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Choice Among Financial Reporting Alternatives

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ACCOUNTANTS have long been engaged in the process of choosing among accounting alternatives. Accounting thought, in turn, has begun to consider questions of the existence and characterization of optimal, or most preferred, accounting systems.[1] But application of this information economics framework to financial accounting issues has not been accomplished. We have partial analyses, as in recent works by Beaver and May and Sundem;[2] but the fundamental question of explicitly recognizing individual financial statement users and assimilating over their diverse preferences, beliefs, and actions has not been addressed.[3]

The purpose of this paper is to formulate the problem of choice among financial reporting alternatives by focusing on the impact of reporting alternatives on the individual consumption decisions in an economy. In the initial section we formulate a model of the consequences of relying on alternative financial reporting policies. Equipped with a model of consequences,

we then turn, in the second section, to the evaluation of alternative reporting policies by focusing on the consequences to which

I am indebted to William Beaver and Charles Horngren for helpful comments.

[1] J. Butterworth, "The Accounting System as an Information Function," *Journal of Accounting Research* (Spring 1972); J. Demski, "Information Improvement Bounds," *Journal of Accounting Research* (Spring 1972), "Optimal Performance Measurement," *Journal of Accounting Research* (Autumn 1972), "Rational Choice of Accounting Method for a Class of Partnerships," *Journal of Accounting Research* (Autumn 1973), and "Some Decomposition Results for Information Evaluation," *Journal of Accounting Research* (Autumn 1970); G. Feltham, *Information Evaluation* (American Accounting Association, 1972), and "The Value of Information," THE ACCOUNTING REVIEW (October 1968); G. Feltham and J. Demski, "The Use of Models in Information Evaluation," THE ACCOUNTING REVIEW (October 1970); J. Marschak and R. Radner, *Economic Theory of Teams* (Yale University Press, 1972).

[2] W. Beaver, "The Behavior of Security Prices and Its Implications for Accounting Research (Methods)," *Accounting Review Supplement* (1972) and R. May and G. Sundem, "Cost of Information and Security Prices: Market Association Tests for Accounting Policy Decisions," THE ACCOUNTING REVIEW (January 1973).

[3] Recognition of the multiperson orientation, of course, occupies a prominent position in the accounting

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they give rise. The final section then considers recent choice proposals, such as the development of information markets, voting, and formation of the Financial Accounting Standards Board, as possible solutions to the problem of choice among financial reporting alternatives.

RESOURCE ALLOCATION CONSEQUENCES

In this section we provide an explicit description of the consequences of altering a firm's financial reporting policy. The primitive consequence focused on is the consumption of each individual in an economy. Hence, we shall require a model of individual choice and price formation in an economy, as well as a precise statement of the role of financial reporting information. For this purpose, we shall focus on the type of economy-wide model used in general equilibrium theory.[4]

This has the advantage of explicitly viewing financial reporting systems in terms of the consumption schedules to which they give rise. That is, rather than state the problem in terms of vaguely defined "costs" and "benefits" or focus on security price movements, we concentrate on the more primitive consequence of individual consumption. This allows us to formulate explicitly the problem of choice among financial reporting alternatives in terms of (heterogeneous) individual preferences; with such a formulation, additional aspects of the financial reporting problem become apparent. For example, we often casually frame the financial reporting problem in terms of the statement users, but nonusers have a definite stake in the problem as well. Similarly, adopting an economy-wide view of consequences leads to the recognition of fundamental difficulties in defining the value of information.

Briefly, then, we propose to compare financial reporting alternatives by focusing on the consumption schedules to which

they give rise. These consumption schedules, in turn, are the schedules that would be in equilibrium if the respective reporting systems were implemented. To keep the analysis within bounds, however, we shall focus on a specific example of an economy rather than employ the full analytic power of general equilibrium theory.

A Simple Economy

Consider, then, a one-good economy (corn) in which two distinct dates are recognized (present and future). Two homogeneous classes of individuals exist; and, for convenience, we focus on one representative individual from each class. The first type of individual, which we index by $i=1$, is endowed with 24 units of current corn and nothing else. Individual type $i=2$, however, is endowed with 46 units of current corn and owns a firm that may produce either nothing or, using 10 units of current corn, a lottery of future corn. In particular, if state $s=1$ prevails, 10 units of future corn are produced; but if

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literature; but the formal exploration of heterogeneous users and their impact on the accounting choice process remains unexplored. The AAA *Statement of Basic Accounting Theory* (American Accounting Association, 1966), for example, calls for the production of information believed relevant for *any* substantial group of users, and Ijiri calls for the production of objective, consistent, and unambiguous data when conflicting interests are present. (Y. Ijiri, *The Foundations of Accounting Measurement, A Mathematical, Economic, and Behavioral Inquiry* (Prentice-Hall, 1967).) Similarly, Edwards and Bell are concerned with evaluating management's decisions and providing a basis for taxation, and McDonald views accounting as being concerned with facilitating the decision making by various parties. (E. Edwards and P. Bell, *The Theory and Measurement of Business Income* (University of California Press, 1961) and D. McDonald, *Comparative Accounting Theory* (Addison-Wesley, 1972).)

