Most production in modern economies occurs within organizations, and this production is regulated only to a limited extent by prices. The size of some of the largest organizations, like General Motors or IBM or AT&T, exceeds that of many national economies. Moreover, many of the organizations which play an important role in resource allocation, including governmental organizations, are not profit-maximizers. These observations make it clear that if economists wish to understand how resources in modern economies are allocated, we must understand what goes on inside organizations. Even if the Arrow-Debreu model accurately depicted how market economies behave—that is, the relations between and among households and firms—it would provide insight into only a fraction of all economic activity. Herbert Simon makes this point powerfully in his contribution to this symposium.

Somewhat surprisingly, most economists have traditionally relegated the study of organizations to business schools, or worse still, to sociologists. The general attitude seemed to be that while it might be important for managers, or the firm's personnel officers, to know something about organizations, the subject was not worthy of Economic Science. Many economists argued that there was no need to look carefully into the black box called the firm: firms maximized profits (stock market value); if managers didn't, they would be replaced; and firms that didn't maximize value wouldn't survive. Accordingly, what went on inside the black box was mere detail. The behavior of the firm could be described completely without knowledge of those details.

Joseph E. Stiglitz is Professor of Economics, Stanford University, Stanford, California.
These beliefs were articles of faith, based on a priori reasoning rather than on empirical evidence. Those like Berle and Means (1933), March and Simon (1958), and Mariss (1964) who argued otherwise were given short shrift by the mainstream of the economics profession, as heretics who ill understood the basic tenets of the profession. To be sure, there were many aspects of economic behavior for which the standard model did remarkably well: it could, for instance, accurately predict responses of input mixes to changes in factor prices, or the response of output to changes in prices. But there were other questions, including those raised by some of the institutional practices described below, to which the standard model provided no answer, or for which the answers that it did provide seemed wrong.

Fortunately, these views have changed markedly over the last 15 years. The easy confidence in the earlier dogma was disturbed by two events. First, the development of the new economics of information, stressing the fact that information is imperfect and costly, provided an intellectual foundation for the argument that managers had considerable discretion. The fundamental problem of owners of firms is how to motivate their managers to act in the interest of the owners. Today, this problem is referred to as the principal-agent problem. David Sappington provides an excellent overview, as well as further references, for the vast literature which has developed since the early contributions of Ross (1973), Stiglitz (1974), and Jensen and Meckling (1976).

The existence of imperfect information implied that managers might not (in general would not) maximize shareholder value, both because imperfect information gave managers discretion to pursue their own interests, which were often at odds with those of owners, and because the cost of obtaining and processing information meant that satisficing and rule-of-thumb strategies (March and Simon, 1958) would be followed. A large literature developed detailing the limits of control on managers, including difficulties with share voting, with takeover mechanisms, and how good management has aspects of a public good (Demsetz, 1988; Grossman and Hart, 1980; Stiglitz, 1972a, 1981).

Secondly, these theoretical arguments were buttressed by increasing evidence that firms did not pursue shareholder interests. The most marked examples entailed firm behavior with respect to taxes and takeovers. Many corporations, perhaps most, did not seem to minimize total (corporate plus individual) tax liabilities (Stiglitz, 1973, 1983). Managers often resisted takeovers that would enhance shareholder value through poison pills and golden parachutes; managerial subversion of stockholder interest and managerial incompetence became epitomized in the cases of RJR Reynolds and Texaco; in

---

1A rather separate line of analysis argued that in the absence of a complete set of securities markets, different shareholders would wish the firm to pursue different policies. There was ambiguity about what the managers "should" do, even if they wished to pursue "stockholder interests." (See Grossman and Stiglitz, 1980, and the references cited there.) Moreover, pursuing a policy of maximizing stock market value might not be (constrained) Pareto efficient (Stiglitz, 1972b, 1982).
the one case, the managers allegedly walked off with more than $100 million, in
the other, a single miscalculated decision cost the firm billions of dollars.
Furthermore, as described in the symposium in the Winter 1988 issue of this
journal, many studies have found that firms undertaking hostile takeovers
experience no increase in share value.

With these developments as a backdrop, the study of the economics of
organizations has focused on several questions: What determines the boundary
between organizations and markets? How does what happens within organiza-
tions differ from what happens between actors in markets? What determines
the behavior of organizations? Are there ways of changing organizational
design to make organizations more effective?

