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Volume 2 Selected Papers

Objectives of Financial Statements

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Accounting for Social Costs and Benefits

Joshua Ronen

Introduction

The need for accounting to provide information about social costs and benefits has recently received increased attention. Evidently, whether accounting information should reflect social values (costs and benefits) as well as private values depends on what the objectives of accounting are. This paper discusses the justification for including information about social values in accounting reports. Necessarily, such a justification, if accepted, implies the desirability of broadly defining accounting objectives to include the goals that measurements of social values are intended to satisfy.

The objectives of accounting could be broadly defined to include the promotion of an optimal allocation of resources, or even equity or welfare considerations, or they could be restricted to private considerations. In the latter case, prescriptions about accounting principles and standards will only consider events that facilitate maximization of the wealth of the firm's shareholders. Such a set of prescriptions may not facilitate the achievement of optimal allocation of resources within the economy or the maximization of social welfare.

Loosely speaking, when the actions of the firm affect only its own costs and benefits, there is no divergence between private values and social values,² and thus the decisions and actions taken in pursuit of the firm's own

¹ Churchill, *et al.*, for example, claim: "More than ever before, what one organization does affects other organizations and society as a whole. Information regarding social and private costs, as well as social and private benefits, is badly needed." [See Neil C. Churchill, Joshua Ronen, Robert J. Sack, George H. Sorter, and Robert M. Trueblood, *Information for Proprietors and Others*, Prepared for the Tenth International Congress of Accountants (Touche Ross & Co.: October 1972).]

² The discussion is initially restricted to the case of externalities caused by a firm in the sense that its activity affects the value of a production function or of a consumption function of other entities *directly* (i.e., via the arguments of such functions). For an elaboration of the definition of an externality, see E. J. Mishan, "The Postwar Literature on Externalities: An Interpretative Essay," *Journal of Economic Literature* (March 1971), p. 2, who restricts the term to cases where the effect produced "is not a deliberate creation but an unintended or incidental product of some otherwise legitimate activity."

interests will result in the optimization of both. However, when the actions of an individual firm do affect other firms' or individuals' actions, then pursuing only private benefits *may* not result in the optimization of social benefits or in an economy-wide efficient allocation of resources. In this case, an accounting objective that is restricted to the consideration of private benefits and costs may require the communication of data that will not meet the social objectives.

The emphasis on the word "may" was deliberate. It is possible that private profit maximization by a firm will also bring about an efficient allocation of resources even when the firm's actions directly affect³ the other firms' actions. This would be the case when the firm takes into account explicitly these effects before it makes its decisions. In fact, to maximize its profits, the firm must consider the effects of its actions on other firms or individuals unless such consideration is, in itself, too costly. These effects fall within the normal economic definition of opportunity costs and should, therefore, be explicitly considered along with other costs in making rational decisions.⁴ Inasmuch as these opportunity costs are relevant inputs to decisions that lead to the maximization of both private and social values, the benefits of systematically incorporating them in accounting information are clearly positive. The problem is to ascertain whether these benefits exceed the costs of including opportunity costs in accounting reports.

The issue becomes more complex when the effects of a firm's actions on others are not or cannot be taken into consideration when making decisions within the firm. This would be the case when the price mechanism of the market—which enables the firms to consider such facts explicitly in their decisions—either does not exist or is too costly. Operationally, this means that transaction costs such as conducting negotiations, drawing up contracts and inspecting are higher than the benefits of adjusting the firm's actions on the basis of the expected effects of these actions on other entities. In this case, pursuing private interests will not lead the firm to bring about a socially desirable allocation of resources, and governmental intervention through the legal determination of rights, regulations, policing, etc., may eventually become desirable.⁵ Should the accounting objective in such cases include a quantification of the social effects, and, if so, how would such effects be measured in the absence of a smoothly operating price mechanism?

Illustration With a Simple Case of Two Producers

It would probably be best to deal with the above question in the simple case of one producer who directly and adversely affects another producer's

³ In the sense of the externality definition, see footnote 2.

⁴ The economic definition of costs refers only to opportunity costs. See, for example, George J. Stigler, *Theory of Price*, 3d ed. (New York: Macmillan, 1966), pp. 104-110.

⁵ For a lucid discussion of this issue, see R. H. Coase, "The Problem of Social Cost," *Journal of Law and Economics* (October 1960), pp. 1-44.

output through engaging in a diseconomy-producing activity.⁶

To illustrate, suppose that a machine shop, A, produces noise that brings about an increase in the number of defective devices produced by B, a neighboring manufacturer of highly specialized precision-electronic instruments. B's loss resulting from the noise interfering with the skilled workers' ability to perform is \$400 per month, while his profit in the absence of damage amounts to \$300 per month. A's profit from operations amounts to \$350 per month. A noise stifling device could be installed in the machines to eliminate the damage to B; this would cost A \$250 monthly.

Clearly, from a social viewpoint, A should continue its operations, since the value of its production (\$350) exceeds the cost of eliminating the damage to B. Given that A and B can get together and bargain, the socially desirable solution (with A continuing its operations) will prevail irrespective of whether A is legally liable to pay damages to B. If A is liable to B, the corrective device will be installed. It would be more profitable for A to incur the \$250 monthly cost rather than produce the noise and pay \$400. A's actual profit will be reduced from \$350 to \$100. The \$250 are actual costs for A incurred to preclude the adverse effects of its operations on B.

If B cannot sue A, a feasible alternative might be to pay A an amount not in excess of \$300 (B's profit) to terminate operations. B would attempt to pay no more than \$250 per month, the cost of installing a noise-stifling device. The exact payment will depend on B's bargaining power in relation to A. The \$250 payment passed up (assuming that this will be the agreed-upon payment) is an opportunity cost to A, and its profits are \$100: \$350 from operations minus the opportunity costs of \$250.⁷ The \$100 is also A's eventual contribution to the social product, i.e., the value of its production (\$350) reduced by the value of resources needed for the corrective device (\$250)

⁶ Certainly, this is only one of many business situations in which social costs and benefits can be incurred. The standard example of social costs which is typical of the two-producers situation is the case of the factory emitting smoke which has harmful effects on those occupying neighboring properties. An example of social benefits would be the training by a firm of its employees which benefits future potential employers of the trained personnel. Some social costs can be easily quantifiable through the operation of a smooth market price mechanism. Other social costs are very difficult to quantify. Examples of the latter include the effect of noise or fumes caused by a factory on the health and satisfaction of the neighborhood residents, the benefit rendered to society through conducting educational and recreational programs by a firm, etc. Social costs are easier to quantify when the action of a firm affects the product of another firm. Situations like this give rise to what is usually known as "external economies" and "diseconomies." But while social costs and benefits are more difficult—and therefore more costly—to quantify than in other situations, the type of analysis that justifies their quantification is similar to the one employed in the simple case discussed above.

⁷ In any case, \$250 will be the minimum opportunity cost. Since this is the only possible opportunity cost magnitude known with certainty to A, it is suggested as A's measure of opportunity cost.

which A will eventually install (as a result of bargaining with B), thus precluding alternative use of the resources elsewhere in the economy.