[4] For a detailed discussion of general equilibrium theory, see K. Arrow and F. Hahn, *General Competitive Analysis* (Holden-Day, 1971), G. Debreu, *Theory of Value* (Wiley, 1959), J. Quirk and R. Saposnik, *Introduction to General Equilibrium Theory and Welfare Economics* (McGraw-Hill, 1968), and R. Radner, "Competitive Equilibrium Under Uncertainty," *Econometrica* (January 1968). Radner also provides a recent appraisal of the state of the theory in "Problems in the Theory of Markets Under Uncertainty," *American Economic Review* (May 1970).

state $s=2$ prevails, 15 units of future corn are produced.

For individual i, we denote the amount of corn consumed in the present period by x_{i1} and the amount consumed in the future period, if state s obtains, by x_{i2}^s. We also assume that both individuals assign 0.5 prior probabilities to each state and exhibit logarithmic utility functions of the form:

$$EU_i(x_{i1}, x_{i2}^1, x_{i2}^2)$$

$$= \ln x_{i1} + \tfrac{1}{2} \ln x_{i2}^1 + \tfrac{1}{2} \ln x_{i2}^2 \quad (1)$$

We next assume that current, future state $s=1$, and future state $s=2$ corn are traded in perfectly competitive markets and denote their respective prices by P_1, P_2^1, and P_2^2. The current price, then, of a promise to deliver one unit of future corn if $s=2$ obtains is denoted P_2^2.

Each individual is now viewed as selecting the most personally preferred consumption schedule that is available to him. In an expected utility format, we model his choice behavior as

$$\max EU_i(x_{i1}, x_{i2}^1, x_{i2}^2)$$

subject to $x_{i1}P_1 + x_{i2}^1 P_2^1 + x_{i2}^2 P_2^2 \leq W_i$ [2]

where the constraint reflects the fact that he cannot spend more on consumption than his budget, W_i, allows. This budget, in turn, is merely the total value of the individual's endowment. That is, W_1 is $24P_1$ and W_2 is $46P_1$ plus the firm's maximum profit.

Finally, our economy is in equilibrium when a set of prices exists such that the optimal individual and firm actions, given these prices, equate supply and demand for each class of corn. Relevant data are summarized in Table 1, and the equilibrium price and consumption schedules are displayed in Table 2.[5]

Now suppose that firms produce information, as well as future corn, and distribute this information to various individuals. This information might be

TABLE 1

DATA FOR EQUILIBRIUM ILLUSTRATIONS

	Commodities		
	x_1	x_2^1	x_2^2
Production Possibilities			
null	0	0	0
future corn	−10	10	15
Individual Endowments			
$i=1$	24	0	0
$i=2$	46	0	0
	Ownership		
$i=1$	0		
$i=2$	100%		

Expected Utility Evaluation

$EU_1(\cdot) = \ln x_{11} + \tfrac{1}{2} \ln x_{12}^1 + \tfrac{1}{2} \ln x_{12}^2$

$EU_2(\cdot) = \ln x_{21} + \tfrac{1}{2} \ln x_{22}^1 + \tfrac{1}{2} \ln x_{22}^2$

TABLE 2

EQUILIBRIUM DATA

	Commodities		
	x_1	x_2^1	x_2^2
Total Original Endowments	70	0	0
Production	−10	10	15
Supply	60	10	15
Individual 1 Demand	12	2	3
Individual 2 Demand	48	8	12
Total Demand	60	10	15
Sustaining Commodity Prices	1	3	2

Expected Utility

$EU_1(\cdot) = \ln 12 + \tfrac{1}{2} \ln 2 + \tfrac{1}{2} \ln 3 = 3.38$

$EU_2(\cdot) = \ln 48 + \tfrac{1}{2} \ln 8 + \tfrac{1}{2} \ln 12 = 6.15$

[5] Determination of a set of equilibrium prices is accomplished in the following manner. First, since the prices need only be relative, we select current corn as a numeraire and arbitrarily set $P_1 = 1$. Next, the firm has two alternatives that will produce a profit of either zero or $10P_2^1 + 15P_2^2 - 10$. The production alternative is, however, clearly optimal. Without production, both individuals will consume no future corn—implying $EU_1(.) = EU_2(.) = -\infty$. With this in mind, we next use classical techniques to establish the price dependent optimal consumption schedules as:

$$x_{i1} = \frac{W_i}{2}$$

$$x_{i2}^s = \frac{W_i}{4P_2^s}$$

Finally, the equilibrium prices must clear all markets. Focusing on demand and supply for current corn and future state 1 corn, we have

$$12 + \tfrac{1}{2}[36 + 10P_2^1 + 15P_2^2] = 24 + 36$$

produced and distributed before decisions are finalized, in which case it plays the familiar prior probability revision role. Alternatively, it might be produced and distributed after decisions are finalized, in which case it provides the discrimination among states that is necessary for the trading of state dependent commodities. These pre- and post-decision roles are discussed below.[6] Following this we discuss the more interesting question of what happens to the individual consumption schedules when firms alter their information acquisition and transmission policies.

The Role of Information

Receipt of information *before* selection of a most preferred action is a familiar subject. Suppose individual i will receive some information before selecting his consumption schedule. In an expected utility setting, receipt of such information is viewed as altering his state probability assessments. The optimal consumption schedule is then determined as in equation (2), but with the altered conditional probability assessment; and the resultant equilibrium is conditional on the information.

