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Source: *The Accounting Review*, Vol. 45, No. 2 (Apr., 1970), pp. 322-332

Published by: American Accounting Association

Stable URL: <http://www.jstor.org/stable/244384>

Accessed: 27-10-2016 06:27 UTC

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A Study of Some Relationships between Accounting and Decision-Making Processes

Robert C. Culpepper

ACCOUNTING information influences many decisions, but little is known about the way in which this influence is exerted in particular classes of decisions. If the facilitation of decisions is taken as the purpose of accounting,¹ then accounting measurement methods ought to be evaluated in terms of their influence on the decision-making process. Beaver, Kennelly, and Voss have pointed out that two serious problems arise when the decision-making criterion is adopted.

... the first is to define the decision models (or processes) of potential users of accounting data. ... The second problem is, even after the decision model is specified, it is not sufficient for determining which accounting measure produces the better decisions. Many, if not all of the decision variables are capable of being measured in more than one way.²

Solution of the first of these problems seems to be beyond the present state of knowledge. However, the criterion of predictive ability has been suggested by Beaver, Kennelly, and Voss as an approach to the solution of the second.³

The absence of definitive solutions to these problems does not, however, rule out exploratory research into the relationships between accounting methods and decision-making processes. Research can be conducted to learn if different decisions result from the use of alternative accounting methods in various classes of decision situations. In addition, the effects of

changing methods may be studied. Enough such empirical studies may yield a basis for useful generalizations.

A small number of empirical studies, seeking to determine the effects of alternative methods on decisions, have been

¹ Howard C. Greer, in the foreword to *An Introduction to Corporate Accounting Standards*, referring to the growing importance to society of the accountant's work, stated:

"His findings (the accountant's) and the manner in which he sets them forth have become the basis for significant decisions and policies, not only in business affairs, but in economic, social, and political matters as well."

More recently in *A Statement of Basic Accounting Theory* the author committee said:

"The objectives of accounting are to provide information for the following purposes:

1. Making decisions concerning the use of limited resources, including the identification of crucial decision areas and determination of objectives.
2. Effectively directing and controlling an organization's human and material resources.
3. Maintaining and reporting on the custodianship of resources.
4. Facilitating social functions and controls."

All the listed objectives either explicitly state or imply that the purpose of accounting is to supply information inputs to decision-makers.

² William H. Beaver, John W. Kennelly, and William M. Voss, "Predictive Ability as a Criterion for the Evaluation of Accounting Data," *THE ACCOUNTING REVIEW* (October 1968), p. 679.

³ *Ibid.*, pp. 675-683. The authors suggest the use of predictive ability as a purposive criterion for judging which of two or more alternatives is the better for a particular class of decisions.

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conducted in recent years.⁴ Sometimes inconclusive and contradictory, the results of previous studies have prevented generalizations and point to a need for further research of an exploratory type. Ijiri, Jaedicke, and Knight have made some tentative efforts at stating theory to explain the relationship between accounting and decision-making processes.⁵ The present research is intended to add to the empirical evidence gained in previous studies and to examine some propositions of the Ijiri, Jaedicke, and Knight formulation for consistency with the findings of the study.

DESIGN OF THE STUDY

This inquiry looks at permitted rates of return for privately owned natural gas distribution utilities. It attempts to relate differences in these rates of return with differences in accounting methods used. Compared to many other decisions, the regulatory decision is fairly well standardized. In addition, the output of the decision is a single unambiguous number. For these reasons the regulatory decision may be studied with expectations of a greater probability of obtaining meaningful results than would be the case with less well-structured decisions.

Financial accounting procedures for utilities are prescribed by regulatory commissions. All the commissions in the jurisdictions represented in the present study have adopted either the uniform system of accounts of the Federal Power Commission or the National Association of Railroad and Utility Commissioners. The two systems are very similar; consequently accounting practices of utilities tend to be quite similar.

Utility commissions in the United States regulate primarily by the rate base method. The objective of regulation by the rate base method is to allow a utility to earn sufficient revenue to yield, after de-

ducting reasonable costs of service, a specified rate of return on its rate base (i.e. the assets necessary to produce the service). Permitted rate of return is uniformly defined as the ratio of net operating revenue after taxes and before bond interest to the rate base.

When deriving cost of service for rate making purposes, virtually all commissions require the use of straight-line historical cost depreciation.