Naturally, if the cost to A and B of reaching an agreement and enforcing it is more than the benefit of doing so (in this case \$300) and if A is not liable to B, no agreement will be reached. B will terminate its operations, and the social product will decrease by \$300. This may still be the better alternative (since transaction costs would have decreased the social product by even more) unless the government could, at a cost less than \$300 per month (either through establishing a liability for damage or by a tax subsidy system), induce B to resume operations and A to install the noise-stifling device.

The Role of Opportunity Costs

As the above illustration demonstrates, the resource allocation is optimal regardless of whether the harmed party has the right to bring an action for damages, as long as opportunity costs are appropriately considered. To avoid inflicting the damage, A could increase its precautions by either installing the device or moving to another location. Either action could potentially increase A's costs. In this illustration it was assumed that installation of the device was the least costly means of preventing the damage. Alternatively, A could pay for the damage. This would be done if the payments for damage were less than the additional costs that would have to be incurred to avoid the damage. In that case, the payments for damage would become part of the cost of manufacturing A's product. It may be possible that the damage could be prevented by some action on the part of B. If B's additional cost, in this case, is less than the amount of damage that would otherwise occur, it should be possible for a mutually satisfactory bargain to be struck by A and B. If B would have had to suffer the damage without compensation, the allocation of resources would not have been affected. Since B would be willing to pay an amount up to its loss of income to induce A to discontinue production, this loss of income would become a part of A's costs.

Thus, in order to achieve an optimal allocation of resources, it is desirable that both parties consider the harmful effects in deciding on their courses of action. When opportunity costs are explicitly considered, the fall in the value of production due to the harmful effects would be a cost for both parties.

Accounting information should reflect these social costs since they are legitimate and true costs of production for each of the two manufacturers. The harm which was done by A to B is a joint result of the actions of both parties. The increase in the number of defective devices was caused by noise produced in A's machine shop, but no damage would have occurred if B had not chosen to engage in a highly specialized and delicate activity that made its workers highly sensitive to noise and easily affected by it. Both parties caused the damage. Both should treat the harm as part of their costs.

If accounting information is to reflect the costs of production, and if it is to reflect the resulting income so that the latter gives the proper indication

of the quality of management performance, these costs should be a part of accounting information. Reflecting such opportunity costs makes it possible for accounting report users to properly assess managerial performance, inasmuch as managers have to choose the best actions possible for the firm. But, in addition, if income figures that result from past actual transactions are deemed to be at all important (both in providing a record of actual past transactions to fulfill the stewardship function of accounting and in providing the means to validate past managerial expectations), it is evident that these opportunity costs should be treated as production costs.

The fortunate fact that the independent actions of the parties—in pursuit of their own self interests (with or without predetermination of a legal right to impose payment for damages)—led to optimal allocation of resources was facilitated by a market mechanism in which transaction costs are not too high. A market transaction involves costly activities such as drawing up a contract and enforcing it. These operations can be costly to the extent that they may preclude some transactions that would have been carried out in a world in which the pricing system was costless. Once the costs of carrying out market transactions are taken into account, it is clear that such compensating transactions would only be undertaken when the increase in the value of production resulting from the transactions is greater than the cost of the transactions. In other situations, in which transaction costs are high, such as the standard case of smoke nuisance which may affect a vast number of people engaged in a wide variety of activities, the prohibitive administrative cost might make impossible any attempt to deal with the problem within the individual firm. An alternative solution to establishment of legal rights would be direct governmental regulation. Instead of a legal system of rights that is modifiable by market transactions, the government may impose direct regulation. Because of its power, the government may be able to bring about corrective actions at a lower cost than that of a private organization. And although governmental action can be extremely costly, it may be the only alternative to private action.

What are the implications for accounting objectives, in the case of high transaction costs, which may make governmental intervention necessary or desirable? There are two reasons, in addition to those stated for the case where transaction costs were not high, why the gathering and communication of information about social costs are desirable even in the absence of a potential solution on the private level. The first is that the communication of such information may (subject to the determination that such information is best processed by the firm creating the externality) lead to the proper kind of governmental intervention that achieves efficient allocation of resources. Disclosure of such information should be helpful in determining which of the alternative social arrangements is optimal for dealing with externality. An additional reason for reporting such information rests upon the ultimate benefit to the private user. Assume that an efficient market will eventually lead to desirable social action. In this case, the communication of information about the cost to the firm, that will probably be associated with whatever

social arrangement emerges, will enable users of financial statements to appraise the future prospects of the firm. The importance of providing data on social costs to make possible the carrying out of an appropriate policy that minimizes resource misallocation will become much clearer when the social-cost problem is viewed as isomorphic to the problem of transfer pricing.

The Social Cost Problem Viewed in A Transfer Pricing Context

Careful analysis of the problem of social costs reveals striking similarities to that of transfer pricing within an individual decentralized firm. The problem of divergencies between social costs and private costs is the counterpart of the transfer pricing problem at the total economy level.

At the individual firm level, decentralization through use of the profit center concept is motivated by several factors. Among these are the division's nearness to the marketplace which provides the local managers with relevant information regarding changes in the prices of inputs and outputs, and more effective coordination of factors of production that can be obtained locally at the divisional level.⁸ The need to establish the proper system of transfer prices for decentralized profit centers is predicated primarily upon three requirements.⁹ First, the transfer prices must enable central management to evaluate as accurately as possible the performance of the profit centers in terms of their separate contributions to corporate profits. Second, the system of transfer pricing must motivate profit center managers to pursue their own self-interests in a manner which is conducive to the success of the company as a whole. And, third, the system must serve as a stimulus to managers to increase their efficiency without restricting the autonomy of the divisions as profit centers. With respect to the objectives of accounting reports, as related to the first of these requirements, Ronen and McKinney¹⁰ commented:

One of the main functions of accounting reports is to facilitate the evaluation of the profitability of various segments of the firm. This

⁸ See the following:

Paul W. Cook, "Decentralization and the Transfer-Price Problem," *Journal of Business* (April 1955), pp. 87-94.

J. R. Gould, "Internal Pricing in Firms When There Are Costs of Using an Outside Market," *Journal of Business* (January 1964), pp. 61-67.

Jack Hirshleifer, "On the Economics of Transfer Pricing," *Journal of Business* (July 1956), pp. 72-84, and "Economics of the Divisionalized Firm," *Journal of Business* (April 1957), pp. 96-100.

Joshua Ronen, and George McKinney III, "Transfer Pricing for Divisional Autonomy," *Journal of Accounting Research* (Spring 1970), pp. 99-112.

David Solomons, *Divisional Performance: Measurement and Control* (Financial Executives Research Foundation, 1965).

⁹ See Ronen and McKinney, "Transfer Pricing for Divisional Autonomy," pp. 99-100.

