
Core Theory and Uniformity in Accounting: Rationalizing the Accounting Rulemaker

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If there are serious constraints on investors' abilities to process information, as well as to syndicate and share information, a uniform accounting system may convey substantial benefits to investors. After describing the potential benefits of a uniform accounting equilibrium, this article examines, using core theory, whether an unconstrained competitive environment with unrestricted coalition-formation possibilities amongst firms is likely to yield a uniform accounting equilibrium, or whether an accounting rulemaker is necessary for obtaining uniformity. It shows that an unconstrained competitive system may not yield a uniform accounting equilibrium even though it may be in every firm's (and security holder's) interest to have a uniform system. First, the core of the negotiations game among firms to set up a uniform system may be empty. That is, there may be no allocation of gains among firms resulting from an overall uniform accounting system which satisfies both individual and group rationality. Second, a uniform accounting system may have public goods characteristics which make a competitive uniform accounting equilibrium less likely. Both reasons serve to rationalize the accounting rulemaker.

Introduction

Underlying the debate concerning the extent of mandated financial information disclosure in particular and the need for an accounting rulemaker (e.g., the SEC or FASB) in general is the efficacy of competitive markets in eliciting the optimal amount of disclosure. Some have argued that firms will disclose sufficient information because such disclosures are in their own self-interest.¹ To the extent that information is not provided, shareholders will perceive the firm to be riskier. To compensate for the additional risk, claimants on the firm will demand a higher return, thereby driving up the firm's cost of capital. Therefore, it is argued, it is in the firm's own interest to provide information that reduces claimant uncertainty about its future prospects.² Should the firm not provide some piece of information, it is presumably because the

¹ The most cogent exposition of this point of view—which could be labeled the benefit-cost approach to disclosure—is undoubtedly that of Benston (e.g., 1973; 1979a; 1982, bibliography).

² There are, of course, many other potential benefits from disclosure, such as improving the marketability of the firm's shares. Although we shall concentrate on the impact of disclosure on risk reduction, the arguments we are about to make are fairly general and will pertain to other benefits as well.

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transaction costs of providing the additional information outweigh the benefits. Rulemakers, it is argued, are not constrained by cost considerations and are likely to mandate more information than is optimal, i.e., efficient.

A somewhat more sophisticated argument for the optimality of competitive markets is given by Gonedes and Dopuch (1974) and especially Gonedes (1975). Basing his arguments on the theory of the core, Gonedes shows that, under a specific set of assumptions about the nature of the game, the core of a competitive information–production equilibrium exists. Intuitively this means that, left to their own devices, firms and investors will generate an information–disclosure system that is Pareto optimal, obviating the need for a central accounting rulemaker.

What needs to be emphasized about the Gonedes framework is his assumption that the underlying game is balanced or, more specifically, that he is dealing with a market game. This means that, once a coalition forms, its members are committed to the coalition and there is no potential for recontracting among the parties. This limitation on coalition behavior in the Gonedes framework helps to ensure the existence of the core (Shubik, 1971), thus making the accounting rulemaker redundant. Besides the assumption of balancedness, the Gonedes result is also very much predicated on the assumption that security holders can form at no cost into coalitions to syndicate and share information.

In this article we relax some of the underlying assumptions of Gonedes' paper and consider an economic environment in which there are serious constraints on investors' abilities to process as well as share information.³ We argue that in such an environment a uniform accounting system will convey substantial benefits to investors. We then examine, using core theory, whether a competitive system in our postulated environment is likely to yield a uniform accounting equilibrium. Just because there are benefits from a uniform accounting system does not mean that such an equilibrium solution could not evolve in a competitive markets setting. In particular, it seems that in such a setting it would be in each firm's interest to enter into agreements with other firms in its industry to maintain a uniform accounting system.⁴ Each industry, perhaps through a trade association, could determine a uniform financial reporting standards for its members and thereby capture the attendant collective benefits. Therefore, a basic question is whether an unconstrained competitive environment, with the possibility of costless and unrestricted bargaining among coalitions of *firms*, is likely to yield a uniform (if only at the industry level) accounting equilibrium or whether a central accounting rulemaker is necessary to obtain the desired result.

³ Basically, we are assuming that it is too costly for security holders to syndicate and share information on their own.