A brief description of a rate adjustment proceeding in a jurisdiction which adheres to original cost data in its regulation follows: a test or "normal" year is selected and income statement and balance sheet exhibits are prepared by both the company and the commission staff from the company's historical cost records. Usually the test period is the most recently closed fiscal year prior to commencement of the proceedings. Exhibits of the company and the commission staff reflect pro forma adjustments for known significant changes such as a new labor contract or a change

⁴ The following represent the principal studies in the area: David K. Eiteman, "Interdependence of Utility Rate-Base Type, Permitted Rate of Return and Utility Earnings," *Journal of Finance*, (17-1962), pp. 38-52; Thomas R. Dyckman, "The Effects of Alternative Accounting Techniques on Certain Management Decisions," *Journal of Accounting Research* (Spring 1964), pp. 91-107. William J. Bruns, Jr. "Inventory Valuation and Management Decisions," *THE ACCOUNTING REVIEW* (April 1965), pp. 345-357.

John L. O'Donnell, "Relationships Between Reported Earnings and Stock Prices in the Electric Utility Industry," *THE ACCOUNTING REVIEW* (January 1965), pp. 135-143.

John L. Livingstone, "The Effects of Alternative Accounting Methods on Regulatory Rate of Return Decisions in the Electric Utility Industry" (Unpublished Doctoral Dissertation, Stanford University, 1966). A part of Livingstone's research is also reported in "A Behavioral Study of Tax Allocations in Electric Utility Regulation," *THE ACCOUNTING REVIEW* (July 1967) pp. 544-552.

Robert E. Jensen, "An Experimental Design for Study of Effects of Accounting Variations in Decision Making," *Journal of Accounting Research* (Fall 1966), pp. 224-238.

⁵ See: Yuji Ijiri, Robert K. Jaedicke, and Kenneth E. Knight, "The Effects of Accounting Alternatives on Management Decisions," in *Research in Accounting Measurement* (American Accounting Association, 1966), and Yuji Ijiri, *The Foundations of Accounting Measurement* (Prentice-Hall, 1967), Chapter Eight.

in tax assessments or rates. After hearing arguments of the company and its own staff, the commission will adopt a set of pro forma historical cost exhibits as a basis for determining the rate base and cost of service.

Testimony concerning what is a "fair" rate of return is then heard. Having selected a permitted rate of return, the commissioners will determine the amount of net operating revenue necessary to earn the specified rate on the rate base. Required net operating revenue is then added to pro forma cost of service to determine required gross revenue. A rate schedule is then proposed which will produce the required gross revenue.

Procedures in so-called "Fair Value" jurisdictions are quite similar to those in original cost jurisdictions except for one important difference. The denominator of the rate of return—the rate base—is not usually the depreciated original cost as reported in the company's records.

Company accountants and commission staffs prepare, in addition to the historical cost exhibits described above, another set of exhibits on the basis of reproduction cost new depreciated. Company accountants have followed a variety of approaches to determination of reproduction costs. Commission staffs, virtually without exception, have applied the Handy-Whitman Index of Public Utility Construction costs to the recorded book costs.⁶ Utility commissions have nearly always accepted the staff determination of reproduction cost over that of the company's accountant. A compromise weighted average of historical cost and reproduction cost is then declared to be the value of the rate base and the procedure completed in the same manner as in original cost jurisdictions. Note that income data is historical data determined in the same way as in original cost jurisdictions.

Net operating revenues may be ma-

terially affected by the method of accounting for the tax reductions related to the use of liberalized depreciation under Section 167 of the Internal Revenue Code of 1954. The choice between alternative methods of accounting for these tax reductions is the subject of this study. The impact on net revenue of this choice is demonstrated by the fact that annual deferred tax expense for gas utilities increased each year from 2.85 percent of net operating revenue in 1957 to 4.27 percent in 1966.⁷

Three alternative tax-effect accounting methods are used by the regulatory agencies in the various states. These are:

1. Flow-through: The tax expense charged against operating revenues is the actual tax liability for the period as affected by the use of liberalized depreciation for tax purposes.
2. Normalizing: The tax expense charged against income is based on the straight-line depreciation used in the financial statements although liberalized depreciation is claimed for tax purposes.
3. Straight-line: This category includes those firms which do not use liberalized depreciation for either financial reporting or income tax purposes.