¹⁰ *Ibid.*, p. 100.

same objective lies at the root of divisionalization. Paradoxically, however, when profit and loss reports are based on a typical set of transfer prices, they do not reflect the amount which profit center activities contribute to the pool of corporate profits. . . . Reflecting these contributions is not only important to the manager of the contributing division, but also to central management who evaluates the division's profitability and decides whether to continue or abandon them.

A series of substitutions in this quotation renders it an appropriate representation of the problem of social costs. After modification, the quotation reads as follows:

One of the main functions of accounting reports is to facilitate the evaluation of the profitability of various segments of the economy. This same objective lies at the root of decentralizing the economy into firms. Paradoxically, however, when profit and loss reports are based on only market prices established through market transactions, they do not reflect the amount which the firm's activities contribute to the pool of the economy's increment in wealth. . . . Reflecting these contributions is not only important to the manager of the contributing firm, but also to the government that evaluates the firm's activities and decides on the appropriate measures regarding activities which are socially harmful.

Thus, the similarity is striking—the same economic cost and benefit evaluations underlie the centralization/decentralization decisions within a firm and the centralization/decentralization decisions within the economy as a whole. For example, Coase argues thus:¹¹

It is clear that an alternative form of economic organization which could achieve the same result at less cost than would be incurred by using the market should be used whenever it would enable the value of production to be raised . . . within the firm individual bargains between the various cooperating factors of production are eliminated and for market transaction is substituted an administrative decision. The rearrangement of production then takes place without the need for bargains between the owners of the factors of production. . . . The firm would acquire the legal rights of all the parties and the rearrangement activities would not follow on a rearrangement of rights by contract, but as a result of an administrative decision as to how the rights should be used. . . . The government is in a sense a super firm since it is able to influence the use of factors of production by administrative decision.

But as is the case when

¹¹ "The Problem of Social Cost," *Journal of Law and Economics* (October 1960), pp. 16-17; see also Coase, "The Nature of the Firm," *Economica* (New Series, 1937).

. . . the administrative costs of organizing transactions within the firm may also be high, and particularly so when many diverse activities are brought within the control of a single organization . . . the governmental administrative machine is not in itself costless. . . . [and] . . . direct governmental regulation will not necessarily give better results than leaving the problem to be solved by the market or the firm. But equally, there is no reason why, on occasion, such governmental administrative regulations should not lead to improvements in economic efficiency.

It is these high administrative costs of organizing transactions within the firm when operations are centralized or within the economy where the government extensively intervenes that induces a firm, among other things, to decentralize and the government to let the free market mechanism bring about a desirable equilibrium. But at the same time, decentralization may lead to less than optimal value accumulation whenever there are interdependencies among the autonomous units.

Thus, at the individual firm level where the profit centers or the divisions are not economically independent, as would be the case whenever the external market for the intermediate product which is transferred from one division to the other is not perfectly competitive, decisions taken by the autonomous profit centers in pursuit of their self interest will likely be most dysfunctional from the standpoint of the profitability of the firm as a whole. Analogously, at the economy level, decentralization may lead—whenever there are producers' interdependencies—to a less-than-optimal social product if the individual firms are left to pursue their own self interests through maximizing private profits when these diverge from social profits. Dysfunctional decisions that result from decentralization within a firm can be avoided by recentralization wherein relevant economic decisions (production processes, prices, etc.) are made by central management. Similarly, at the level of the economy as a whole, it is necessary to completely integrate all industry to eliminate all divergence between private profits and public benefits.¹² Thus, profits of firms in a market economy may not lead to economic optimum and, the more decentralized and differentiated the economy, the less they are a guide to such optimum. Would centralization—whether at the firm or the economy level—be the only solution to suboptimal decisions caused by decentralization?

As indicated, central decision-making by a firm engaging in a diverse range of activities can be costly as can be governmental administrative regulation. And, in any particular instance, it must be ascertained whether the gain that would come from regulating action that gives rise to harmful effects

¹² Thus, Rodan Rosenstein advocated that "the whole of the industry to be created is to be treated and planned like one huge firm or trust." ["Problems of Industrialization of Eastern and South Eastern Europe," *Economic Journal* (1943), p. 204.]

would be higher than the cost involved in governmental regulation. There are alternatives, and the problem becomes one of choosing the appropriate and least costly social arrangement for dealing with harmful effects, whether at the firm or the economy level. Since the alternative schemes that were suggested to deal with the social effects problem are similar to those that are discussed in the context of transfer pricing at the individual firm level, it should be useful to review and juxtapose these schemes.

The need for information to be reported by a division in a decentralized firm on its contribution to the firm's overall profits—to facilitate continuance-abandonment decisions—has long been established in the accounting literature. So did the need for incorporating in the accounting information data that made possible the determination of the optimal transfer pricing rules (optimal in the sense of inducing goal-congruent decisions by the profit centers without adversely affecting their autonomy). In a similar fashion, at the economy level, firms should communicate information that facilitates and makes possible the determination of the best social arrangement that should be effected to deal with externalities (unless this information is more cheaply provided by other sources). Information should also be provided about the contribution of any individual firm to the social product as a whole. While these individual contributions may not equal the total social product, they constitute a valuable guide to decisions taken on an economy-wide level concerning the encouragement of some economic activities within the economy and the discouragement of others.

Indeed, the objectives of accounting cannot end at the individual firm level just as reporting requirements within a firm are not exhausted by defining the individual profit center's needs. Accounting should consider the repercussions of the firm's actions on others. As in the case of a decentralized firm, it should consider the repercussions of the actions of an individual profit center on other profit centers and thus on the profits of the firm as a whole.

The Alternative Solutions to the Problem of Interdependencies. There are a number of possible social arrangements dealing with the problem of "side" effects.¹³ The choice of the best social arrangement naturally depends on the evaluation of costs and benefits associated with the arrangement. No particular arrangement can be said a priori to be superior to others. Rather, careful examination of the circumstances of any particular case is necessary. For example, as shown by Coase,¹⁴ if the party imposing harmful effects and the party suffering them are able and willing to negotiate to their mutual

¹³ The term "side effects" was used by Harold Demsetz ["The Exchange and Enforcement of Property Rights," *Journal of Law and Economics* (October 1964), pp. 11-26] rather than either "external effects" or "neighborhood effects" to avoid the connotations implied by these terms.

¹⁴ In "The Problem of Social Cost."

advantage, governmental intervention is unnecessary in order to bring about the most efficient resource allocation. Thus, the imposition of a tax on the party imposing the harmful side effects could be a very complicated matter even in principle, and any prior prescription of such a tax may be unwise.

Other alternatives are available; their advisability depends on the costs of effecting and policing them. These include outright government regulation establishing zoning rules, for example, extension of the role of the firm through integrating the entities affected by the diseconomy-creating activity,¹⁵ the solution that combines the extension of the firm with combination-sale devices.¹⁶ Demsetz¹⁷ argues that devices like these can extend the usefulness of markets for revealing and measuring the value of side effects. For this solution (combination-sale) to be feasible, of course, the resulting under-specialization cost should not exceed the reduction in exchange and policing costs (created by the solution). Finally, it may be that the market solutions are too costly, and the most efficient alternative is to disregard and not to take into account some external or side effects.