We tend, in fact, to associate many financial accounting issues with this pre-decision role. Examples include such issues as historical versus replacement cost income measures, revenue recognition, human resource accounting, and earnings per share calculation—where, in each instance, the questions are framed in terms of, say, "usefulness" to individual investment decisions.

This is, however, only part of the story, because trading in state dependent commodities—such as future corn if $s=2$ obtains—requires an ability to distinguish among the various states. For example, the firm in our economy can distinguish between $s=1$ and $s=2$ as a mere byproduct of its productive activities. Communica-

tion of this revelation then provides a basis for state dependent trading in future corn, as was assumed in Table 2. Without such revelation, from some source, the individuals could not contract for state dependent exchanges.[7] If, for example, individual 1 could not distinguish between $s=1$ and $s=2$, he could not make trades that depend on which of the two states occur. Hence, $x_{12}{}^1 = x_{12}{}^2$; and we model his consumption choice decision by appending this trade constraint to the basic model in equation (2). In a similar vein, feasibility of a hybrid security with payments dependent on replacement-cost income performance depends on the availability of a replacement-cost income measure.

Quite clearly, then, inability to distinguish between two events precludes a trade contingent on which of the two events does occur.[8] This does not imply, however, that unique state revelation is desirable. Such a set of systems and markets has a cost;[9] it is also conceivable that increasing the number of state distinctions

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and

$$\frac{24}{4P_2{}^1} + \frac{36 + 10P_2{}^1 + 15P_2{}^2}{4P_2{}^1} = 10$$

which jointly imply $P_2{}^1 = 3$ and $P_2{}^2 = 2$.

[6] Note that in a multiperiod setting these two roles become intertwined. See Demski, "Optimal Performance Measurement," for a discussion of these two roles in a budgetary control setting.

[7] The story is told about a wealthy San Francisco resident who, lonely and alone in his city apartment one evening, called a friend in Las Vegas and played roulette over the telephone. He could not, of course, observe state occurrence; and he ended the evening owing his "friend" $70,000.

[8] We observe, for example, death contingent trades (life insurance); death is a readily ascertainable event. But a salvation contingent trade (salvation insurance) is not possible. Similarly, uncontrollable fire contingent trades are not possible; rather, fire insurance depends on the union of uncontrollable and undetectable but controllable fire events; and for this reason the maximum amount of the policy is also limited.

[9] The current interest in "no fault" auto insurance provides a ready illustration. Proponents contend that the cost of making the fault distinction in the present system is too excessive (for example, court litigations) and everyone could be made better off, with the possible exception of litigation agents, by coarsening the state partition and reducing the information costs.

TABLE 3

PUBLIC PREDECISION STATE REVELATION

| | Commodities | | |
	x_1	x_2^1	x_2^2
State 1 Revelation			
Individual 1 Demand	12	2	
Individual 2 Demand	48	8	
Total Demand	60	10	
Sustaining Commodity Prices	1	6	
State 2 Revelation			
Individual 1 Demand	12		3
Individual 2 Demand	48		12
Total Demand	60		15
Sustaining Commodity Prices	1		4

Expected Utility

$EU_1(\cdot) = \frac{1}{2}$ [ln 12+ln 2]+$\frac{1}{2}$ [ln 12+ln 3]=3.38
$EU_2(\cdot) = \frac{1}{2}$ [ln 48+ln 8]+$\frac{1}{2}$ [ln 48+ln 12]=6.15

may result in consumption schedules that are more desirable to some but less desirable to others.

Alteration of Predecision Information Systems

Now consider the effect of altering the information available to an individual before he selects an optimal action. In particular, suppose perfect state revelation will be provided before any decisions are finalized. The price and equilibrium consumption schedules for both revelation possibilities are displayed in Table 3. Observe that, although the prices change, no consumption schedule is altered by this revelation. Quite clearly, then, the information is, socially speaking, useless; it has zero social value.[10]

If, however, a single individual *privately* receives such revelation, he is in a position to alter favorably his consumption schedule. To illustrate, suppose one individual type 1 *privately* receives revelation that $s=1$ will in fact occur. He is considered an atomistic price taker in the economy and his action will therefore have an imperceptible effect on the prevailing (non-revelation) prices of $P_2^1=3$ and $P_2^2=2$.

Hence, with $s=1$ revealed certain, he will consume 12 units of current corn and $12/3=4$ units of future state 1 corn. Conversely, if $s=2$ is revealed, he will consume 12 units of current corn and $12/2=6$ units of future state 2 corn. His well-being is considerably increased as a result of the revelation. (See Table 4.)