Published rate of return decisions by regulatory agencies for the years 1954–1961, inclusive, furnish the data for the study.⁸ During this period there were no changes in the relevant sections of the Internal Revenue Code, so the period of the study is internally consistent with respect to legally available alternative methods for tax accounting relative to depreciation of fixed assets. There are 88 decisions reported by 32 regulatory juris-

⁶ A description of this index is in *Handy-Whitman Index of Public Utility Construction Costs*; Bulletin No. 83, (Baltimore, Whitman, Requardt and Associates, 1966.)

⁷ American Gas Association, *Historical Statistics of the Gas Industry* (American Gas Association, 1961 and annual supplements), p. 362, Table 179; and 1966 Annual Supplement, p. 175, Table 159.

⁸ The data were obtained from *Public Utility Reports*, third series, volumes 3–42 (Public Utilities Reports, Inc. 1954–1962.)

dictions. Sixty-six gas utility companies are represented in the 88 cases.

Before the data could be analyzed statistically, certain adjustments were required. First, the effects of alternative methods of valuing the rate base were eliminated. Three approaches to the valuation of the utility rate base are in use by the jurisdictions included in the study. They are:

1. Original Cost: The historical cost of property when first placed in public service, less accumulated depreciation.
2. Reproduction Cost: The cost of reproducing, at present prices, the existing (depreciated) utility plant.
3. Fair Value: A compromise value lying somewhere between original cost and reproduction cost.

Ohio is the only state which uses the reproduction cost method. During the period of the study, only four cases were decided in Ohio. These four cases were excluded from analysis because they were believed to represent an insufficient number for valid results. All the 88 cases in the study, therefore, are from the original cost and fair value classes.

To eliminate the effects of the differing rate base methods from the analysis, the data were grouped into six subclasses; one for each of the tax methods within each of the two rate base classes.⁹

Secondly, it was necessary to convert the data to a uniform basis of accounting (the converted data are referred to as adjusted rates of return). Two steps were necessary to convert the data. Fair value rate bases were converted to the original cost basis in order that the denominator of the rate of return would be uniform. As noted above, fair value jurisdictions follow basically the same procedure but differ in the weight attached to reproduction cost in determining fair value. Conversion of rate basis to original cost eliminates the effect of this factor on the calculation of permitted rate of return within the fair

value rate base class. Net operating revenues in normalizing cases were adjusted to the flow-through basis so that the numerator of the rate of return would be uniform. These adjusted rates of return are exhibited in Table I. The data are listed in columns classified by the tax accounting method. The rates of return shown, however, are all calculated on a uniform flow-through, original cost basis.

One factor not adjusted for is the differing treatment accorded the reserve for deferred taxes by those commissions which normalize taxes. Three treatments are known to have been used during the period of the study.

1. The balance in the deferred tax reserve is deducted from the rate base. (Thus reducing permitted earnings to the extent of a return on funds provided by the tax advantage of liberalized depreciation.)
2. A reduced rate of return is permitted on rate base assets equivalent to the balance in the deferred tax reserve. (The FPC has allowed 1.5% return and a few other commissions have followed.)
3. No allowance is made for the deferred taxes. (That is, the rate base is not reduced nor is the return reduced.)

Sufficient data were not available to permit explicit adjustment for differences in treatment of the accumulated deferred taxes. However a majority of the commissions in the present case follow (1) above. Also, the period of the study coincides with the early years of liberalized depreciation; therefore, accumulated deferred tax balances probably were not large enough to significantly effect rate base totals.

Nominal rates of return as published in the rate cases are listed in Table II. These data represent the same cases as those in Table I except they are in their original form—that is, before conversion to a uni-

⁹ In a preliminary study, significant differences were found to be associated with the alternative rate base methods. Therefore, in order to eliminate the effects of rate base method from the analysis of tax method effects the alternative tax methods are analyzed within the context of a given rate base method.