Ronald Coase (1937) provided the classic answer to the first two questions:
markets and organizations differ in the manner in which transactions occur,
and the boundary between the two is determined so as to minimize transactions
costs. Transactions costs theory has provided a rich explanation of the changing
boundaries between organizations and markets, but like the typical stock
market analyst, it perhaps does better on Monday morning quarterbacking
than as a tool of prediction. In his essay in this symposium, Herbert Simon
argues that the economy is in an essentially neutral equilibrium between
organizations and markets, implying that seemingly large changes in the mix
between markets and organizations might result in little change in efficiency.
From this perspective, one decade might see the formation of conglomerates,
another their breakup, but economists should not expect that such shifts in the
boundary between firms and markets are symptoms of fundamental changes in
transactions costs or other technologies.

Part of the reason that Simon holds his position is that he sees less
difference between markets and organizations, at least in some respects, than is
traditional among economists. The traditional caricature had relations within
markets regulated by prices, while relations within organizations were regu-
lated by quantities or commands. But this view vastly oversimplified both
markets and organizations. Organizations rely on commands only to a limited
extent; Simon’s paper in this symposium discusses how they use authority,
rewards, and identification to motivate workers, while Sappington’s contribu-
tion describes how firms design incentive schemes which are a far departure
from traditional price mechanisms. Further, markets rely on prices to only a
limited extent; quantities like sales and size of inventories are as important as
prices in determining corporate behavior. Market relations among firms are
governed not just by prices, but by contracts, contracts which in many ways
appear similar to those between a firm and its workers.

The problems posed by the boundary of the firm were most fully articu-
lated in the context of the debate over vertical integration: while some
economists argued that vertical integration allowed firms to internalize exter-
nalities or resolve certain “command” problems—ensuring, for instance, the
downstream firm that supplies would be forthcoming—others argued that
integration never should make much difference. Whether in integrated or
unintegrated firms, decisions are made by managers, and whatever incentive
scheme was employed in the integrated firm could have been employed before
integration, with contracts ensuring specified payments in different contingenc-
ies from one establishment to another. From this perspective, there appears
no convincing argument for integration.

The argument cuts the other way, as well. In Stiglitz (1989b), I have
described what I call the "centralization paradox." Since a centralized organiza-
tion can do anything that a decentralized organization can—it can even choose
to decentralize, if it wishes—but the converse is not true, shouldn't centraliza-
tion be a dominant form of organization?

Recent research on these issues begins with the premise of incomplete
contracts: with complete contracts, all contingencies are taken care of, and it
makes little difference whether the transaction occurs within a firm or between
firms.

One view emphasizes that incomplete contracts must provide for the
allocation of residual rights. What happens when an unspecified event occurs?
Who has the right to take what actions? Just as traditional theory emphasized
the "residual" rights to profits that were vested in the ownership of firms, the
more recent theory (Grossman and Hart, 1986) has emphasized the residual
rights of control that are vested in ownership. In this view, vertical integration
changes who has residual rights of control. Of course, while the owners of the
firm have residual control over capital, workers have residual control over their
labor, and a firm can be viewed as a partnership between these (and other)
factors of production. Accordingly, residual control is not cleanly assigned, and
unanticipated events will lead to bargaining. 2

A second answer to the issue of why markets and organizations are not
functionally identical emphasizes that unforeseen contingencies provide differ-
ent incentives to various parties to take actions; however, the costs and benefits
of taking actions (and therefore the actions which will occur) may be affected by
the organizational structure. For instance, consider the problem of intervention
in the event of a loss by a production unit. When the production unit is a
subsidiary of a larger firm (which, accordingly, will bear its losses), then the
larger firm has a strong incentive to intervene and the costs of such interven-
tion are relatively low. Contrast this with what happens if the smaller produc-
tion unit is free-standing. The costs of the larger unit intervening are larger. It
could intervene, but it would have first to buy up a majority of shares in the

2 Note that this view of the firm as a partnership is somewhat different from the "principal-agent"
view described by Sappington in this issue. Still a third view sees the managers at the center of the
firm; they are the agents, but there are multiple principals, like workers (the union), suppliers of
equity, banks, and so on. The firm is thus viewed as a multiple principal-multiple) agent problem
(Stiglitz, 1985; Stole, 1990).
smaller unit, take control of the board of directors, and use its control of the board of directors as the basis of intervention. All of this takes time, making the benefits of intervention smaller. Accordingly, when the production unit is free-standing, there is an effective commitment by the larger firm not to intervene. Note that these statements may be valid even though the shareholders of the smaller production unit are the same as those of the larger unit. Thus, those who ultimately bear the losses are the same, and "nominal control" (which resides in shareholders) is the same. In this way, organizational form (including what Williamson (1979) refers to as the "rules of governance") can be viewed as forms of making commitments. Even with the possibilities of last-minute renegotiation and broken contracts, commitments do make a difference.  