TABLE 4

PRIVATE PREDECISION STATE REVELATION
FOR INDIVIDUAL 1

| | Commodities | | |
	x_1	x_2^1	x_2^2
State 1 Revelation			
Individual 1 Demand	12	4	0
State 2 Revelation			
Individual 1 Demand	12	0	6

Expected Utility

$EU_1(\cdot) = \frac{1}{2}$ [ln 12+ln 4]+$\frac{1}{2}$ [ln 12+ln 6]=4.07

Apart from illustrating the effect of introducing new predecision information, this example also demonstrates a fundamental conflict between the private and social value of information. The individual has, in this case, a definite incentive to produce the information, even though its social value is precisely zero. We could, in fact, increase the divergence by allowing the single individual to speculate as well; we could reduce the divergence by introducing production decisions that would be affected by the revelation. Divergent probability beliefs would also reduce the divergence, and movement away from complete markets could affect the divergence. The point, however, is that the social and private values of prechoice information may be divergent.[11] In fact, non-

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[10] With production and consumption schedules unchanged, the information is clearly of zero social value. Precisely what social value means in a more robust context is, however, a far deeper question, as noted in the following section. Also see J. Demski, "The Value of Financial Accounting," (Unpublished Working Paper, Stanford University, 1973).

[11] Further discussion of the divergence between the private and social value of information can be found in

divergence appears to be the "special" case.

Alteration of Post-Decision Information Systems

Alteration of the post-decision information system is analyzed in a similar manner. The nature of the consumption schedule effect is, however, somewhat different. In this situation, alteration of the information systems has the effect of altering the market, or trading, opportunities that are available.

To illustrate, suppose that the firm will reveal state occurrence only to its owners. We might interpret this as the firm giving its owners exclusive access to the financial statements. Individual 1, then, being unable to distinguish between the two states, will be able to contract for future corn delivery, but not state dependent delivery of the future corn. This has the effect of adding the constraint $x_{12}{}^1 = x_{12}{}^2$ to his consumption schedule determination model. With this added constraint, he will, under these circumstances, consume less of the state $s = 2$ corn and more of the $s = 1$ corn. The resulting price and consumption schedules and expected utilities are displayed in Table 5.

A more dramatic illustration of this type of effect is provided by altering the pro-

TABLE 5

POST-DECISION REVELATION FOR FIRM OWNERS[a]

| | Commodities | | |
	x_1	$x_2{}^1$	$x_2{}^2$
Individual 1 Demand	12	2.38	2.38
Individual 2 Demand	48	7.62	12.62
Total Demand	60	10	15
Sustaining Commodity Prices	1	3.15	1.90

Expected Utility

$EU_1(\cdot) = \ln 12 + \frac{1}{2} \ln 2.38 + \frac{1}{2} \ln 2.38 = 3.35$
$EU_2(\cdot) = \ln 48 + \frac{1}{2} \ln 7.62 + \frac{1}{2} \ln 12.62 = 6.16$

[a] This situation corresponds to that depicted in Tables 1 and 2 with the single exception that $x_{12}{}^1$ and $x_{12}{}^2$ are now constrained to be equal.

duction possibility set of the firm so that only 1 unit will be produced if $s = 1$ obtains. Further suppose that individual 1 continues to regard both states as equally likely, but individual 2 now regards state $s = 2$ as certain. Under these conditions, the owner's consumption schedule is increased by systematically withholding the information from the nonowner and thereby decreasing the trading opportunities available to the nonowner. Details are summarized in Table 6.

Two points emerge. First, by focusing on individual consumption decisions we are able to track through the effect of alternative financial reporting policies at the individual level. We have a model of the consequences that will follow from adopting one set of reporting policies as opposed to another.[12] Second, a given firm's reporting policy may affect both owner and nonowner individuals; moreover, there is no compelling reason to suspect that individual firm decisions will be desirable in a social sense. Examples in Tables 4, 5, and

E. Fama and A. Laffer, "Information and Capital Markets," *Journal of Business* (July 1971), and J. Hirshleifer, "The Private and Social Value of Information and the Reward to Inventive Activity," *American Economic Review* (September 1971). Fama and Laffer, however, employ a partial equilibrium analysis that does not explicitly consider individual consumption effects. Hirshleifer, on the other hand, provides an extensive discussion of predecision externalities in an equilibrium setting (in terms of "fore-knowledge" and "discovery" information), but does not discuss the post-decision externalities discussed in the following subsection. Further observe that similar pathologies arise in a game situation. See J. Ponssard, *Information Usage in Non-Cooperative Game Theory* (Unpublished Ph.D. Dissertation, Stanford University, 1971).

[12] In developing this argument of modeling the resource allocation consequences of alternative financial reporting systems, we have relied on a highly simplified equilibrium model. This does not detract from the basic development, but the reader should be aware that numerous extensions are possible. We could, for example, introduce competing information sources, limit the availability of future markets, introduce explicit spot markets and financial instruments, and thereby formally introduce a securities market, or we could introduce stochastically varying preferences at the individual level. But the essence of the argument remains: we rely on an equilibrium setting to model the resource allocation consequences of employing alternative financial reporting systems.