TABLE I
ADJUSTED PERMITTED RATES OF RETURN UNDER ALTERNATIVE ACCOUNTING METHODS

Count	Method of Accounting for Deferred Taxes (if any)					
	Flow-Through		Normalizing		Straight Line	
	Original Cost	Fair Value	Original Cost	Fair Value	Original Cost	Fair Value
1	5.48	6.28	6.14	7.21	5.20	6.31
2	5.99	6.35	6.19	7.25	5.84	6.67
3	6.09	6.50	6.42	7.36	5.94	6.78
4	6.25	6.90	6.54	7.46	6.10	7.40
5	6.25	7.29	6.59	7.51	6.13	7.58
6	6.25	7.70	6.95	7.66	6.20	7.85
7	6.25	8.27	6.98	8.06	6.25	7.96
8	6.30		7.13	8.07	6.25	8.00
9	6.30		7.18	9.14	6.25	8.21
10	6.31		7.24	9.68	6.25	9.49
11	6.35		7.30	9.69	6.25	
12	6.35		7.32		6.30	
13	6.40		7.73		6.30	
14	6.40				6.30	
15	6.40				6.34	
16	6.40				6.40	
17	6.40				6.40	
18	6.50				6.44	
19	6.60				6.45	
20					6.50	
21					6.50	
22					6.50	
23					6.50	
24					6.60	
25					6.75	
26					7.00	
27					7.09	
28					7.13	
Means	6.28	7.04	6.90	8.10	6.36	7.63

Total: N = 88

Grand Mean: 6.84

Rate Base Means: Original Cost, 6.45; Fair Value, 7.66

Tax Method Means: FT, 6.48; N, 7.45; SL, 6.70

form basis. Each datum represents the rate as determined and calculated by a commission under whatever tax accounting and rate base accounting methods are required by that commission.

Well-established traditional regulatory practices are basically similar in all jurisdictions studied. In addition, access to national money markets by most utilities tends to cause both costs of capital and notions of "fair return" to cluster within a fairly narrow range. Examination of the data of Table II reveals that *nominal* permitted rates of return fall within a relatively narrow range about the overall mean within each rate base class. Taking

these factors as reasonable *a priori* grounds for assuming that, within a given rate base class, utility commissions tend to have a common target rate of return, we may proceed to consider the expected effect of alternative tax accounting methods on the permitted rate of return decision.

Ijiri, Jaedicke, and Knight (henceforth IJK) have defined the concept of functional fixation, as it relates to accounting, as follows:

If the outputs from different accounting methods are called by the same name such as profit, cost, etc., people who do not understand accounting well tend to neglect the fact that alternative

TABLE II
NOMINAL PERMITTED RATES OF RETURN UNDER ALTERNATIVE ACCOUNTING METHODS

Count	Method of Accounting For Deferred Taxes					
	Flow-Through		Normalizing		Straight Line	
	Original Cost	Fair Value	Original Cost	Fair Value	Original Cost	Fair Value
1	5.48	5.00	6.00	5.85	5.20	5.46
2	5.99	5.45	6.10	5.90	5.84	6.00
3	6.09	6.00	6.25	5.90	5.94	6.00
4	6.25	6.11	6.34	5.95	6.10	6.00
5	6.25	6.18	6.34	6.00	6.13	6.07
6	6.25	6.50	6.37	6.00	6.20	6.13
7	6.25	7.00	6.50	6.00	6.25	6.21
8	6.30		6.50	6.10	6.25	6.40
9	6.30		6.66	6.49	6.25	6.40
10	6.31		6.70	6.76	6.25	6.40
11	6.35		6.73	6.98	6.25	
12	6.35		6.75		6.30	
13	6.40		6.85		6.30	
14	6.40				6.30	
15	6.40				6.34	
16	6.40				6.40	
17	6.40				6.40	
18	6.50				6.44	
19	6.60				6.45	
20					6.50	
21					6.50	
22					6.50	
23					6.50	
24					6.60	
25					6.75	
26					7.00	
27					7.09	
28					7.13	
Means	6.28	6.03	6.47	6.18	6.36	6.11

Total: N=88

Grand Mean=6.28

Rate Base Means: Original Cost, 6.36; Fair Value, 6.12

Tax Method Means: FT, 6.21; N, 6.33; SL, 6.30

methods may have been used to prepare the outputs.¹⁰

In other words, people tend to ignore a change in the substance of an accounting datum if the name remains the same. The concept of fixation is applicable in situations where the decision-maker has received some feed-back regarding a change in the accounting process. Where functional fixation on an accounting concept exists and the accounting data are important inputs to the decision process, a change in accounting method is expected to significantly influence the decision.