⁴ While such an equilibrium might be impractical (too costly) economywide, it may be feasible at the industry level.

After describing the potential benefits of a uniform accounting equilibrium, we show that an unconstrained competitive environment will not always yield a uniform accounting system even when it is in each firm's interest to have such a system. There are two major reasons for this. First, even though it may be in every firm's interest (i.e., Pareto optimal) to create a uniform accounting system, agreement among the firms may not obtain because of the problem of the so-called empty core; that is, there may be no allocation of gains among firms resulting from an overall uniform accounting system that satisfies both individual and group rationality. Second, setting up a uniform accounting system may create beneficial externalities, inducing free-rider behavior, that make the success of such an undertaking less likely. We then argue that transaction costs, especially the costs of coalition formation, make the empty core, and thus the need for an accounting rulemaker, more likely. The section that follows then argues that the public goods aspects of a uniform accounting system lead to free-rider problems that make the evolution of a competitive uniform accounting equilibrium even more problematic. A brief concluding section follows.

Uniformity in Accounting

Firms differ by business risk, capital structure, heterogeneity of their shareholders, and a myriad of other characteristics each of which is bound to affect the nature of a firm-specific financial reporting system. If there are no constraints on investors' abilities to process as well as syndicate and share information, then a heterogeneous information system will be Pareto optimal, as Gonedes has shown. However, in an environment that precludes investors from syndicating and sharing information, and in which there are limitations on their abilities to process information, a heterogeneous accounting equilibrium will be suboptimal. Such a system makes it difficult for investors to assess firms rationally. Would an investor be able to say that firm A is riskier than B if A reported sales and no cost data while B reported costs only?⁵ Even constructing indices (against which individual firm data could be compared) would prove difficult because of the lack of uniform data.⁶ In the process of each firm's trying to minimize uncertainty to its security holders, firms could be made collectively worse off as investors are only able to make limited use of the data generated by a heterogeneous accounting equilibrium.

This latter situation is very much in contradistinction to the uniform accounting equilibrium promulgated by the SEC and the FASB. These organizations have been concerned not only with specific mandated dis-

⁵ This state of affairs is not so farfetched. As reported by Benston (1973, p. 133), only 62% of the firms listed on the NYSE in 1933 (before the SEC) gave sales figures, and only 54% provided the cost of goods sold. This is despite the rather stringent requirements of the Exchange.

⁶ Many risk models to date are based just on such comparisons, as the literature on accounting betas would testify.

closures but also with the overall structure and especially the uniformity of the financial accounting system. Indeed, it is fair to say that over time FASB and SEC rulings have served to reduce markedly the degree of freedom permitted the individual firm in its financial reporting. For example, the limitations on pooling to account for business combinations, the requirement of lower of cost or market for marketable (equity) securities, and the capitalization of financial leases are only a few of the many cases for which specific accounting procedures were mandated in place of an unconstrained environment. This is not to say that the FASB and SEC have not allowed for flexibility, especially in specific industries where standard financial reporting procedures are impractical or irrelevant.⁷ And, of course, some degree of freedom or flexibility in financial reporting is bound to be optimal. Nevertheless, one major impact of the accounting rulemaker has been to mandate a uniform accounting system across firms and not only to systematize generally accepted accounting principles.⁸ The issue we are concerned with is whether a rulemaker is necessary to obtain some level of uniformity or whether a competitive environment can yield the same results.

A Uniform Accounting System and the Problem of the Empty Core

Consider an industry comprising three firms (labeled 1–3) each of which is free to disclose as much information as it deems optimal. We assume that each firm attempts to maximize the welfare of its security holders. However, there is an asymmetric distribution of information between the firm (management) and security holders so that each firm faces the problem of selecting an information system that best conveys information to its security holders.⁹ We also assume that security holders cannot syndicate and share information and that there are limitations to their abilities to process information, so that from their perspective a uniform information system is optimal¹⁰ We also assume that each firm is sufficiently different from the others—despite that they are all in the same industry—in terms of size, capital structure, investor clienteles, and so on—that, in the absence of coalition formation, each firm designs a different

⁷ Many would argue that, if anything, there is still too much flexibility in generally accepted accounting principles (e.g., Chambers, 1974).