TABLE 6
OWNER OPTIMAL POST-DECISION REVELATION

	Commodities		
	x_1	x_2^1	x_2^2
Production Possibilities			
null	0	0	0
future corn	−10	1	15
Individual Endowments			
$i=1$	24	0	0
$i=2$	46	0	0
State Revelation to Both Individuals*			
Individual 1 Demand	12	1	1.67
Individual 2 Demand	48	0	13.33
Total Demand	60	1	15
Sustaining Commodity Prices	1	6	3.6

Expected Utility

$$EU_1(\cdot) = \ln 12\tfrac{1}{2} \ln 1 + \tfrac{1}{2} \ln 1.67 = 2.74$$
$$EU_2(\cdot) = \ln 48 + \ln 13.33 = 6.46$$

State Revelation Limited to Owner Individual			
Individual 1 Demand	12	1	1
Individual 2 Demand	48	0	14
Total Demand	60	1	15
Sustaining Commodity Prices	1	8.55	3.43

$$EU_1(\cdot) = \ln 12 + \tfrac{1}{2} \ln 1 + \tfrac{1}{2} \ln 1 = 2.49$$
$$EU_2(\cdot) = \ln 48 + \ln 14 = 6.51$$

* Individual 2 continues to own all of the firm, and the two individuals possess divergent probability assessments: $\emptyset_1(1) = \emptyset_1(2) = 0.5$, $\emptyset_2(1) = 0$ and $\emptyset_2(2) = 1$.

6 illustrate this phenomenon. Hence, we conclude that the question of optimal policy determination is potentially far more encompassing than what is in the interests of the firm's owners.

This optimality question is pursued in the following section.

EVALUATION OF ALTERNATIVE RESOURCE ALLOCATION CONSEQUENCES

Suppose, now, that we compare two alternative sets of financial reporting systems for the various firms. We assume that both sets admit an equilibrium,[13] that the respective equilibria will be achieved if the set is adopted, and that the resulting equilibria are substantively different in terms of resource allocations. No additional restrictions are placed on the nature of these reporting systems. The overall in-

formation content may be identical, with information processing costs being the only issue. Conversely, the systems may offer substantively different information contents.[14]

In comparing these systems, we focus on the consumption schedules they will induce. Movement from one set of systems to another may be unopposed, as illustrated in Table 3. Alternatively, as illustrated in Tables 4, 5 and 6, movement from one to the other may benefit some individuals and harm others. Indeed, as in these Tables, we may be able to interpret such a movement as being completely equivalent to redistributing the initial endowments and leaving the information systems unaltered. That is, some information policy changes are identical to wealth redistributions.[15]

[13] Existence is hardly an issue in our simple example; but it becomes a profound question as complexity is added. Briefly (and somewhat casually) in a competitive economy the following conditions are sufficient to ensure existence of an equilibrium set of prices: (1) individual tastes are summarized by continuous, convex, and nonsatiating preference relations with closed, convex, and nonempty opportunity sets; (2) individual production possibility sets are closed and allow zero production by any firm; and (3) aggregate production possibilities are convex, irreversible, and allow for free disposal of unwanted inputs.

[14] This is an important point, because market efficiency is often casually interpreted as implying that the only interesting accounting questions relate to which information source has a cost advantage in producing a certain datum. But different cost distributions imply different consumption distributions—and these consequences must be evaluated if the equally informative systems are to be compared. In addition, efficiency exists with respect to a set of information (past prices, all public information, or public and private information in the various forms of efficiency). But here we also entertain the question of altering that set of information, e.g., a new measurement technique may allow a state partition that presently cannot be attained. Moreover, the question of precisely what behavior may be altered by information policy shifts assumes a natural position in a full (as opposed to partial) equilibrium setting. Table 4, for example, illustrates unilateral acquisition of private information; but the speculation incentives would disappear if the information were already reflected in the price schedules. In fact, a game interpretation of the economy is far more revealing at this point. See Arrow and Hahn, *General Competitive Analysis*.

[15] This is, of course, no accident. The conditions cited in footnote 13 are also sufficient to guarantee that any arbitrary Pareto optimal distribution of the economy's resources can be achieved as an equilibrium distribution

Hence, the question of comparing financial reporting alternatives requires a concept of optimality far more robust than that of unopposed movements, or Pareto optimality.

Unfortunately, we must admit to some pessimism in this regard. If we make the ethical judgment that individual (user) tastes are to count in comparing financial reporting alternatives, and if we require our concept of optimality to display certain almost innocuous requirements, Arrow's famous impossibility theorem guarantees that no such evaluation concept exists:

There is no method of selecting among social alternatives that is not dictatorial, but is Pareto optimal, independent of irrelevant alternatives, and provides a complete, transitive, and reflexive ranking of the social alternatives.[16]

All methods of collective choice violate Arrow's conditions. Construction of a concept of social optimality cannot follow from individual tastes in the sense of satisfying Arrow's conditions. Moreover, given the assertion that alternative financial reporting systems may induce significantly different resource allocations, this impossibility result applies to choice among financial accounting alternatives as well. In particular, the question of what we mean by an optimal set of financial reporting systems cannot be approached by assimilating individual preferences and opinions in a manner consistent with Arrow's conditions.

Observe, however, that this result does not imply that well-defined, acceptable concepts of optimality do not exist in restricted settings. Beaver's careful analysis of association tests provides a ready illustration.[17] But we cannot rely on fortuitous circumstances to resolve the optimality question. Neither, for that matter, can we rely on special purpose reporting, with each class of users being presumably homogeneous and receiving a class-wise mutu-

ally preferred report. Such an approach does not, for example, address the evaluation question of one set of users being benefited while another is harmed. In short, it offers but a restricted form of Pareto optimality that is simply not robust enough to resolve all necessary comparisons.[18]

Moreover, we cannot avoid making these choices. Indeed, the central import of the theorem is to preclude, if we seek a general formulation, viewing these choices as optimality-maximization problems in the absence of some form of imposition. These types of choices continue to be made; but whatever method of choice is employed is inconsistent with Arrow's conditions. However, the various methods fail in different areas, and some fail better than others. The concept of optimality thus becomes intertwined with the institutional method of choice that is actually used. Several alternative methods of choosing among financial reporting alternatives are discussed in the following section.

