectations.

Model 1 was prepared by me for presentation in a Public Utilities Fortnightly Article. It had its genesis in testimony I presented regarding the subject matter in a proceeding a number of years prior to the PUF article.

This model deals with the once controversial subject of tax normalization versus flow through. It is a five-year revenue requirement comparison of the two methods. It assumes a constant 46 percent tax rate, an 11.75 percent pretax and 9.887 percent post-tax cost of capital. The model reveals that if the hypothetical utility's post-tax cost of capital is used to discount the two cash flow streams they are equal, that is, the net present values of both streams are the same --$115,244.

The second example is a model prepared by Dr. White which considers the economic implications of a depreciation reserve deficiency. As we all know, service life estimates are rarely fixed and many time are changed throughout the life of utility plant. When this occurs the issues of remaining life depreciation and reserve imbalances generally arise. Dr. White's model compares a straight-line whole life revenue requirement stream assuming that original life estimates were correct, with an alternative stream in which the original service life estimates were changed and the remaining life technique was used to correct the

resulting reserve imbalance. Dr. White used the utility's after-tax cost of capital as a discount factor to demonstrate the equality of the two revenue requirement streams.

Dr. White and I both determined that it was proper to discount the cash flow streams, and we both demonstrated that the utility's discount factor is defined as its after-tax rate of return. Furthermore, in both examples we have imputed that discount rate to the utility's customers. Thus, using that assumption, all other things being equal, it was presumed that the parties to whom the alternatives were presented would use the utility's discount factor to make the implied choice because any other discount would skew the results and eliminate the equality.

It is reasonable to assume that the customers would use the utility's cost of capital to evaluate cash flow streams under those circumstances? I think the answer is no. The customer would use their own discount rates to evaluate the alternatives.

IMPACT OF THE CUSTOMERS DISCOUNT RATE

The impact of using the customers discount rate is the reason for our debate. In the example 1, normalization vs. flow through model, any rate higher than the utility's after tax cost of capital would support the conclusion, all other thing being equal, that flow through was the superior method. In fact, all things were not equal in that debate and normalization was adopted. However, it is important to understand that a recognition of the customers discount rate if indeed higher than the utility's would largely explain why there was so much—about 20 years worth of customer opposition to normalization.

MEASUREMENT

If it could be shown that the customer's discount rate was always equal to a utility's embedded after tax cost of capital then we would not be having this debate because the customers rate would always implicitly recognized in revenue requirement model. On the other hand, if the customer rate is not equal to the utility's cost rate, we are faced with a measurement problem. As I stated previously, there are broadly two classes of utility customers: firms and individuals. Large firm's discount rates can be observed in the market place. Small firm and individual discount rates, however, are not observed in the market place. They are fundamentally subjective personal valuation standards.

I am not here today to advocate any particular measurement technique, nor am I here to estimate a composite customer discount rate. However, I will state that the individuals discount rate is different from and higher that the utility's cost of capital.

Obviously, there is a wide range of customer discount rate measurement possibilities. In the past, I have seen estimates tied to consumer credit card costs. I have also seem estimates of composite (individuals and firms) customer discount rates in which a rate is estimated for both classes of customers and then weighted to determine both classes of customers and then weighted to determine the composite. I have also seen reference to the social rate of discount which is based on the opportunity cost of public spending. All of these measurement approaches to determine the customer's discount rate have one consistent characteristic. The yield result that bear no relationship to the utility's cost of capital.

CONCLUSION

The issue today is whether the customer's discount rate should be considered in a revenue requirement comparison. I submit that the customers discount rate should be considered when a model is presented which implies that choice can be made. In that circumstance, it is the discount rate of the parties to whom the choice is presented that is the relevant statistic.

I thank you for listening and once again would like to thank Dr. White and Dr. Cowles for inviting me here today.

COMPARISON OF NORMALIZATION AND FLOW-THROUGH REVENUE REQUIREMENTS REFLECTING RATE BASE REDUCTION OF ACCUMULATED DEFERRED TAXES

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Normalization Cost of Service	$38,309	$34,226	$29,048	$23,995	$21,977	$147,515
Net Present Charges	34,862	28,344	21,892	16,429	13,716	115,243*
Flow-through Cost of Service	34,050	19,314	16,504	44,361	40,699	154,928
Net Present Charges	30,986	15,995	12,438	30,424	25,401	115,244*

Cost of Capital – Post-tax = .09887

	Per Cent	Cost	Pretax Weighted Cost	Tax Effect	Posttax Weighted Cost
Debt	45	.09	.0405	(.01863)	.02187
Equity	55	.14	.0770	-0-	.07700
Total	100		.1175	(.01863)	.09887

*** Difference in totals due to rounding.**

COMPARISON OF REVENUE REQUIREMENTS

	Correct Service Life Estimate (No Reserve Deficiency)			Revised Service Life Estimate (Reserve Deficiency)		
	Cash Flow		Revenue	Cash Flow		Revenue
Year	Debt	Equity	Requirements	Debt	Equity	Requirements
1	$101.40	$87.60	$408.00	$78.90	$72.60	$333.00
2	67.14	63.78	460.57	39.27	45.95	366.47
3	60.47	59.38	566.48	84.53	77.18	643.83
4	56.94	57.30	781.55	78.88	73.10	852.78
5	663.89	462.35	1,425.61	683.70	476.16	1,490.73
Present Value	$600.00	$400.00	$2,563.83	$600.00	$400.00	$2,563.83

	Per Cent	Cost	Pretax Weighted Cost	Tax Effect [1/]	Pretax Weighted Cost
Debt	60	.12	.72	(.036)	.36
Equity	40	.17	.68	-0-	.68
Total	100		1.40		.104

[1/] 50 percent tax rate