⁸ Uniformity and comparability are not always synonymous, as Merino and Coe (1978) and Revsine (1975), among others, have pointed out. Nevertheless, we are concerned here primarily with contrasting a competitive market solution, where uniformity (and hence comparability) may not obtain at all, with a central accounting rulemaker who requires at least some uniformity. Uniformity and comparability tend to diverge if there is absolute uniformity and no scope for judgment. Absolute uniformity is not an issue in this note. Also, uniformity has been conceptualized in terms of industry rather than economywide data. Comparability and uniformity are less likely to be synonymous at the level of the economy as a whole, but their divergence is much less of an issue at the industry level.

⁹ Throughout, we assume that firms (managers) act in the best interest of their owners (security holders). The problem of what kinds of incentive schemes would be necessary to induce managers to act in the interest of security holders is not addressed.

¹⁰ As we pointed out in the foregoing, security holders' inability to syndicate and process information can be ascribed to high transaction costs.

financial reporting system. In other words, in the absence of coalition formation, a heterogeneous accounting equilibrium obtains. Let $v(\{i\})$ denote the profits of firm i ($i = 1, 2, 3$) in this heterogeneous reporting environment.

Now suppose we allow for coalition formation. When a coalition forms, firms belonging to the coalition will design a uniform accounting system that is optimal for the coalition as a whole. Let $v(\{i, j\})$ denote the joint profits that firms i and j can guarantee themselves if they form a coalition and design a jointly optimal uniform accounting system. We assume that the (set) function v , called the *characteristic function*, is superadditive so that

$$v(\{i, j\}) > v(\{i\}) + v(\{j\}), \quad i, j \in \{1, 2, 3\}. \quad (1)$$

This means that a uniform accounting system yields a joint profit to the members of the coalition larger than the profit that coalition members could obtain in a heterogeneous accounting equilibrium. This is because of our assumption that a jointly uniform accounting system allows claimants better to assess firm risks (relative to a heterogeneous accounting system), thus reducing each firm's cost of funds and increasing profits.¹¹ We also assume for now that the jointly uniform accounting system conveys no additional information about the riskiness of firms not in the coalition. We shall relax this latter assumption later in this paper.

If all firms in the industry form a coalition, called the *grand coalition*, their joint profits will be denoted $v(\{1, 2, 3\})$. Superadditivity of the characteristic function requires that

$$v(\{1, 2, 3\}) > v(\{i, j\}) + v(\{k\}) \quad \text{all } i, j, k \in \{1, 2, 3\}, \quad i \neq j \neq k. \quad (2)$$

This means that the grand coalition solution, which is the overall uniform accounting equilibrium, yields joint profits greater than what could be obtained from any partially uniform accounting system. Thus, we have by assumption biased the case in favor of an overall uniform accounting equilibrium. We shall now show by example that, although it is Pareto optimal that is, in every firm's interest to join the grand coalition an overall uniform accounting equilibrium need not obtain.

Consider the following example:

$$\begin{aligned} v(\{1\}) &= 1, & v(\{2\}) &= 4, & v(\{3\}) &= 6; \\ v(\{1, 2\}) &= 9, & v(\{1, 3\}) &= 11, & v(\{2, 3\}) &= 14; \\ v(\{1, 2, 3\}) &= 16. \end{aligned}$$

The reason that the grand coalition may not form in this example (in the

¹¹ This is somewhat of an exaggeration since a given firm could be made worse off once there is some basis for interfirm risk assessment. Nevertheless, we wish to bias the case in favor of a competitive market solution. Therefore, throughout this note we assume that uniformity is beneficial to all firms and then ask whether competitive markets necessarily (even with this bias) generate the desired (Pareto optimal) uniform accounting equilibrium.

absence of an accounting rulemaker) is as follows. In deciding to join a specific coalition, each firm will consider the profits it will obtain by joining the coalition. Of course, once a specific uniform financial reporting system is determined, this will in turn specify the profits accruing to each firm in the coalition. However, *ex ante* in the design stage, there are likely to be a number of potential uniform reporting systems each of which is beneficial to the coalition overall.¹² However, each potential uniform system will have a different impact on the profits of each of the firms in the coalition. Remember that in the absence of a coalition each firm would have (optimally) designed a different reporting system. Thus, any uniform system whose design and concept is closer to a specific firm's heterogeneous design is bound to be more profitable for that specific firm. On the other hand, those firms whose heterogeneous reporting systems are not as congruent with the uniform system that eventually results from the coalition will not benefit as much from the coalition.