SOME ALTERNATIVE CHOICE MECHANISMS

Many alternative methods of collective choice exist. Three alternative classes that have found limited application or recom-

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of resources through an appropriate redistribution of the initial endowments. Price and resource directives are, in this sense, dual to one another.

[16] See K. Arrow, *Social Choice and Individual Values*, second edition (Wiley, 1963). Further discussion can be found in R. Luce and H. Raiffa, *Games and Decisions* (Wiley, 1957), Quirk and Saposnik, *Introduction to General Equilibrium* . . . , and A. Sen, *Collective Choice and Social Welfare* (Holden-Day, 1970).

[17] See Beaver, "The Behavior of Security Prices . . . ." Another example, based on cooperative sharing, is provided by Demski, "Rational Choice of Accounting Method for a Class of Partnerships."

[18] For example, the effect observed in Table 6 could be reversed by giving the $i = 1$ individuals a state-revealing special report. This places them in a position of benefiting at the second individuals' expense. Quite clearly, special purpose reporting does not preclude a setting in which one group may benefit at another's expense. Indeed, incorporating liberalism of this type leads to an impossibility theorem similar to the one quoted above. See Sen, *Collective Choice* . . . , Chapter 6.*

mendation in financial reporting will be briefly discussed in this final section: market mechanisms, voting procedures, and impositions.

The Laissez-Faire Approach

Reliance on a market mechanism for determination of each firm's financial reporting policy possesses a great deal of simplistic appeal. Those who desire the information would, for example, absorb its cost. In fact, this approach presently exists under the guise of, say, professional financial analysis. Furthermore, Abdel-khalik has recently suggested its direct use in the resolution of certain financial reporting issues.[19] But, for all its virtue, reliance on a market mechanism possesses one significant disadvantage. The private and social values of information may diverge; if so, myopic, individual-by-individual acquisition may not be socially desirable.[20] This externality phenomenon is illustrated by our original example in Tables 3 and 4, where the private value of perfect state revelation was positive, but the social value precisely zero.

In a related vein, closing all such information markets and allowing a firm to adopt a financial reporting policy designed to maximize the well-being of its particular owners also displays this externality phenomenon. This is vividly illustrated by our last example, summarized in Table 6, where the owners prefer suppression of state information because suppression allows them to exploit the nonowner individuals.

To be certain, these externalities may be removed through appropriate expansion of the commodity space. Attempts to control pollution through sale of "pollution certificates" provide a ready example. But the resulting markets may be too thin and are definitely costly.[21] For example, additional price data would have to be processed by the individual agents; also, the

mere establishment of a market would consume resources.

Thus, reliance on a market mechanism ignores the fundamental collective nature of the information produced by firms. Whether this reliance is desirable in an aggregate sense clearly depends on the circumstances and value judgments at hand.

Voting Procedures

Voting provides an alternative to laissez-faire determination of the financial reporting systems. It is, in fact, presently employed in a limited nature, as evidenced by membership voting in the AICPA for selection among, say, alternative codes of ethics and in the FASB for selection among alternative accounting practices. Also, direct application to financial reporting issues has been proposed by Abdel-khalik.[22] But voting methods cannot be adopted without cost (aside from the obvious cost of implementation).

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[19] See A. Abdel-Khalik, "User Preference Ordering Value: A Model," THE ACCOUNTING REVIEW (July 1971).

[20] Indeed, with externalities present, the associated equilibrium may not be Pareto optimal. The market approach also violates Arrow's conditions—in particular, the condition requiring unrestricted domain or a complete ranking. See Arrow, Social Choice . . . , especially p. 110.

[21] If the market is too thin, individual bargaining becomes involved and we begin to question whether adequate solutions exist. Mutually advantageous bargains have, for example, been apparently shunned in international relations. Adverse selection phenomena also argue against the markets approach. See K. Arrow, "Political and Economic Evaluation of Social Effects and Externalities," in M. Intriligator (ed.), Frontiers of Quantitative Economics (North-Holland, 1971) for an extensive discussion of externalities.

[22] Abdel-khalik ("User Preference Ordering . . . ") makes a number of specific proposals, but the central feature of his recommendation is voting by the set of users on the most preferred system coupled with information markets to serve minority interests. Implicit voting recommendations can also be found in the literature. R. Estes "An Assessment of the Usefulness of Current Cost and Price-Level Information by Financial Statement Users," Journal of Accounting Research (Autumn 1968) and V. Brenner, "Financial Statement Users' Views of the Desirability of Reporting Current Cost Information," Journal of Accounting Research (Autumn 1970), provide ready examples.