The IJK paper also discusses environmental conditions in which the *choice of*

accounting method affects decisions.¹¹ In "ill-structured" decision-making environments, the decision-maker uses his past associations, available data, standard operating procedures, etc., to define his environment and structure the decision problem. Under these conditions, IJK believe that accounting surrogates are "used . . . as predictive surrogates to define the decision-maker's environment, his goals, and decision procedures."¹² It is these two propositions which have relevance to the present study.

¹⁰ Ijiri, Jaedicke, and Knight, *op. cit.*, p. 194.

¹¹ *Ibid.*, p. 195.

¹² *Ibid.*, p. 196.

In an earlier study of electric utility rate decisions, Livingstone found that mean permitted rates of return were significantly different in the original cost class, but not in the fair value class.¹³ Livingstone hypothesized that this was because the original cost jurisdictions were functionally fixed with respect to financial statement data, whereas the fair value jurisdictions, having experience with adjustments of and departures from the financial statements, were not so fixed. He further hypothesized that: "Once users of accounting information have learned to adjust for the effects of one set of alternative accounting methods . . . they will tend to adjust rapidly for the effects of new sets of alternative accounting methods that confront them. . . . they are then said to have formed a learning set."¹⁴ If the conditions under which regulatory agencies have adopted and used the tax accounting methods in question are such that the concept of functional fixation is applicable, then, *a priori*, we would expect analysis of the data of the present study to confirm Livingstone's hypotheses.

An alternative view of the situation is justified. The concept of fixation connotes inability of the decision-maker to adjust to a change in the substance of an accounting datum when it continues to be identified by its original title. Fixation results from the decision-maker's inability to assimilate the new concept because of his past associations with the label attached to it. Fixation should not apply to the reasoned rejection of one concept in favor of an alternative. The latter appears to be the case regarding the adoption of tax accounting methods related to liberalized depreciation by utility commissions. In some cases, flow-through or normalizing methods were adopted only after lengthy hearings and much testimony by expert witnesses; in others, the merits of the

alternatives were debated in individual rate cases before rulings were issued. The significant factor is that the ruling in each case represents a reasoned choice of one alternative over the other as a superior method for determining net operating revenue for a public utility.

If we restrict the concept of fixation so that it relates to experiential reactions to changes in objects or titles, then one cannot say that functional fixation is involved in the type of situation represented by the selection of tax methods in the present case.¹⁵ The present case represents the second situation envisioned by IJK as reported above, namely, that the decision-maker uses standard operating procedures, accounting models, etc. to structure what would otherwise be an ill-structured decision situation.

In this situation our *a priori* hypothesis is that alternative accounting methods would significantly influence decision outputs, since the accounting methods would serve, to an important extent, to provide structure for the decision-maker's environment, and means for expressing goals and evaluating goal achievement. Note that while we *reject functional fixation* as the cause of differences in decisions in the present case, we nevertheless expect the differences to appear as a result of interaction between the accounting process and the decision process.

STATISTICAL ANALYSIS

A Kruskal-Wallis one-way analysis of variance was used to test the null hypothe-

¹³ John L. Livingstone, "A Behavioral Study of Tax Allocation in Electric Utility Regulation," *THE ACCOUNTING REVIEW*, (July 1967), pp. 544-552.

¹⁴ *Ibid.*, p. 551.

¹⁵ Neil Churchill suggests that this restricted definition of functional fixation is a more appropriate use of the psychological concept. (See "Discussion Comments" to the IJK paper, p. 217 in *Research in Accounting Measurement*.) Of course, all do not agree; some would apply the term functional fixation to *any* situation where the same name was attached to a datum computed by different methods regardless of the conditions attendant to the use of one or the other method.

