CHAPTER 1

Introduction

Much of society's resource allocation takes place within organizations. With some important exceptions such as agriculture, organizations are the prevailing structure where there is profit-oriented productive activity, both in free market economies and in economies that are controlled in varying degrees; in most industries it has become unusual for individual producers to deal autonomously with markets. Virtually all of every economy's governmental and private nonprofit enterprises take place within organizations. Consequently, when economic analysis of exchanges among organizations is not concerned with economic behavior within organizations, it overlooks a large part of society's resource allocation.

If employees competed on the basis of the external market forces of demands for the organization's outputs and supplies of its inputs, neglect of resource allocation within organizations could be unimportant. However, if economic forces that act independently of these external forces are generated within the organization, neglect of economic behavior within organizations could result in incomplete and perhaps incorrect conclusions about resource allocation.

This book presents a positive economic theory of resource allocation within organizations. Based on recent developments in the economic theory of information, the theory extends to individuals within an organization the received theory of firm and industry supply. In the theory presented here, information costs lead employers to delegate discretion over an organization's resource allocation to employees. Employees take advantage of this discretion by pursuing their own objectives at the expense of their employers' objectives. Employers can limit the costs of this behavior by imposing constraints on employees. The nature of these constraints depends on the costs of imposing them and how much they reduce employers' costs of employees' contributions to the organization's outputs. Although it may in some cases be feasible to prevent entirely employees from pursuing their own objectives at their employers' expense, employers' optimal setting of constraints ordinarily limits their costs of this behavior to some determinate amount.

When employees use the organization's resources to achieve their own objectives, they establish demands for resources independent of those external to the organization. These create an economy within the organization that is responsive to employees' own goals as well as to clients' and owners' goals. Employees' uses of their discretion affect the scope of activities occurring within the organization and raise by a determinant amount what must be paid for the organization's outputs.

A systematic analysis of the choices employees make within the imposed constraints provides the basis for a set of positive hypotheses about an organization's resource allocation and its efficiency. Although much work remains, enough hypotheses about resource allocation within organizations are derived to show that the range of these hypotheses is roughly comparable to the range of existing hypotheses about resource allocation among organizations. The derived hypotheses pertain to an organization's supply of its final and intermediate outputs for short-run and long-run periods, the implicit or explicit prices that guide employees' uses of resources, and the organization's demands for inputs. Hypotheses also pertain to employees' investing resources to enhance their prospects of pursuing their own goals and to the effects of these investments on the organization's resource allocation in the long run.

Other hypotheses concern the total incomes (including noncash incomes) of an organization's employees; the influences of employees on an organization's internal structure and on its growth and transition; and the allocation of resources to employees' acquisition of information. Most of the derived hypotheses apply to behavior in any type of organization; some, however, apply specifically to private corporations, private nonprofit organizations, or public organizations. None of the hypotheses depends on particular variables, such as levels of sales or budgets in employees' utility functions, none require aggregating employees' goals, and none depends on the active role of an owner-entrepreneur in the organization's management.

A Overview of the theory and core definitions

In order to extend economic theory to the constrained choices of an organization's employees, it is necessary to resolve the following questions. What kind of information costs lead employers to delegate discretion over resource allocation to employees? How can this discretion be defined in economic terms? What are the constraints applicable to employees and how do information costs influence em-

ployers' choices among them? How can employees alter these information costs and thereby reduce the effectiveness of constraints facing them? Who outside the organization might impose constraints on employees and, should no one deliberately impose constraints, what would limit employees' using the resources delegated to them to pursue their own goals? The following overview outlines how the theory deals with these issues and presents the core definitions used in the description of the theory.

The analyses of information costs, employees' information cost advantages, and their discretion over resource allocation are based on the production functions for the organization's intermediate and final outputs. A number of economies result from multiple final and intermediate outputs being produced by a single organization. These include reduced costs of coordinating input applications when two or more outputs share the same production function. For example, the production of one output may confer technological spillovers on the production of another that can be dealt with more economically if both are produced in the same organization. There can be economies from a single organization coordinating uses of an indivisible input to produce multiple outputs instead of separate organizations for each output having to deal with another organization that coordinates uses of this resource. It can be more costly to establish and enforce contracts for the external supply of inputs having unique characteristics than to produce them internally. An informed owner-entrepreneur ensures that the organization produces a combination of final and intermediate outputs that maximizes his net return after his costs of coordination. In contrast, when there is no owner-entrepreneur actively involved in the organization's management, the opportunity costs of production in separate organizations represent limits on the costs of production in a single organization. There are often smaller limits on these costs, however.