First, voting will not always work. As long as the 18th century Condorcet illustrated that majority voting may lead to situations in which voters with consistent individual preferences show inconsistent collective preferences. To illustrate this phenomenon, suppose we have three individuals, numbered 1, 2, and 3, and three alternative financial reporting alternatives, denoted η, η', and η''. Further suppose that individual 1 prefers η to η' and η' to η''. and, by transitivity, η to η''; individual 2 prefers η' to η'' and η'' to η and, by transitivity, η' to η; and individual 3 prefers η'' to η and η to η' and, by transitivity, η'' to η'. Using a simple majority voting procedure, we now observe that a majority prefer η to η', η' to η'', and η'' to η.[23] Indeed, Arrow has proved that, in the absence of assumptions about the individual orderings, no method of voting will remove this inconsistency.[24]

Second, voting procedures preclude the formal taking into account of individual preference intensities.[25] For example, 55% of the people may "mildly" prefer lease capitalization, whereas 45% "strongly" prefer noncapitalization. For this reason, we do not generally regard voting as a universally applicable social choice procedure. (It is, for example, often regarded as an unsatisfactory basis for making distribution decisions.)

Finally, voting procedures may give rise to strategic voting issues. For example, it may be in an individual's best interest to misrepresent his true feelings.[26] With such misrepresentation, the results of a particular vote cannot necessarily be taken as an expression of social preference.

Voting procedures, then, are simple, well-accepted in our society, yet not without cost. Whether, in fact, their use—in whatever manner—in the resolution of financial reporting issues is desirable in an aggregate sense remains an unsettled question.[27]

Imposition

Laissez-faire and voting provide alternative methods of selecting among alternative financial reporting systems. Both have the virtue—and cost—of direct and obvious movement from individual preferences and opinions. Another method is that of imposition. This has the obvious disadvantage of being, potentially, far removed from the individual tastes; but it may be desirable in an aggregate sense.

Two forms need to be distinguished—dictatorial imposition and imposition by convention. Dictatorial imposition is illustrated by Congress and the various governmental agencies that affect financial reporting policies, as well as the FASB. For example, the SEC, FPC, and FCC, all in-

[23] This simple example does not imply universality of the inconsistency. M. Garman and M. Kamien, "The Paradox of Voting: Probability Calculations" (*Behavioral Science* (July 1968) have, for example, shown that, when all possible rankings of three alternatives are equally likely, the probability of observing the inconsistency approaches 0.088 as the number of individuals increases without limit.

[24] See Arrow, *Social Choice* .... Thus, voting procedures violate Arrow's condition of an unrestricted domain.

[25] Logrolling (vote trading) and filibustering do, of course, allow for the expression of preference intensities. But they are not robust solutions. Filibustering provides an opportunity for minority control. A logrolling solution, on the other hand, may call for a randomized strategy, which cannot be achieved in a vote market. See R. Wilson, "An Axiomatic Model of Logrolling" *American Economic Review* (June 1969) and "A Game-Theoretic Analysis of Social Choice," in B. Lieberman (ed.), *Social Choice* (Gordon and Breach Science Publishers, 1971).

[26] Arrow, *Social Choice* ... provides one such example (pp. 80–81). Also see R. Farquharson, *Theory of Voting* (Yale University Press, 1969). One interesting implication of these misrepresentation results is that opinion surveys—such as comparing historical and current cost income measures—cannot be relied upon as unbiased indicators of preference.

[27] While the discussion has concentrated on a few negative effects, we should note that K. May "A Set of Independent, Necessary and Sufficient Conditions for Simple Majority Decisions," *Econometrica* (1952)) has proven that in choice between two alternatives simple majority rule is the *only* method of social choice that always works (i.e., is always decisive), that does not depend on the labeling of individuals or alternatives, and that is positively responsive to individual rank orderings. Also see Sen, *Collective Choice* . . ., for a summary of related results.

fluence accounting policies.[28] Further observe that, although we may interpret the decisions of any of these agents as being an imposition, we must ultimately recognize that a form of voting is implicitly at work. Congressional action provides an obvious illustration.[29] The point, of course, is that the laissez-faire, voting, and imposition alternatives are not independent solutions to social choice problems. For example, imposition may be the result of elaborate voting procedures conducted within an authoritative group.

A subtle issue arises here. We often interpret such a dictatorial but socially conscious group as the FASB as performing cost-benefit analysis, however defined, in selecting among its alternatives.[30] Although the benefit side of the analysis is obtuse, we must recognize that so is the cost side. In particular, information is a joint product in this case. It is jointly produced, along with the more obvious schedule of produced commodities, by the firm.

The second form is imposition by convention. We have a history of, say, historical cost reporting and interperiod comparability. It is, of course, difficult to separate the two types of impositions; but their interpretation is somewhat different. Dictatorial impositions are the direct product of the dictator. Indeed, this is a central argument for broadening the membership of the APB. Presumably, a broadened base will provide decisions more in harmony with society's desires, broadly interpreted. Social norms, or conventions, however, may evolve as a satisfactory collective form of solution to a social choice problem.

For example, the comparability convention may be interpreted as an attempt, however crude, to compensate for divergence between the social and private values of information. Similar comments apply to the conventional role of the AICPA in establishing financial reporting requirements.