TABLE III
RESULTS OF ANALYSIS FOR SIGNIFICANT DIFFERENCES IN RATES OF RETURN UNDER ALTERNATIVE TAX-ALLOCATION METHODS

Rate Base Class	Nominal Rates of Return	Adjusted Rates of Return
Original Cost	not significant (.20 level)	significant (.005 level)
Fair Value	not significant (.99 level)	not significant (.13 level)

TABLE IV
TWO SAMPLE COMPARISONS OF FAIR VALUE PERMITTED RATES OF RETURN

Contrast	Adjusted Rates of Return
Flow-Through/Straight Line	not significant (.17 level)
Normalizing/Straight Line	not significant (.20 level)
Flow-Through/Normalizing	significant (.05 level)

sis of no significant differences in mean adjusted permitted rates of return between tax methods (within a given rate base class.)¹⁶ Results of this analysis are summarized in column two of Table III. In the original cost class, the hypothesis is rejected at the .005 level of significance. On the other hand, in the fair value class, the differences are not significant at the .13 level. Examination of the data of Table I reveals a considerable degree of variation within groups for the fair value class. Furthermore it may be noted that the range of the observations in the straight line group extends from approximately the lower boundary of the flow through group to the upper boundary of the normalizing group. Since the effect of within-group variation is to reduce the significance of between-group variation and thereby reduce the probability of rejecting the null hypothesis, two sample comparisons were made of the three two-sample pairings in the fair value data. For this purpose, a Mann-Whitney U test was used.¹⁷ Results of this analysis are reported in Table IV. As shown by the table, for the flow-through/normalizing comparison, H_0 may be rejected at the .05 level of significance. Failure of the three-sample analysis of variance to reject H_0 may be attributed to the relatively large variation in the straight line class which has the effect of obscuring the differences between flow-through and normalizing

rates. When we focus our attention on these two groups we find a greater probability of difference in means. Results of the two-sample comparison allow the conclusion that mean rates of return are significantly different for *only* the flow through/normalizing contrast in the fair value class.

The nominal rates of return in Table IV were tested in the same way as the adjusted rates. A Kruskal-Wallis analysis of variance was applied to the alternative tax accounting methods within each rate base class. Results of these tests are summarized in column one of Table III. In both original cost and fair value classes, differences in mean nominal rates of return are found not significant.

INTERPRETATION OF RESULTS

Rejection of the hypothesis of no differences in mean adjusted rates of return in the original cost class and in *one* of the contrasts for the fair value class is consistent with the *a priori* hypothesis that choice of accounting method would significantly influence decisions. Failure to reject the hypothesis of no difference in mean nominal rates of return is likewise consistent with expectations, since, as-

¹⁶ This test is described in Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences* (McGraw-Hill, 1956), pp. 184-193.

¹⁷ For a description of this test, see Siegel, *op. cit.*, pp. 116-126.

suming a common target rate of return, we would expect the nominal output of the decision process to be the same across methods while the adjusted output would be different. The apparent similarity in nominal rates may be interpreted as evidence that once a method is chosen it becomes a means of adding structure to the situation by providing a definition for the concept, "income tax expense."¹⁸

Fair value jurisdictions generally consider original cost and reproduction cost data before establishing a fair value of the rate base (which always falls between the two). This experience in adjusting and departing from financial statement data led Livingstone to hypothesize that fair value jurisdictions would not be influenced by different income tax accounting methods.¹⁹ Livingstone suggested this hypothesis after analysis of his data revealed no significant difference in means for the fair value class (0.80 level of significance achieved with Kruskal-Wallis test).²⁰

Two possible causes for the results found in the normalizing/flow-through contrast in the fair value class are: (1) Even though a fair value of the rate base is determined through consideration of nonoriginal cost data in addition to original cost data, the net operating revenue calculation is made in the same way by fair value jurisdictions as it is by original cost jurisdictions. That is, an historical cost approach to income measurement is used by both groups. Consideration was given to depreciation on fair value of plant in only one case.²¹ (2) Fair value of the rate base presumably is determined after examining depreciated original costs in the accounting records and comparing this evaluation with depreciated reproduction cost. In virtually all cases reproduction cost is determined by applying the Handy-Whitman Index of Public Utility Construction Costs to the recorded book costs. Therefore, for practical purposes, repro-

duction cost becomes in nearly all cases a standardized linear transformation of original cost. The factor which differs between fair value jurisdictions is the relative weights assigned to the two cost measures in determining fair value; these weights are seldom reported in the cases, but are implicit in the reported fair value. It appears, therefore, that fair value determinations are inextricably related to recorded costs and modifications thereof. In addition, one long time observer of the rate making process has suggested that fair value jurisdictions actually rely on original cost in making their decisions. After having made a decision to allow a reasonable annual net revenue (based on original cost and considerations of inflation, etc.) they "plug" the fair value of the rate base at a figure which will yield a rate of return capable of surviving the scrutiny of public opinion and the appellate courts.²²

Consideration of the foregoing may suggest sufficient reason to expect mean permitted rates of return to be different for fair value jurisdictions as well as for original cost jurisdictions. But no ready explanation for the conflict in results for one of the contrasts in the fair value class between two essentially similar studies is at hand. Some factors which may bear on this question are discussed below.