All of the above solutions apply with some slight modification to the problem of ensuring efficient resource allocation among the profit centers of a decentralized firm.

An attempt is made below to show how the standard economic analysis necessary to determine the optimal amount of externality to be produced is identical in the two situations, i.e., the transfer pricing and the social cost situations. In fact, the harmful side effect imposed by one firm on others which causes divergence between social costs and private costs corresponds to a "noxious" intermediate product that is transferred from one division to another within a decentralized firm in the context of transfer pricing. This standard economic analysis is appropriate when exchange costs are not too high so that the optimal allocation of resources is brought about through mutual exchange between the parties affected.

As indicated earlier, when transaction costs are too high, other solutions may be preferable, such as governmental regulation and taxation. However, to ascertain which social alternative arrangement is preferable, it is essential, first, to apply the standard economic analysis in order to evaluate explicitly the benefits of engaging in exchange as opposed to the cost of exchange and thus to compare the alternative of exchange with other social arrangements. The economic aspects of the exchange are discussed first. Once the identity of the analysis between the individual firm and the economy is established, a discussion of the information requirements needed to bring about a necessary exchange or to make possible the valuation of the advisability of an exchange in the transfer pricing context is presented after which the

¹⁵ See Coase, "The Nature of the Firm."

¹⁶ See Demsetz, "Exchange and Enforcement of Property Rights."

¹⁷ Ibid.

nature of the information requirements in the social cost context is considered.¹⁸

Inevitably, the information requirements will be very similar. The same reasons that justify the communication within accounting reports of information that facilitates the proper transfer pricing system call for the communication within accounting reports of information that makes possible the choice of the social arrangement that is necessary to deal with the divergence between social costs and private costs.

The Economic Analysis in the Transfer-Pricing Context

The discussion which follows is based on the analysis in Ronen and McKinney.¹⁹ For the purpose of the discussion, assume a simple case of a decentralized firm with two divisions, with no loss of generality: a manufacturing division and a distribution division. The manufacturing division transfers some intermediate product to the distribution division. The distribution division sells the final product to the outside market.

To simplify the analysis, it is assumed that the divisions are technologically independent; i.e., the level of production in one division does not affect the cost of the other. It is also assumed that a common level of output is to be reached by the two divisions (either because there exists no market for the intermediate product or because the marginal costs of either division rise sharply when dealing with an outside market).

To assure optimal profits for the firm as a whole without unduly restricting the autonomy of divisional managers,²⁰ it was suggested (see Figures 1 and 2, page 328) that the manufacturing division communicate to central management its marginal cost curve, MMC, by stating how much it would produce at various transfer prices. From this, central management derives the

¹⁸ Indeed, the problem of providing information that facilitates the choice of an appropriate policy is of primary importance as argued by Harold Demsetz in "Some Aspects of Property Rights," *Journal of Law and Economics* IX (October 1966), p. 68:

The costs and benefits of a prospective change in resource allocation cannot be treated as given datum. The marginal cost and benefit curves associated with a prospective realignment of resources are not known by the government. Each affected individual knows his benefits or costs, and, in the absence of high exchange cost, this information would be transmitted to others in the form of market negotiations. The primary problem of the government is the estimation problem. The compensation principle by its assumption that costs and benefits are known begs the most difficult question posed by a prospective change.

¹⁹ "Transfer Pricing for Divisional Autonomy," pp. 103-105.

²⁰ In that they are not permitted to act as monopolistic buyers or sellers where a perfectly competitive market for the intermediate product does not exist externally. See Hirshleifer, "On the Economics of Transfer Pricing."

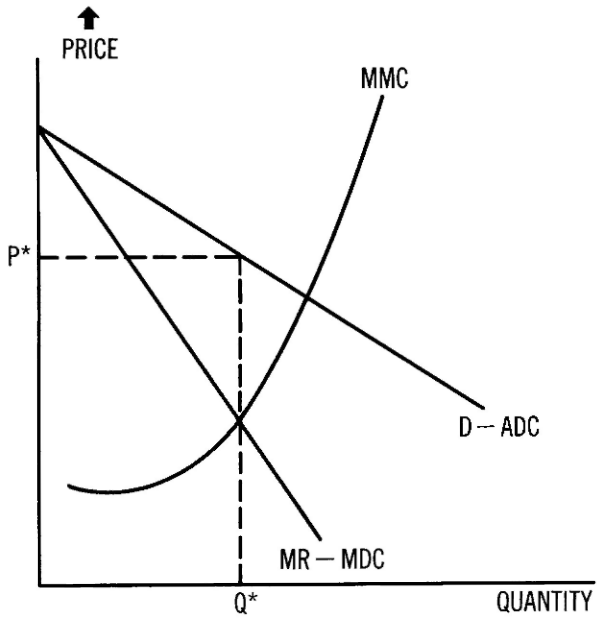


Figure 1 MANUFACTURING DIVISION

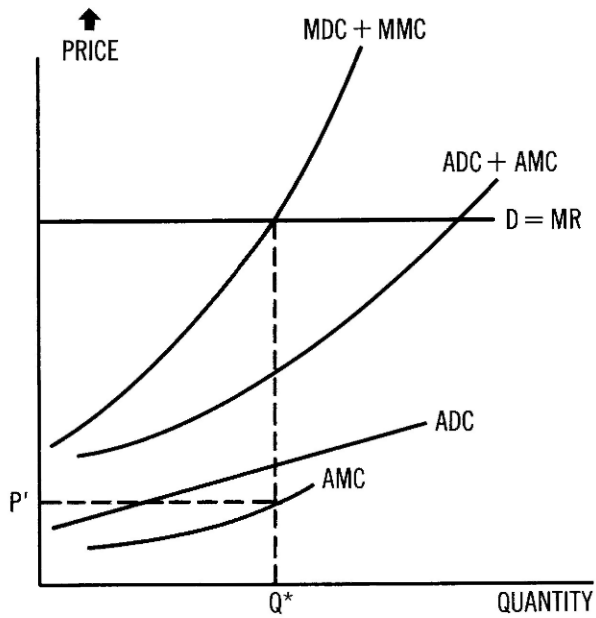


Figure 2

average cost function which is then given to the distribution division designating $P^1(Q)$ the actual transfer price it will be charged for alternative quantities. Similarly, central management obtains from the distribution division its demand schedule showing how much that division would purchase at various transfer prices (this equals the marginal revenue from the sale of the first product, MR, less the marginal distribution cost, MDC). From this, an average revenue function (which is the final product demand, D, less average distribution cost, ADC) is given to the manufacturing division as its demand schedule designating $P^*(Q)$ the transfer price offered to the manufacturing division for any quantity supplied. The distribution division is charged $P^1(Q^*)$ for any quantity (Q^*) transferred. The manufacturing unit is credited with $P^*(Q^*)$ per unit, consisting of the payment from the distribution division, plus a subsidy from central management of $[P^*(Q^*) - P^1(Q^*)] \cdot Q^*$.