Either way, however, we recognize that a system of impositions, however established, has the potential disadvantage of producing results far removed from those desired by the society's members. Indeed, if either the choices or the method of choice become accepted conventions, we must raise the related question of whether alteration becomes inadmissible simply because the established conventions are themselves too costly to alter.

To recapitulate, laissez-faire, voting, or imposition approaches to the problem of choice among financial reporting alternatives all leave something to be desired. All three are likely to differ not only in terms of the financial reporting choices that will evolve but also in terms of the cost of making these choices. In a very fundamental sense, then, which method of choice is the most desirable, however defined, remains an open question.[31]

SUMMARY

The question of selecting among finan-

[28] Actually, these various influences presently constrain practice without explicitly stating a single, specific reporting system that must be followed in each individual instance. (Notationally, we interpret this as stating a set of preferred alternatives, or set of alternate optima.) Also, see C. Horngren, "Accounting Principles: Private or Public Sector?" *Journal of Accountancy* (May 1972) for a discussion of the relationship between the APB and Congress and the SEC.

[29] It is interesting that dissatisfaction with the APB has led to establishment of a new, broader-based board —but still a form of dictatorial imposition. (See the 1972 AICPA Study on Establishment of Accounting Principles.) Similar comments apply to the idea of an "Accounting Court."

[30] May and Sundem, "Cost of Information and Security Prices . . . ," for example, adopt an explicit cost-benefit view of the problem, thus admitting to, without further restriction, either a dictatorial imposition or interpersonal utility comparisons. Similar comments apply to D. Downes and T. Dyckman, "A Critical Look at the Efficient Market Empirical Research Literature As It Relates to Accounting Information," THE ACCOUNTING REVIEW (April 1973), and I. Nakano, "Noise and Redundancy in Accounting Communications," THE ACCOUNTING REVIEW (October 1972).

[31] Indeed, we have only scratched the surface of the institutional method of choice problem. Each conceivable method encompasses "costs" and "benefits;" but little is known beyond the obvious. See L. Hurwicz, "On Informationally Decentralized Systems," in C.

cial reporting alternatives is viewed in the same manner as any other information choice problem. That is, we move from the system, to the signal, to the actions induced by the signal, to the consequences that stem from the actions, to—ultimately —the 'evaluation of these consequences. Two difficulties, however, emerge.

First, the consequences affect a number of individuals. As a result, developing a model of these consequences becomes a nontrivial task. We approached this problem by focusing on a general equilibrium setting and assumed that interequilibria movements would not only occur, but would occur without cost.[32]

Second, evaluation of consequences ultimately must entail trading off one person's gains for another's. We cannot collapse the evaluation question into a generally usable, straightforward preference relation without imposing how these tradeoffs are to be accomplished. This imposition may take the form of a direct and obvious imposition or selection of some institutional method of choice, such as reliance on information markets, voting, or social control agencies.

These difficulties do not, however, negate the observation that choice among financial reporting alternatives can be viewed within the confines of rational choice theory. Indeed, this has the advantage of focusing attention on the dual questions of consequence and consequence evaluation; and in addressing these questions we are also able to bring social choice theory to bear. In particular, we know that no robust concept of optimality exists, unless we admit to a dictatorial imposition. This, in turn, implies that one set of accounting research issues lies in discovering restricted environments in which "acceptable" social evaluation criteria arise. For example, if we drop the transitivity requirement, game theory provides

a possible avenue for exploring the optimality question—both in terms of existence of an optimum and its characterization. Similarly, another research issue lies in the question of what biases to expect with the various institutional frameworks for selecting among financial reporting alternatives. Finally, another research issue concerns the nature of interpersonal tradeoffs that are induced by relying on accounting information standards, such as relevance, objectivity, or usefulness.[33]

In a similar vein, significant questions on the consequence side are also suggested by this framework. Positive questions concerning the impact of processing costs on individual consumption decisions have not been addressed. Neither, for that matter, do we know how well security-price-based studies reflect consequences at the individual consumption level.[34]

In short, fundamental questions of resource allocation and social choice appear to underlie the question of choice among financial reporting alternatives. Hopefully, accounting theory one day will account for these phenomena.

McGuire and R. Radner (eds.), *Decision and Organization* (North-Holland, 1972) for a related discussion.

[32] A more realistic view of these consequences would consider the dynamic movement from one equilibrium point to another. This would, however, require consideration of such phenomena as how many transactions will occur with nonequilibrium prices.

[33] These standards cannot, in general, precisely reflect preferences. See J. Demski, "The General Impossibility of Normative Accounting Standards," THE ACCOUNTING REVIEW (October 1973).

[34] For example, security-price-association tests, as by Ball and Brown and Beaver and Dukes, rely on an "abnormal performance index." This measure is, fundamentally, an indicator of the private value of (partial) state revelation. Yet private value does not necessarily imply social value. (See R. Ball and P. Brown, "An Empirical Evaluation of Accounting Income Numbers *Journal of Accounting Research* (Autumn 1968) and W. Beaver and R. Dukes, "Interperiod Tax Allocation, Earnings Expectations, and the Behavior of Security Prices," THE ACCOUNTING REVIEW (April 1972), and "Interperiod Tax Allocation and δ-Depreciation Methods: Some Empirical Results," THE ACCOUNTING REVIEW (July 1973).)