



## American Finance Association

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The Effect of Fuel Adjustment Clauses on the Systematic Risk and Market Values of Electric Utilities: Discussion

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is any shift of risk away from the investors who can act on it a threat to efficient resource decisions as Greenwald seems to argue?

Litzenberger, Ramaswamy and Sosin provide a paper that should be useful to all rate case participants. They review theory and evidence on the capital asset pricing model, support its use in determining allowed return, and argue that it can provide downward biased estimates. The downward bias comes from failure to provide upward correction to betas below one and from assuming that a stock with a beta of zero has a required return equal to the treasury bill rate. It is reassuring for a regulator to hear that risk can be measured by beta and that there is a return/risk relationship that can give some substance to the idea of "comparables" in a regulatory proceeding. It is rewarding to find a guide to further study, a basis for deciding that utility dividend decreases may not be all bad and a method for estimating both beta and the capital market line that could put an upper bond on allowed return. But it is less than totally satisfying to consider that the relationship between capital asset pricing model and discounted cash flow estimates of allowed return is still obscure and that the allowed return being sought has not really been defined as either a long or short term rate.

Difficult as it is to imagine, regulation is responsive to advances in understanding of economics and finance. It should be, because papers such as the three given in this session provide practical guidance for regulatory action.

## DISCUSSION

**WILLIAM MARSHALL\***: Roger Clarke's empirical study focuses directly on the aspect of these diverse papers that I find most interesting: the endogeneity of the risk bore by a firm's investors and the role of market institutions in determining the allocation of risk. Clarke notes that the use of a fuel adjustment clause has equity implications if the risks bore by investors are altered. There are implications for efficiency as well, on both the input and output sides. *Ceterus paribus*, prices that accurately reflect costs in a timely fashion, will promote efficiency in the use of a utility's product. But the shift in risk that accompanies the change in a pricing rule may induce a change in behavior beyond that attributable solely to the change in expected prices. The less risk tolerant is the consumer, the more his behavior will be altered, simply by the knowledge that he bears the risk of uncertain energy costs. Likewise, utilities may vary the technology they employ in the production process, depending on the portion of the uncertainty about factor prices that they bear. It seems plausible, and is potentially a testable proposition, that utilities located in jurisdictions that do not employ fuel adjustment clauses will utilize technologies that rely on input factors with less volatile supplies, and that integration vertically to gain control over inputs will be more extensive among these firms. Warranties, incentive contracts, and tenure systems are free market responses to the often conflicting goals of providing incentives for efficient resource use and obtaining efficiency in risk bearing. The complexity

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and variety of those arrangements argues that regulators are likely to find no simple solutions to the analogous problems they face.

Clarke provides convincing evidence of the reduction in systematic risk he thought had occurred when fuel adjustment clauses were adopted, but his expectations were based on the observation of negative correlations between oil and coal prices and market returns. I'm uncomfortable with attempts to generalize beyond the sample and period of his analysis. Theory doesn't tell us the signs of correlations between input prices and firms' profits, when both are determined endogenously. The relationship between changes in factor prices and deviations of actual from expected profits will differ depending on whether the exogenous shock to the system was 1) a shift in the factor supply curve, 2) a shift in the demand for the firm's product, or 3) an unanticipated change in the rate of inflation. During the period of Clarke's analysis, uncertainty about the supply of energy resources was apparently the dominant source of risk, on average. That may not always be the case.

Bruce Greenwald also considers a choice over alternative regulatory schemes, in particular, the choice of rate base valuation rule and the appropriate allowed rate of return. Greenwald provides an elaborate and incisive model of the regulated market. Few important aspects of the problem escape his attention. He considers issues of equity and efficiency, the impact of uncertainty, the role of the regulatory process in allocating risk and various pricing rules, all in the process of an analysis of the rate base problem. Not the least of his contributions is an analytical framework that might be applied equally as appropriately to other issues.

I disagree with Greenwald on one minor point that seems worthy of mention. I'm inclined to believe that, except where necessary to motivate desirable behavior, regulators should avoid putting the consumer in the role of riskbearer. If risk remains with the ownership position, consumers who consider the compensation to be sufficient can become riskbearers by choice by purchasing claims on the firm's income stream. But the markets make few provisions for a consumer to hedge the risks that might be imposed upon him through various regulatory conventions. It seems to me that the separation of the roles of consumer and riskbearer provides options not otherwise available and eliminates none. I'm not persuaded by the large numbers-small risk argument. The greatest potential for dilution of specific risks over large numbers of investors would seem to exist where marketable securities are available for investment directly or through intermediaries.

I'm influenced by the observation that cooperative ownership as an alternative to regulation is an option chosen in some cases. Where it is not, I can only assume that the market in its wisdom prefers to maintain the separate riskbearing role of private ownership. As Greenwald points out, only empirical evidence (that may not be attainable even under ideal conditions) can resolve the issue. Unfortunately, decisions must be made and I would argue that a strong *prima facie* case exists in favor of the use of securities markets rather than regulatory edict to allocate risk.

Of the three, the paper of Litzenberger, Ramaswamy, and Sosin is perhaps of

the greatest immediate importance. The CAPM has and continues to gain acceptance as a basis for rate of return regulation. The methodology they propose for the measurement of risk premiums is based on a comprehensive and thorough critique of the relevant issues.

I'm convinced by the authors' accumulation of arguments that a linear rather than proportional risk-return relationship ought to be estimated and used to determine fair rates of returns. I'm also convinced that the proposed estimator of the parameter of the market equilibrium condition determining securities returns has several desirable properties. However, I suspect that their proofs depend more than the authors appreciate on the validity of the underlying theoretical market model, the CAPM, rather than just on the validity of the hypothesized empirical relationship. On the other hand, I suspect that the estimator they propose will be more robust than the conventional estimator with respect to violations of the underlying distributional assumptions. Eventually, of course, the superiority of their estimator should be established empirically.