When the manufacturing unit faces the $(D - ADC)$ curve as its demand curve, it derives the curve marginal to it $(MR - MDC)$, and chooses to produce the quantity optimal for the firm Q^* where $MMC = MR - MDC$. Through a similar process, the distribution division will choose the same level of output. Thus both divisions will want to produce at the same level and will maximize their own profits as well as the firm's in doing so. Furthermore, a division's reported profit equals its contribution to the firm's profit, i.e., the amount by which the firm's profit would be reduced if the division were abandoned. (In this simple case, divisional contributions to the firm's profit is identical to the total firm's profit.)

As shown above, through a tax and/or subsidy system applied to divisions of the decentralized firm, divisional managers could be induced to make decisions which maximize the firm's profit without unduly restricting their autonomy. Also, divisional profits would reflect divisional contributions to the firm's profits as a whole.

What are the informational requirements of such a system and their implications for accounting? The divisions must communicate information about their cost and demand functions. While this, at first, may seem complicated, it should be remembered that the same information is also essential for divisional management to make informed decisions. The only further requirement is to make this information explicit. Probably, the benefit (i.e., enabling central management to effect a policy whereby the divisions' actions in their own self-interest do not adversely affect the firm's profit as a whole) of incorporating such information explicitly rather than implicitly exceeds the cost of communicating such information explicitly and systematically. Notice that the function of central management is restricted, in the above system, to transferring information between the divisions. The divisions themselves are allowed to adapt continuously to changing environmental conditions; changing cost conditions need only be periodically reported to central management. In the absence of an intermediate market which would allow transactions to be conducted directly between the two divisions, it was thus shown that an intervention by central management (which would hopefully be conducted with minimal interference with the divisions' autonomy) may be appropriate and desirable.

Whether accounting should systematically communicate to central management the information essential for such desirable intervention depends on whether the benefits of intervention (which consist of eliminating the reduction in the firm's profits that result from dysfunctional decisions by the divisions in pursuit of their self-interests) exceed the cost of incorporating such information in accounting, communicating it, and processing it by a central management in order to effect the appropriate transfer pricing policy. Within the context of transfer pricing, as discussed above, it appears obvious that the benefits exceed the cost and that the necessary information should, therefore, be incorporated in accounting reports on a systematic and periodic basis. Moreover, the similarities between the transfer pricing problem and the social cost problem justify the conclusion that the benefits of incorporating information about social costs within accounting reports also exceed the costs of doing so.

The Economic Analysis of the Social Cost Problem

To illustrate the analysis of the social cost problem, two entities, A and B, are assumed, although the conclusion would be applicable to any number of entities. A engages in a diseconomy creating a harmful activity, thus causing damages to B. The magnitude of the damage naturally depends not only on the scale of A's activity but also on the way B adjusts to it. In fact, knowledge about the alternative activities open to both A and B with respect to the harmful effect is necessary to determine the optimal allocation of resources. Evidently the optimal allocation of resources is obtained when A's gain from the harmful activity less B's loss resulting from it is maximized, after all alternatives are considered, including discontinuance of the harmful activity.

Suppose that A and B are firms, then the effects that the harmful activity has on their profits measure their gains or losses. In addition, assuming no serious market imperfections, these changes in profits would be the appropriate basis for the determination of a social optimum. If it is also assumed that each firm, in pursuit of its own self-interest, seeks to maximize profits and that each knows about the available alternative activity and is willing to negotiate, then both will achieve the optimum without governmental intervention. They will either merge and internalize the harmful activity, or they will reach the desired level of activity by having B pay A to modify the nature or scale of its harmful activity. When there is liability for damage, A will compensate B for the optimal amount of damage imposed by A. All these solutions are parallel to those applicable to the transfer-pricing case between two divisions of a decentralized firm if these divisions were free to merge, to agree on a mutually optimal transfer price for the intermediate product or if central management were to force A to pay B the amount of optimal loss imposed as a "transfer price" for the noxious "intermediate product" transferred, respectively. Thus, central management can (in the transfer pricing case) specify the quantity of the intermediate product to be manufactured

and transferred or apply a dual tax-subsidy system to avoid suboptimization.²¹ But similarly the government may appropriately intervene in the social cost case and regulate the nature and the scale of the harmful activity or apply a corrective tax-subsidy system. However, there are dissimilarities between the social tax-subsidy solution as traditionally known, and the transfer pricing system described above.

According to the traditional tax-subsidy solution at the social level, the required excise tax for a good generating an external diseconomy is equal to the value of the marginal diseconomy at the optimal output, whereas the excise subsidy should equal the value of the marginal external economy at the optimal output for a socially beneficial good. But these measures are dysfunctional in that the suggested tax will reduce output below its competitive equilibrium, and the subsidy will extend output beyond the optimal level.²²

A related objection to the excise tax-subsidy solution is raised in a paper by P. Bohm²³ as quoted by Mishan:²⁴

If the optimal excise tax increases with output, the firm (he argues) might become aware of the relationship. Subtracting the schedule of optimal taxes from the demand price of the product would result in a downward-sloping net average revenue curve from which the firm could derive a marginal revenue curve. By equating marginal cost to this "marginal revenue" curve, the firm reduces its output below optimal.

However, the government is not obliged to impose a *uniform discriminating* tax, one equal at each unit of output to the marginal effluent and, therefore, at any output raising a total tax equal to the total loss inflicted by the effluent. Such a tax, already marginal, effectively precludes the industry from "exploiting" it by reducing its output. In addition, such a discriminating tax ensures that the total conditions are met. Thus, heavy effluent charges properly imposed on the initial units of the output could well prohibit production of the good.

It is interesting to notice the striking similarity between Bohm's suggestion at the social level and Hirshleifer's²⁵ solution for the transfer pricing problem in that divisional managers are not permitted to act as monopolistic

²¹ See Ronen and McKinney, "Transfer Pricing for Divisional Autonomy," pp. 99-112.

²² For a discussion of this issue, see Mishan, "The Postwar Literature on Externalities," pp. 1-28; J. M. Buchanan and W. C. Stubblebine, "Externality," *Economica*, XXIX (November 1962), pp. 371-384; and Ralph Turvey, "On Divergencies Between Social Cost and Private Cost," *Economica* (August 1963), pp. 309-313.

²³ P. Bohm, "Pollution, Purification and the Theory of External Effects" (mimeographed, 1969).

²⁴ "The Postwar Literature on Externalities," pp. 15-16.

²⁵ "On the Economics of Transfer Pricing."

buyers or sellers where a perfectly competitive market for the intermediate product does not exist externally. Unfortunately, this solution, for both transfer pricing and the social cost problem, may unduly restrict the autonomy of the manager (of the division and the firm, respectively). In addition, it does not provide information about the contribution (of the division and of the firm) to the overall profits (of the firm as a whole and of the economy, respectively).²⁶

It can be shown, however, that the dual tax-subsidy solution suggested by Ronen and McKinney²⁷ for the transfer-pricing problem, as discussed above, can apply to the social cost case as illustrated in the figures below.