Accounting for Oil and Gas Producing Companies (SFAS No. 19) is a possible case in point. In a heterogeneous equilibrium some firms would choose the successful efforts method, others full cost (or perhaps some other method). Now, it may be that all firms in the industry would be better off ultimately if one reporting system were adopted.¹³ However, even if this were the case, firms that had chosen full cost originally would not benefit as much as successful-efforts firms if the uniform reporting system chosen were closer to a successful efforts design. It is this potential profitability tradeoff that could lead to a disagreement about a uniform system and, as we shall see, cause an empty core.

We define x_i to be the profits to be earned by firm i , $i = 1, 2, 3$. Suppose the grand coalition forms, resulting in an overall uniform accounting system with $x_1 = 2$, $x_2 = 3$, and $x_3 = 11$. This solution is inherently unstable since firm 2 is earning less than it could in a heterogeneous accounting equilibrium. Firm 2 has no incentive to be part of the coalition. Thus, individual firm rationality dictates that

$$x_i \geq v(\{i\}), \quad i = 1, 2, 3. \quad (3)$$

Suppose, on the other hand, that the grand coalition yields $x_1 = 2$, $x_2 = 5$, and $x_3 = 9$, an allocation of profits that is individually rational. Nevertheless, this solution is also unstable since firms 1 and 2 are earning less (namely, 7) than they could by forming their own uniform accounting system without firm 3's participation (namely, 9). Indeed, from the point of view of collective

¹² We assume for simplicity (but without loss of generality) that every potential uniform reporting system yields the same *joint* profits. Thus, $v(\{1, 3\}) = 11$ no matter which jointly uniform reporting system firms 1 and 3 choose. However, what profits 1 and 3 earn separately will be a function of the specific uniform system chosen.

¹³ This is only one possible interpretation of the events. It could also be that moving to successful efforts makes full-cost firms worse off.

rationality, the allocation of profits should satisfy the condition

$$x_1 + x_2 \geq v(\{1, 2\}) \quad (4)$$

and similarly for all other coalition possibilities. Finally, any allocation of profits cannot exceed the value of the grand coalition, so that

$$x_1 + x_2 + x_3 \leq v(\{1, 2, 3\}). \quad (5)$$

Here, however, we have the problem of the empty core. There is no allocation of profits that satisfies all these requirements simultaneously. In particular, for our example the allocation of profits x_1 , x_2 , and x_3 must satisfy the (core) conditions

$$x_1 \geq 1, \quad x_2 \geq 4, \quad x_3 \geq 6; \quad (6a)$$

$$x_1 + x_2 \geq 9, \quad x_1 + x_3 \geq 11, \quad x_2 + x_3 \geq 14; \quad (6b)$$

$$x_1 + x_2 + x_3 \leq 16. \quad (6c)$$

Adding all the inequalities in (6b) and dividing by 2 yields the inequality

$$x_1 + x_2 + x_3 \geq 17, \quad (7)$$

which contradicts inequality (6c). Therefore, there is no allocation of profits that is both individually and collectively rational, and hence an agreement to set up a uniform reporting system need not obtain.¹⁴

The nonexistence of the core is a form of market failure. Even though it is in each firm's interest (that is, Pareto optimal) to form a grand coalition and set up a uniform accounting system, this may not occur. Indeed, which if any coalition forms when the core is empty is an empirical question that cannot be determined *ex ante*. We simply cannot be sure that a competitive market, with unrestricted coalition formation possibilities among firms, will yield a homogeneous uniform accounting equilibrium. When the core is empty, firms may simply not agree to form the grand coalition. Unlike a competitive market solution, however, an accounting rulemaker can mandate a uniform accounting system if the core is empty or can restrict the set of legal coalitions so that the core constraints that remain can be satisfied, yielding Pareto optimality. Therefore, on the basis of the empty core, we can show the need for an accounting rulemaker like the SEC or FASB even though we have biased the case in favor of a competitive market solution.¹⁵

It is worth noting that the foregoing analysis does not deny the role of

¹⁴ The empty core can also be motivated as an endless cycling phenomenon in which coalitions form and reform but no solution obtains in the end. Essentially, no coalition will succeed since any resulting distribution of profits can be blocked by an alternative coalition. For an explanation of the empty core along these lines and in the context of providing a rationale for specific financial contracts, see Aivazian and Callen (1980, 1981).