Utility commissions have more experience in regulating electric utilities than gas utilities. In most fair value jurisdic-

¹⁸ Those who hold to a more inclusive definition of functional fixation than that espoused in this paper would say that the similarity in nominal rates and the differences in adjusted rates result from fixation on the accounting data.

¹⁹ Siegel, *op. cit.*, p. 551.

²⁰ *Ibid.*, p. 549.

²¹ From approximately 180 gas and electric decisions made during the years 1954-1961 inclusive, the only case in which depreciation on fair value of plant was allowed was the case of Iowa-Illinois Gas and Electric Company (Volume 20, *Public Utility Reports*, 3rd. series, 1957, pp. 159ff).

²² James C. Bonbright, *Principles of Public Utility Rates* (Columbia University Press, 1961), pp. 281-283.

tions, the regulation of natural gas distribution is relatively new compared to the much older regulated electric utility industry. In addition, the operations of producing and distributing electricity tend to be more similar from company to company than is the case with gas utilities. These factors could lead to less need for reliance on the accounting data to structure the environment in the electric utility situation.

Another possibility, always present when research data are drawn from a non-controlled environment, is the presence of intervening variables. Unaccounted, but important, factors may influence the observations so that the underlying process appears unstable in replication. For example, if a number of jurisdictions were pursuing policies designed to foster expansion of natural gas distribution into new areas while older more developed jurisdictions were pursuing policies designed to minimize the cost to consumers, the effects of these dissimilar policies might be sufficient to mask the effects of the variables under investigation.

In view of the unexplained conflict in research results it is necessary to consider the results relating to the fair value class as questionable pending further research. On the other hand, as regards findings concerning the original cost jurisdictions, results of the two studies are supportive; consequently, remarks below relate to the findings in the *original cost class only*.

CONCLUSIONS

As formulated in the IJK paper, choice of accounting method is expected to influence decisions in ill-structured environments. No hypothesis is offered concerning the influence of choice of method on decisions as the decision environment becomes more well-structured.

Regulatory rate-of-return decisions were characterized above as having relatively

well-structured environments when compared to many other economic decisions. A close look at the rate-of-return decision by regulatory agencies leads one to conclude that a key structuring element in the decision situation is the related accounting process. Determination of rate of return is defined in terms of accounting process.²³ It is this accounting income/assets orientation which structures the environment and allows the development of traditional "standard operating procedures."

A possibility exists that, as we examine environmental conditions of many other economic decisions which are considered fairly well-structured, we may find the accounting process to be the most significant element for structuring the environment. In other words, the principal difference between ill-structured and well-structured environments in many cases may be the extent to which the decision situation is describable in terms of accounting variables. If this is true, the way in which the accounting variables are measured is of great significance. Need for objective criteria for selection among alternative accounting methods becomes apparent.

As mentioned above, Beaver, Kennelly, and Voss have suggested predictive power as one criterion for selection. Only a few predictive studies have been made. This criterion needs to be further tested empirically. Other criteria may warrant consideration. Also, problems of implementation of selection criteria are formidable and solutions to these problems are necessary.²⁴

Research is needed on the role of functional fixation on accounting data in decision-making. We need to know if fixa-

²³ Rate of return for regulatory purposes is defined as the ratio of net operating revenue (net income after taxes but before debt charges) to the rate base (depreciated utility plant plus working capital allowance).

²⁴ See the Beaver, Kennelly, Voss article for a discussion of some of these problems.

tion is merely a transitory phenomenon following a change in accounting method or if it persists. Related to this, Livingstone's learning set hypothesis needs to be tested. If decision-makers quickly learn to adjust to changes in accounting methods, the problem of fixation may be of no great significance. Finally, whether decision-makers are influenced in their decisions

because of fixation or because of their choice of a particular method of measuring an accounting variable, the fact that decisions may be influenced by the related accounting process points to a need for greater research efforts directed at finding objective criteria for selection among alternative accounting methods for particular purposes.