Figure 3, opposite, illustrates the situation faced by A. The scale of the harmful activity conducted by A, as represented by the horizontal axis, and the scale of B's losses resulting from the activity, as represented in Figure 4, opposite, are assumed to be continuously variable. In Figure 3, the line MG(A) represents the marginal gain to A from the harmful activity. This is simply the net gain that results from producing the goods and services which necessitate engaging in a harmful activity. Thus, this line reflects the revenue minus all the costs (including the private costs of the harmful activity) related to the product which creates the harmful activity to B. The area under this line gives the total gain to A from the harmful activity. The line ML(B) in Figure 4 represents the marginal loss to B from the harmful activity of A. This is the marginal reduction in profit resulting from the side effects of A's activity. The total area under this line reflects the total loss to B after making the best possible adjustment to A's activity. It is, therefore, the direct loss as reduced by adjustment plus the cost of making that adjustment. If A and B cannot negotiate and if no restrictions whatever are imposed on A, A would choose to engage in the harmful activity at a level OC. Clearly, the optimal level for the activity from the social standpoint is OD, which would be obtained if A and B could merge, as illustrated in Figure 5, page 334. When the optimum level of the activity OD is produced, the net social gain is reflected by the area OEF in Figure 5, which is clearly greater than the area OEF minus ECH, which would have reflected the net social gain if A is led, in the absence of either negotiations or restrictions, to produce OC of the harmful activity. If A and B were to negotiate, B would be willing to pay up to the area OCH in Figure 5 to induce A to discontinue its activity. A would be willing to accept a payment which does not fall below the area DCE to reduce its activity to the optimal level OD. A would have been willing to reduce its activity to level C in exchange for a payment which does not fall below area ODEF, but for this reduction B would not be willing to pay more than ODE. Since B, however, is willing to pay more than DCE for a reduction in the activity level from OC to OD, the resulting scale of the activity will be the optimal level OD as a result of negotiations.

²⁶ These criticisms are discussed in more detail in Ronen and McKinney, "Transfer Pricing for Divisional Autonomy."

²⁷ Ibid.

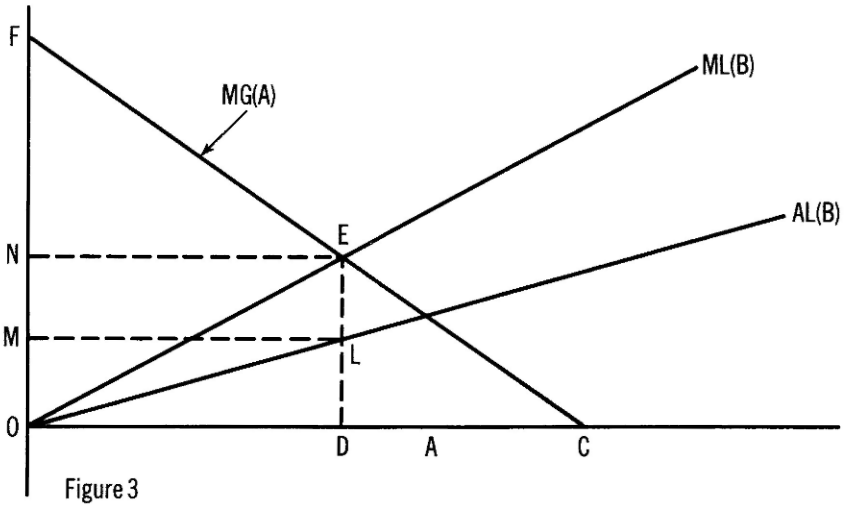


Figure 3

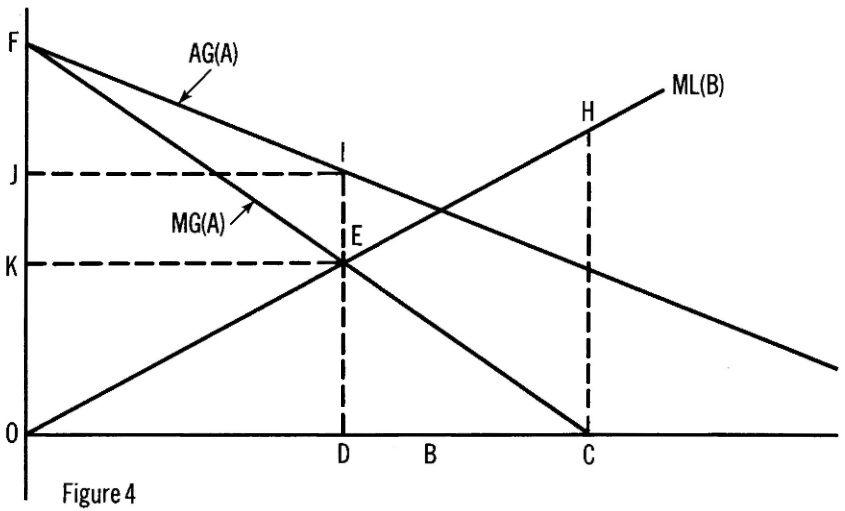
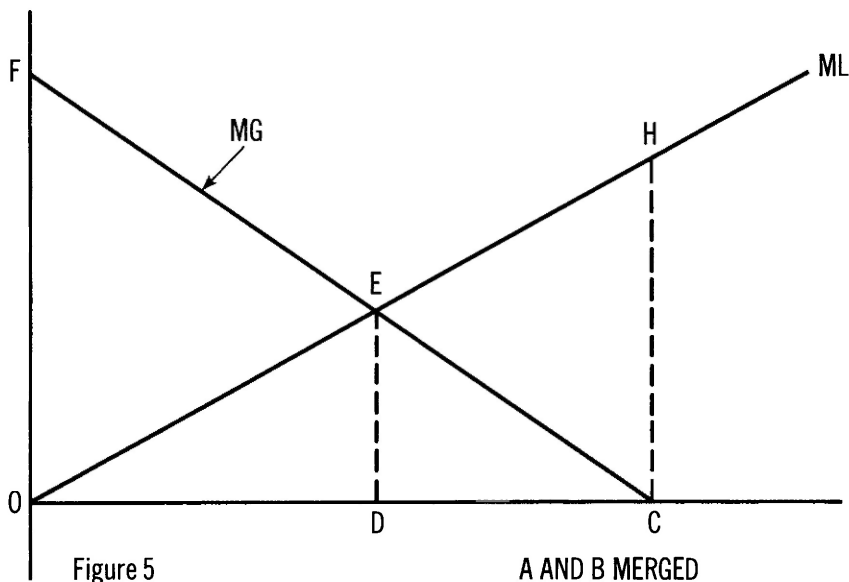


Figure 4



If liable to compensate B for actual damages, A will voluntarily choose the scale OD at which the marginal loss to B which has to be paid just equals A's marginal gain from the harmful activity. By producing at OD, A will have to pay B the area ODE, but the total gain would be ODEF and, thus, A's net gain is OEF. This net gain will be reduced if A chooses a scale that is either higher or lower than OD. Thus, the gain from negotiation is the difference between the net social gain with negotiation, which is OEF, and the net social gain in the absence of negotiation, which is OEF minus CEH. The net gain attributable to negotiation is, therefore, the area CEH. For negotiation to be worthwhile from the social standpoint, the cost of negotiation should not exceed this gain. If the cost of negotiation exceeds this gain, society would be better off with A producing the harmful activity at level OC. If the cost of governmental intervention, however, is less than CEH,²⁶ it would be worthwhile for the government to intervene, either through establishing a liability for damage or through outright regulation, thus inducing A to reduce its level of activity to the optimal scale, OD. Alternatively, the government could employ a tax or subsidy system corresponding to that suggested above for the transfer-pricing problem.