Economists have come to realize that the question of the boundary of the firm need not coincide with the perhaps more fundamental question of centralization and decentralization. There might be a single firm in the economy (whatever is meant by the concept of a "firm") yet that firm could be organized in a decentralized manner. Moreover, an organization may be decentralized with respect to some activities, and not with respect to others.

Centralization vs. Decentralization

The advantages (and occasionally the disadvantages) of decentralization have long been a major theme of economic analysis. In particular, the Austrian tradition emphasized the decentralized nature of knowledge in society (Hayek, 1945), and the Arrow-Debreu model was often touted as establishing the efficiency of decentralized mechanisms. However, few have formally attempted to compare centralized and decentralized systems, including their ability to acquire and respond to new information. The paper by Raaj Sah in this symposium describes some recent work which explicitly recognizes that each of the units within an organization have limited information; it is costly for them to acquire information; and communication between units is costly, limited, and imperfect. Thus, human fallibility may lead units to make mistakes. The structure of decision-making—for example, polyarchies, hierarchies or committees operating under various rules—affects the likelihood that good projects get rejected or bad projects get approved, and the costs (including the costs of

---

3 This perspective has been applied to the interpretation of the difference between privatization, regulation, and nationalization of, say, utilities, where the eventual "shareholders" are citizens of the country or the state. See Sappington and Stiglitz (1987) and the paper by Vickers in this issue.

4 One early example of how commitments can make a difference is from the industrial organizational literature. In models of spatial competition, it would pay a monopolist with many stores to set up those stores as independent franchises; the organizational form served as an effective commitment to respond to entrants in such a way as to deter entry more effectively (Stiglitz, 1986a).

5 Two such attempts should be noted. Marschak and Radner's (1972) "theory of teams" and Hurwicz's work both spawned large literatures.
delays) associated with deciding at all. Work along these lines sets out to delineate the circumstances under which decentralized (or centralized) decision making has decided advantages.

Another strand of recent research has emphasized that decentralization with many units engaged in roughly similar activities has an important informational advantage: it provides information which would not otherwise be available, a basis of comparison that is useful for selecting those who are good at the particular tasks and for providing incentives. This form of competition, markedly different from that envisaged in the traditional Arrow-Debreu model and much closer to that seen in modern industrial economies between firms, has decided efficiency benefits.\(^6\)

A Closer Look at Internal Organization

There is more to organizational structure than just centralization and decentralization. The firm has to decide how to motivate workers and how to arrange the production process. The interests of the managers and workers of a firm seldom coincide exactly with that of the firms' owners, and the presence of imperfect and costly information allows managers and workers some discretion to pursue their own interests. The old adage that "if you want something done right, do it yourself" may reflect divergences in interests as much as it does differences in competencies. But careful attention to the compensation structure of workers and managers can make the interests of "principal" and "agent" coincide better. Sappington's paper in this issue provides an insightful discussion of how this can most effectively be done, and of why it is that, as much as one tries, divergences remain.

Much of the work discussed by Sappington involves fairly simple organizations: a manager with several employees. But of course, modern corporations involve managers managing managers managing managers... managing workers. This multi-tiered layered structure involves a host of new problems. For instance, one has to be sure that the supervisors, instead of managing the workers in the interests of the owner, do not collude with workers "against" the owner (Tirole, 1986). The limited information of upper level bosses about

---

\(^{6}\)Sappington discusses this information advantage in this issue and provides some citations. For an application to R&D, see Stiglitz (1986b).

This brief discussion of recent strands of research on centralization versus decentralization is by no means complete. One strand of literature has focused on consequences for the variability of organizational performance and the effectiveness of evolutionary processes (Sah and Stiglitz, 1985, 1991); another strand focuses on the relative speeds of action (Geanakoplos and Milgrom, 1988; Bolton and Farrell, 1990; Stiglitz, 1989a, b); still another strand, growing out of the team theory literature (Marschak and Radner, 1972) focuses on the costs of communication.
worker activities may make systems where workers are provided with an incentive to monitor their peers particularly attractive.\(^7\)

On one side, limited information and incomplete contracting necessitate vesting managers with discretion; on the other, they also provide managers with an ability to use their discretionary power to entrench themselves and to acquire rents (Shleifer and Vishny, 1989; Milgrom and Roberts, 1988). Hannaway (1989) has argued that much of managerial activity is in fact of this form.