¹⁵ In particular, we assumed that uniformity unambiguously makes all firms better off. See also footnote 11.

transactions costs in determining the choice among alternative institutional arrangements, such as the choice between a competitive market system and one with an accounting rulemaker. Instead, it points out that the choice among institutional arrangements depends as well on the stability (in the core sense) of alternative coalition structures. The nonexistence of the core provides a rationale for the existence of particular institutional arrangements in that they may be useful in eliminating potential bargaining situations that defy solution. Institutional arrangements (such as the accounting rulemaker) may evolve to force a solution on the bargaining process.¹⁶

The Costs of Coalition Formation and the Empty Core

One of the arguments for the optimality of a competitive market solution to disclosure is that accounting rulemakers tend to disregard the transaction costs imposed by their disclosure requirements on firms.¹⁷ Be that as it may, the existence of transaction costs can also buttress the argument for the optimality of an accounting rulemaker. As we shall now show, transaction costs, specifically the costs of coalition formation, may exacerbate the problem of the empty core in a competitive environment, further justifying the need for an accounting rulemaker.

Let us again consider an industry comprising three firms and assume that the (normalized) characteristic function is¹⁸

$$\begin{aligned} v(\{i\}) &= 0 && \text{all } i = 1, 2, 3; \\ v(\{1, 2\}) &= a, & v(\{1, 3\}) &= b, & v(\{2, 3\}) &= c; \\ v(\{1, 2, 3\}) &= d, \end{aligned}$$

where a, b, c, d are positive constants $d > a, b, c$. It can be shown quite readily

¹⁶ Empirically, it is difficult to distinguish between institutional arrangements that arise because of the nonexistence of the core from those that arise from transaction costs when there is a core. After all, the nonexistence of the core will also manifest itself in transaction costs, e.g., through the opportunity cost of (negotiation) time or the erosion in value of the exchange opportunity as it is postponed. It is wrong to conclude, however, that, once transaction costs are introduced, then the problem of the empty core disappears and a Pareto optimal solution obtains. In such circumstances negotiations tend to break down more quickly and which specific coalition structure (the grand coalition, a proper subcoalition, or no coalition) obtains cannot be specified a priori. See also Aivazian and Callen (1981).

¹⁷ There are many potential examples of this. See Benston's (1979b, p. 96) comments on ASR-250, for example.

¹⁸ Normalization imposes the requirement that $v(\{i\}) = 0$ for all i . There is no loss of generality by imposing this requirement. For example, the characteristic function in the preceding section is equivalent to the normalized form

$$\begin{aligned} v(\{i\}) &= 0 && \text{all } i, \quad i = 1, 2, 3; \\ v(\{i, j\}) &= 4 && \text{all } i, j, \quad i \neq j; \\ v(\{1, 2, 3\}) &= 5. \end{aligned}$$

that a necessary and sufficient condition for the core to be empty is

$$d < \frac{1}{2}(a + b + c). \quad (8)$$

Now let us impose a transaction cost structure on the negotiations. In particular, we shall make the reasonable assumption, that the costs of forming a coalition are convex in the number of firms in the potential coalition.¹⁹ To simplify the analysis we specify the convex cost function:

$$\begin{aligned} x^k, & \quad x > 1, \\ 0, & \quad x \leq 1, \end{aligned} \quad (9)$$

where $k > 1$ and x is the number of firms in the coalition. With this cost structure, the characteristic function of the negotiations becomes

$$\begin{aligned} v(\{i\}) &= 0 & \text{all } i; \\ v(\{1, 2\}) &= a - 2^k, & v(\{1, 3\}) = b - 2^k, & v(\{2, 3\}) = c - 2^k; \\ v(\{1, 2, 3\}) &= d - 3^k. \end{aligned}$$