If, in the case of negotiations or in the case whereby A is liable to pay damages to B, the payment is to be assessed per unit of damage (expressed in average rather than marginal terms), then A will have to operate on the

²⁶ The determination of whether the cost of intervention exceeds or falls below the net gain attributable to negotiations is not independent of the type of law that prevails. For an elaborate discussion of this issue, see Mishan, "The Postwar Literature on Externalities."

line $AL(B)$ which is the line average to B's marginal cost line. By facing the line $AL(B)$ as its average cost of the activity, A will construct the line marginal to it [$ML(B)$], equate it to the marginal gain, and choose level OD. Similarly, B will receive the payment per unit in average terms. B will face the average gain curve $AG(A)$ to which will be drawn the marginal $MG(A)$ in Figure 4, equate it with the marginal loss line $ML(B)$, and choose activity level OD as well.

A direct translation of this analysis into one appropriate for a transfer-pricing problem is possible. B can be viewed as transferring an intermediate product to A in this case. The intermediate product is B's acceptance of A's harmful activity. This acceptance is again assumed to be continuously variable. The higher the level of the activity that B accepts, the higher its marginal loss and the lower the marginal gain to A. If, in the absence of negotiations, the government were to employ a tax-subsidy system corresponding to that suggested for the transfer-pricing problem,²⁹ information about the marginal loss to B, $ML(B)$ would be needed. The government would provide A with the average schedule $AL(B)$ as the supply curve for the acceptance of B; the government would correspondingly be provided by A with its marginal gain $MG(A)$, and it would communicate the average gain schedule to B as the demand curve for its acceptance. If both A and B construct the marginal to these curves and operate on it, both will voluntarily and in pursuit of their self-interests choose the optimal level of OD. The total receipts of the government from A would be ODLM (see Figure 3). The government will pay B a total of ODIJ (see Figure 4), and a net subsidy amounting to the difference between the total net gain of A's activity (ODEF) and the total loss to B of the activity (ODE) will be paid by the government to B.

Information Requirements. The information requirements for the administration of such a policy are identical to those arising in the transfer-pricing case. Information about the marginal loss and marginal gain resulting from the activities should be obtained and communicated. This communication should be preferably on a systematic basis since changing factors in the environment may affect the loss and the gain curve.³⁰ In the final analysis, it can be concluded that accounting must communicate periodically this information unless the cost exceeds the benefit. The benefit can be measured by the net gain resulting from governmental interference, negotiation, or any other social arrangement that becomes desirable as a result of obtaining the information. The cost involves estimation of the loss by B and of the gain

²⁹ See Ronen and McKinney, "Transfer Pricing for Divisional Autonomy."

³⁰ Communicating this information systematically becomes crucial in a changing environment, because the cost of obtaining such information under these conditions becomes prohibitive. Thus, in discussing the traditional tax-subsidy solution, Mishan argues ("The Postwar Literature on Externalities," p. 15): "The chief obstacle here is, of course, the costs of collecting the necessary information and the costs of supervision, costs which would be particularly heavy for industries in which demand and supply conditions are apt to vary frequently."

by A. Since A and B presumably are best qualified to estimate their respective gain and loss resulting from the activity, it is reasonable to assume that this information can be most cheaply provided by them. In particular, a firm is in the best position to provide information on (a) its cost of a harmful activity caused by another firm and (b) its cost of eliminating or reducing a harmful activity which it inflicts on other entities. Certainly, whether, in any particular case, the benefit of communicating the information does not exceed the cost is an empirical question. But the proposition that the benefits do exceed the costs in the majority of the cases has great appeal.

The reported profits of each, A and B (including the subsidy), will be identical to the net social gain resulting from B's acceptance of the harmful activity. If A ceases the harmful activity or if B does not accept it and has the means to enforce its discontinuation, the social product will be reduced by the reported profit of either A or B—the area OEF.

Discussion and Conclusions

It was shown that, in the situations that are purely defined as external economies or diseconomies, the systematic communication of information relevant to social costs and benefits is essential for appropriate decisions.

But the need for systematic reporting of information about social costs and benefits is not limited to the cases of pure technical external economies or diseconomies. It extends to the broader class of what Scitovsky³¹ refers to as pecuniary external economies. These include the widespread kind of interdependencies that are frequently to be found in the analyses of industrialization in developing nations. In these analyses, the concept is used in connection with the special problems of allocating savings among alternative investment opportunities. These externalities are usually reflected in market prices, but they may not lead to optimal allocation of resources until after a possibly lengthy period of adjustment. This is particularly true in the case of investment projects where the impact of a firm's investment decision on other producers will be characterized by a time lag.

To elaborate, investment in an industry leads to an expansion of its capacity and may, thereby, lower the prices of its products and raise the prices of the factors used by it. Thus, these results benefit others. The raising of factor prices benefits suppliers of the factors. These benefits should be *explicitly* taken into account when investment decisions are made.

Usually it is recommended that this should be done by taking as a maximand not profits alone, but the total of the profits yielded and the pecuniary external economies created by the investment.³²

This naturally conflicts with the results of equilibrium theory. According to the latter, market interdependence as a competitive system insures that the maximization of profit by each firm and the maximization of satisfaction

³¹ T. Scitovsky, "Two Concepts of External Economies," *Journal of Political Economy*, LXII (April 1954), pp. 70-82.

³² *Ibid.*

by each individual lead to an optimum situation where consumers' and producers' surpluses are maximized. This paradox can only be resolved by recognizing that the limitation of general equilibrium theory renders it inapplicable to the problems of investments which are typically long-run.

The first reason for such a failure is an unrealistic assumption of divisibility when large investment projects are undertaken, e.g., investment in public utilities such as canal zones, bridges, and railways—the typical examples of indivisibilities in economies which would force the producer to choose to produce either less or more than the output that would equate these marginal costs and benefits.