Since early discussions of principal-agent and moral hazard problems (Stiglitz, 1974), attention has been drawn to two complementary control mechanisms: supervision (or monitoring input), and incentive pay basing pay on observed performance. One problem with just observing output, as in a piece rate system, is to ensure quality (Stiglitz, 1975). More generally, the problem is that only some attributes of output can be measured accurately or at all. If those attributes cannot be measured accurately, having pay depend on them will force workers to bear possibly large risk. But if pay does not depend much on those attributes, workers’ attention will be diverted towards those attributes which are highly rewarded, perhaps resulting in quantity over quality. Holmstrom and Milgrom (1990) have recently suggested that these considerations (among others) may be important in job design, in the division of tasks among different individuals. If some important tasks where performance can be accurately measured can be separated out, there can be gains from turning those tasks into separate jobs and thus allowing high-powered incentive schemes to be used.

The Power and Limits of Standard Economic Analysis

The literature on the economics of organizations has been a powerful one, both providing theoretical insights into the merits of alternative organizational structures, and also explaining a variety of institutions in the economy. Edward Lazear, in his paper in this symposium, illustrates this point by showing how such phenomena as mandatory retirement, upward-sloping wage profiles, and huge salary differentials between corporate presidents and vice-presidents can be explained by the incentives paradigm.

Yet, many predictions of the incentives paradigm do not seem to be borne out. Even in highly specialized cases, it can take considerable skill to derive the formula for the optimal incentive scheme; perhaps not surprisingly, observed incentive structures look little like those predicted by the theory, nor do they change in response to the kinds of changes that the theory would have

\(^7\)Arnott and Stiglitz (1991) provides an analysis of peer monitoring in the context of insurance markets, while Stiglitz (1990) provides an analysis of peer monitoring in credit markets.
predicted. Piece rates are seldom an important component of compensation; when they are used, linear piece rate systems are prevalent, even though these are only optimal when utility functions display the particular (and peculiar) property of constant absolute risk aversion (Holmstrom and Milgrom, 1987). In the one area where piece rates are prevalent, agricultural sharecropping, the fraction of output going to the worker remains unchanged over long periods of time, and across crops with quite different properties.

The output-related incentives provided to senior management in large corporations—that is, the fraction of the incremental output which accrues to them—seem too weak to align their economic incentives with those of owners. The form those incentives take (usually stock options) appear inefficient both with respect to risk-bearing and tax burden (Stiglitz, 1987). Thus, the incentives paradigm can neither explain the structure of observed incentive schemes nor what it is that motivates managers and workers.

If economists want to understand what makes managers work and what differentiates successful from unsuccessful organizations, we may need to look beyond the compensation schemes and the economists' standard incentives paradigm. In this symposium, the papers by Lazear and Simon explore these possibilities. Lazear shows how insights of psychology may help us understand the details of labor contracts. Simon argues persuasively that in successful organizations, workers identify with the organizations' objective; that they take on the organizations' objective as their own.

Concluding Remarks

To those who manage firms and actually organize the production which occurs in the economy, the perspectives on economic organization provided in this symposium may seem obvious. For the received wisdom of economics, however, these commonsensical insights should be troubling, since the premises on which these analyses are based and many of the conclusions which they reach are greatly at variance with traditional neoclassical analysis. To those who rely on some version of the perfect markets Arrow-Debreu paradigm, the perspectives on the economics of organizations presented in this symposium must either be wrong, or else be of secondary (or tertiary) importance—no more than window dressing on a basically accurate model of the economy.

The perspectives presented here do not question all the insights of traditional price theory. Whether managers do or do not have a great deal of discretion to pursue their own interests will not alter conclusions such as that at higher output prices, firms will normally produce more, or at higher wage

---

8Among the peculiar properties of this utility function is that the wealth elasticity of risky assets is zero. These properties make it unsuitable as a basis of any descriptive theory.

9A similar argument has been put forward by George Akerlof (1991).
rates, firms will conserve on their use of labor. But they do alter our views about whether markets are necessarily efficient, and about many policies, including those pertaining to takeovers. They may help economists understand and improve upon a variety of observed management practices, including the devices firms use to motivate and retain workers.

At the very least, this symposium and the literature on the economics of organizations have opened up a new set of questions. They look inside the black box of the firm. And that look inside is disquieting: One of the foundations of the neoclassical theory has been shaken. How much of the superstructure will have to be reconstructed remains to be seen.

References