A necessary and sufficient condition for the core to be empty is

$$d - 3^k < \frac{1}{2}(a - 2^k + b - 2^k + c - 2^k), \quad (10)$$

or

$$d + \frac{1}{2}[3(2^k) - 2(3^k)] < \frac{1}{2}(a + b + c). \quad (11)$$

Noting that $\frac{1}{2}[3(2^k) - 2(3^k)] < 0$ for $k > 1$ gives

$$d + \frac{1}{2}[3(2^k) - 2(3^k)] < d. \quad (12)$$

Comparing inequalities (8) and (11) yields two immediate and important conclusions. First, if the core is empty in the absence of coalition formation costs, then it is certainly empty with such costs. Second, even if the core is not empty in the absence of transaction costs, coalition formation costs could force an empty core.²⁰

In a previous section we argued by example that the empty core justifies a central accounting rulemaker. It would also be useful to know if the problem of the empty core is pervasive. However, that is an empirical question and beyond the scope of this paper. What we were able to show in this section is at

¹⁹ This means that the cost of coalition formation increases at an increasing rate with the number of members in the coalition. This is quite reasonable since the number of communications channels among coalition members is also convex in the number of members of the coalition.

²⁰ We could have assumed an alternative transaction cost function such that altering any given coalition structure requires that a fixed positive cost of ϵ be incurred. Then, with a sufficiently large ϵ , a strong ϵ core (Shapley and Shubik, (1966) exists even when the core is empty. However, with an initial situation in which the coalition structure is not that of the grand coalition, the existence of a strong ϵ core merely preserves the status quo and prevents the formation of the grand coalition. Moreover, if recontracting is costly, negotiations will tend to break down more quickly, and the specific coalition which emerges cannot be specified a priori. It may be that no coalition obtains and each firm operates independently.

least that with costly coalition formation the empty core is theoretically more likely.

A Competitive Uniform Accounting Equilibrium and Free Rider Externalities

In our earlier discussion we assumed away some of the public goods aspects of an accounting information system. Specifically, we assumed that if two firms formed a coalition and set up a jointly uniform reporting system, the remaining firm in the industry (and its security holders) would not benefit thereby. It is more likely, however, that the joint uniform accounting system may also help potential shareholders better to evaluate the remaining firm, reducing claimant uncertainty about the holdout firm. Thus, there is a potential free-rider problem here in that the holdout firm can enjoy the benefits of a uniform reporting system without contributing to the costs of setting up such a system. This beneficial externality or public goods aspect of accounting information, in that what one coalition (or, in our case, the holdout firm) earns is a function of countercoalition behavior, is likely to make a competitive uniform reporting equilibrium even less likely, further indicating the need for an accounting rulemaker. Before analyzing our specific problem, however, it is instructive first to discuss this public goods issue in general terms.

The problem just described, that what one coalition obtains depends on countercoalition behavior, occurs quite frequently whenever there are externalities and public goods problems. In a private goods economy without externalities, the characteristic function defines what each coalition can guarantee itself in negotiations *independent* of what others do. With public goods, what a specific coalition can guarantee itself is a function of countercoalition behavior, in which case, as we shall see, superadditivity of the characteristic function need not obtain.

Following Rosenthal (1971), Richter (1974), and more recently Schotter (1979), one can define different characteristic functions in a public goods economy depending on assumed countercoalition behavior. Let S denote a coalition in a bargaining situation involving a public good, so that what S receives depends on what the countercoalition S^* does. G-type behavior presupposes that S^* , having been abandoned by S , acts in a group rational (Pareto optimal) manner by maximizing the joint utilities of the members of S^* . IG-type behavior assumes that S^* acts not only in a group rational but also in an individually rational fashion. Individual rationality, as before, means that each member of S^* must receive a return (imputation) in the coalition that is no less than what could be received by acting individually without the coalition.

Other potential behavior patterns of the countercoalition S^* assume away group rational (Pareto optimal) behavior. I-type behavior assumes that S^*

will act in an individually rational manner. O-type behavior—or, as Schotter calls it, spiteful O-type behavior—presupposes that S^* acts in a manner most harmful to the coalition S even if each member of S^* is made worse off by this type of behavior than by acting individually.