Another reason for the inapplicability of general equilibrium to the problems of investment is the fact that equilibrium theory is static, whereas the allocation of investment funds is dynamic. Equilibrium theory assures the socially desirable optimum only when the system is in equilibrium. Investments need not bring the system closer to equilibrium; when they do not, the result of equilibrium theory may not apply. Profits themselves are a sign of disequilibrium, and investment is undertaken for profit. Profits in a freely competitive industry lead to investment in that industry, and the investment in turn tends to eliminate the profits that have called it forth. The same investment, however, may induce profits in other industries, and to this extent it leads away from equilibrium. Thus, investment in Industry A will cheapen its product, and if this is used as a factor in Industry B, the latter's profits will increase. This is a case where the price reduction creates not a consumer surplus proper, but a pecuniary external economy which benefits firms. The profits of Industry B created by the lower price factor A call for investment expansion in B, which in turn would increase Industry B's demand for Industry A's products. This again will give rise to profits and call for further investment and expansion in Industry A. Equilibrium is reached only when successive doses of investment and expansion in the two industries have led to the simultaneous elimination of profits in both. Only then will the conclusions of equilibrium theory become applicable and thus, in the absence of direct interdependence, the amount of investment possible in Industry A would also be the socially desirable amount. This is greater than the amount which was profitable at the first stage before Industry B has made adjustments.

Thus, in general, when an investment gives rise to pecuniary external economies, its private profitability understates its social desirability. Only when the pecuniary external economy created by investment in Industry A becomes "internal," and part of the profits of the investors themselves, will investment in A be more profitable and will, thus, be pushed further than in the absence of integration, but even then, without investment and expansion in Industry B, it would not be pushed far enough. What inhibits the investment in A is, among other things, a limitation of the demand for Industry A's products imposed by the limited capacity of Industry B which consumes this product, just as investment in Industry B is inhibited by the limited capacity of Industry A, the supplier of one of Industry B's factors of production.

Only the expansion in the two industries, integrated and planned together with the possibility of investment in each one of them, would be a

reliable index of its social desirability. Moreover, it is apparent that vertical integration alone would not be sufficient. Complete integration of all industries (considering all possible instances of pecuniary external economies) would be necessary to eliminate all divergence between private profit and public benefit.

Profits in a market economy could thus be a poor guide to economic outcome as far as investment and industrial expansion are concerned, and the more decentralized and differentiated the economy, the poorer they are as a guide.

In an economy in which economic decisions are decentralized, a system of communications is needed to facilitate the coordination of economic decisions. Prices in a market are generally the signalling device that provides information concerning economic decisions. The merit of perfect competition is that it would cause prices to transmit information reliably and to induce people to respond to this information properly. Market prices, however, can be deficient in reflecting the economic situation as it will be in the future. They are thus more useful for coordinating current production decisions that are immediately effective and guided by short-run consideration than they are for coordinating investment decisions that have a delayed effect and that in the long run should be governed not by what the present economic situation is, but by what the future economic situation is expected to be.

The proper coordination of investment decisions would require, therefore, a signalling device to transmit information about present plans and future conditions as they are determined by present plans—i.e., forecasts made by those who decide on present plans. The pricing system fails to provide this information (except in the case where there exists a developed futures market, so that future prices could provide exactly such a signalling device). In these cases, therefore, there is need either for centralized investment planning or—in the absence of centralized planning when decentralization is considered desirable and superior—for some additional communication system to supplement the pricing system as a signalling device.

Where should such a signalling device come from? If it is considered that a systematic, periodic, and reliable communication system is desirable, then the most appropriate way of providing such signals is through the accounting information system. It is desirable for a producer, in pursuing maximum profits, to attempt to provide the best forecast information that bears upon the effect of present investment plans that may induce other investors to react in a manner which is optimal from a social point of view as well as from the standpoint of the producer's private, long-run goal. If a producer has to communicate these signals in the absence of a systematic information system, two problems may arise. The first is whether the producer, given the time and the information overload pressure at the moment of the decision, and given the daily problems of production, would devote sufficient efforts to such a disclosure. The second problem which arises deals with the economies of information. Even assuming that the manager will pay sufficient attention to the signalling of estimated future effects, would the cost of ad hoc, spur-of-the-moment reporting not exceed the cost of

providing relevant information periodically and systematically through the accounting system? Obviously, this is an empirical issue which cannot be settled in general, one way or the other. In any particular instance, however, or for any particular firm, it may not be impossible to ascertain the cost/benefit relationship so that a determination can be made whether these signals should be detected and communicated in an ad hoc fashion or on a systematic basis.

It seems, therefore, appropriate that the objective of accounting systems should give explicit consideration to providing signals made necessary by the existence of pecuniary external economies or diseconomies whenever such provision within the accounting system is desirable from a cost/benefit standpoint. Explicit consideration of the desirability of incorporating the signalling function within the accounting system seems superior to leaving such signals to chance or to reliance on the belief that the inherent rationality of managers will ensure not only a sufficient amount of attention on an ad hoc basis, but also an optimal search for such signals on an ad hoc basis.

Thus, if such signalling devices are present, investment decisions which exclude the signalling of possible future effects may be suboptimal and less than would have been socially desirable. If signals are given, producers affected by pecuniary externalities will adjust to the expected effects of such investments and probably expand their facilities and generate the expanded demand for the other industry's product, thus causing the chain of expanded investment in the other industry and shortening the period of disequilibrium during which the suboptimality persists.

Summary

Social costs are incurred when actions of business firms have harmful effects on others. Social benefits accrue when actions of business firms benefit others. When actions like these and their effects on others manifest themselves in the market prices of the goods and services provided by the business firms, they become part of the private costs and benefits. In this case, the social effects of such actions (that manifest themselves in market prices of goods and services) need not be considered separately in the formulation of accounting objectives.

As is often the case, however, social costs and benefits are not immediately reflected in the market prices of the goods and services transferred among business firms or to consumers. An explicit and separate consideration of social costs and benefits (not manifested in market prices) becomes justified. Such an explicit consideration is necessary for the private parties concerned to assess the situation correctly and arrive at an optimal solution.

However, in many cases more than two parties are involved in activities causing social costs. In these instances it can be too costly for the parties to come together to agree or bargain, and governmental intervention (through fixing liability for damages, placing taxes or outright regulation) may become appropriate. Whatever social arrangement is deemed best under the circumstances, however, periodic and systematic information about social costs is necessary for the government to effect a desirable and rational policy and

for business firms to be able to anticipate and help shape this policy. Probably, the most appropriate and inexpensive source for such information is the accounting system.

Thus, when government does not have to intervene, accounting information should reflect the social costs as part of the cost of production in such a way that the resulting income properly reflects the quality of management performance. By incorporating social costs explicitly in accounting reports, stockholders and creditors will be more qualified to assess managerial performance inasmuch as the choice of alternative actions within the firm is concerned. Such costs must also be explicitly incorporated in accounting reports to properly reflect the firm's contribution to the social product. This is necessary from a social standpoint just as it is considered necessary for a division of a decentralized firm to reflect its contribution to the firm's overall profit in order to satisfy the decision needs of central management.

The periodic communication of social costs is also necessary when intervention by the government may be desirable to effectively carry out its responsibility. Although many of these costs are difficult to quantify, the main question is whether omitting attempts to measure them within the accounting framework can be justified. These social costs and benefits which are important to users such as management, stockholders, and government will continue to be implicitly, if not explicitly, quantified. Incorporation of these costs and benefits within the accounting framework will obviously represent an improvement.