Returning to the specific issue at hand, we assume that if two firms form a coalition to set up a joint uniform accounting system, then the remaining firm in the industry benefits thereby. However, what the holdout firm expects to earn now depends on the assumed behavior of the countercoalition. Under O-type behavior, interestingly enough, no new problems are created. With O-type behavior, the holdout firm will assume that the coalition will not undertake to set up a uniform accounting system (unless it also participates), even though such a system is coalitionally rational.

To illustrate, assume that without any public goods interactions (i.e., when coalition returns are not a function of countercoalition behavior), the characteristic function has the following simple form²¹:

$$v(\{i\}) = a \quad \text{all } i;$$

$$v(\{i, j\}) = b \quad \text{all } i, j, \quad i \neq j;$$

$$v(\{1, 2, 3\}) = c.$$

Superadditivity of the characteristic function requires that

$$b > 2a \quad \text{and} \quad c > b + a.$$

With public goods interaction and O-type behavior, the characteristic function remains unchanged. Each firm could not expect to earn more than a by holding out since, with spiteful O-type behavior, the holdout expects the coalition *not* to set up a uniform reporting system even though it is in its collective interest to do so.

Yet O-type behavior is essentially irrational behavior. Under (Pareto optimal) rational G- or IG-type behavior, on the other hand, the characteristic function becomes

$$v(\{i\}) = a + f \quad \text{all } i;$$

$$v(\{i, j\}) = b \quad \text{all } i, j, \quad i \neq j;$$

$$v(\{1, 2, 3\}) = c, \quad c > b + a, \quad b > 2a.$$

Here f is the holdout's additional benefit if the other two firms undertake a jointly uniform reporting system. Under assumed G- or IG-type behavior, the holdout firm expects to gain f since it expects that the other two firms will act in a group rational manner. Since $b > 2a$, it is group rational for the other two

²¹ The argument does not at all depend on this simplification, but it does simplify the mechanics of the example.

firms to set up a jointly uniform accounting system despite the holdout. However, now we have a potential problem, since the characteristic function may no longer be superadditive, depending on the size of f . In particular, while $b > 2a$, we could easily have $b < 2(a+f)$, in which case $v(\{i\}) + v(\{j\}) > v(\{i, j\})$.²² In this case not only is the core of the game potentially empty, but the characteristic function is no longer superadditive. However, superadditivity of the characteristic function is a *sine qua non* for the grand coalition to form and hence for an overall uniform accounting equilibrium to obtain. If the characteristic function is not superadditive, there is no incentive for coalition formation. Intuitively, each firm has the incentive to hold out and let the rest of the industry bear the costs of undertaking a uniform accounting system. However, if all or most firms act this way, then even a partially uniform accounting system may not evolve. This does not mean that in all circumstances and in all industries there will not evolve a competitively determined uniform accounting system. However, the public goods aspects of a uniform accounting system provide an incentive for firms to free ride, making it less likely for an overall uniform accounting system to result from competitive forces. Again, the accounting rulemaker reduces the scope for such free-rider externalities by mandating a uniform accounting system.

Conclusions

There is a significant accounting literature that argues that firms will provide, on their own, an optimal level of financial reporting, obviating the need for accounting rulemakers such as the SEC or FASB. The question that naturally arises is whether the resulting competitive solution, with unrestricted coalition formation possibilities among firms, yields a uniform accounting equilibrium when it is in each firm's (and its security holders') interest to have such a system.

This paper started from the premise that there are serious constraints on investors' abilities to process information as well as to syndicate and share information so that a uniform accounting system may convey substantial benefits to investors. Its major point is that in such an environment a competitive system may not yield a uniform accounting equilibrium even at the industry level. There are two reasons for this. First, the core of the negotiations among firms in the industry to set up a uniform system might be empty. This was shown to be especially likely with transaction costs present, particularly the costs of coalition formation. If the core is empty, it was argued, negotiations may not result in a (grand coalition) uniform accounting equilibrium, thus showing the need for an accounting rulemaker. Second, a uniform accounting system may have public goods characteristics in that firms

²² Alternatively, $c < b + a + f$ (although $c > b + a$), again violating superadditivity.

that do not participate in a joint reporting system may still benefit. This was shown to result in potential nonsuperadditivity of the characteristic function, making a competitive uniform accounting equilibrium less likely, again providing a rationale for the accounting rulemaker.

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