Given the outputs produced by an organization and the production functions encompassed by it, an important issue is what is known about these functions and by whom. In addition to determining productivities of inputs, production functions help determine employees' and employers' relative costs of information about possible resource substitutions. Those employees directly involved in applying inputs may face lower costs than do others of obtaining information about production possibilities. The absence of similar production elsewhere or high costs of comparing such production, combined with employees' information about production possibilities being a by-product of their productive activities, contribute to these cost advantages. Spatial

dispersion of production and intangible characteristics of inputs or outputs can contribute to costs of comparing production and can also give employees information cost advantages regarding the amounts or characteristics of the inputs they use or the outputs they produce.

Information cost advantages lead to the delegation to an organization's employees of discretion over resource allocation within production functions. Those delegating discretion to an employee may actually possess only sketchy information about the relevant possibilities for input or output substitutions. An employee's *production domain* is the subset of the organization's production functions over which he holds discretion to apply inputs within some range of their possible values. [To avoid awkward wording, the masculine pronoun is often used in the generic sense to mean "he or she".] There are varying incentives for others within the organization to obtain information about some of the possible input substitutions within an employee's production domain. There also are differing incentives for others to measure and attach values to the inputs used within an employee's production domain and to the resulting outputs or contributions to outputs.

Information cost advantages and the resulting discretion granted to employees make it possible for employees to derive rents from their employment. Employees' uses of these gains lead them to allocate part of the organization's resources to their own ends and in long-run periods to alter to their benefit the organization's stocks of tangible and intangible capital. Thus, employees' use of their discretion over input applications to pursue their ends not only transfers welfare to them but influences the organization's supplies of its outputs and demands for its inputs and affects the efficiency of its resource allocation.

Employees' pursuit of their own ends brings them into conflict with those who delegate discretion to them. An organization's *funding authority* is the individual or group holding ultimate control over the availability of revenues to the organization's employees. Thus, the funding authority of a private corporation is its stockholders, that of a private nonprofit organization is its donors, and a public organization's funding authority is its legislature. When information cost advantages create an incentive for a funding authority to delegate discretion over resource substitutions to employees, often these employees have the incentive further to delegate discretion to other employees. The cash-equivalent costs to an employer of his employees' uses of resources in ways other than those that would maximize his welfare are referred to as *resource diversions* (or diversions, for short).

Resource responsibility and the *funding limit* are two separate constraints that can act separately or simultaneously to restrain employees' resource diversions. Resource responsibility (or responsibility, for short) is a costly constraint that is deliberately placed on an employee by the funding authority or by another employee who has been delegated the necessary authority. The same resource responsibility constraint can affect a single employee or multiple employees. In contrast, the funding limit is not deliberately established and is applicable to all employees in the organization. This constraint reduces the amount of resources available to the organization's employees when the funding authority faces increases in the costs of disposing the organization's outputs according to his interests. Neither of these constraints necessarily applies in any particular situation. It may not be economically worthwhile to impose resource responsibility on an employee, and the resource diversions allowed by the responsibility facing an organization's employees may not be large enough in a particular situation for the organization's funding limit to be binding.

Imposing resource responsibility constraints requires authority, derived from that of the funding authority, to extract or augment employees' rents from working in the organization. There are alternative types of responsibility constraints, all of which have in common that they connect employees' actions or results of their actions with the monetary or nonmonetary incomes they receive from working in the organization. The choice to impose responsibility is voluntary for the funding authority, but employees have no choice to avoid the responsibility constraints facing them, or any changes in them, so long as they continue to associate with and derive rents from the organization. If an employee were under a completely specified contract, resource responsibility would constrain the degree to which he could avoid performing some of his contractual obligations. However, employers usually do not find such contracts economical, and resource responsibility also limits employers' costs of employees' outputs when employment contracts are incomplete. The responsibility imposed on an employee ordinarily changes many times during his tenure with a particular organization.

The effectiveness of responsibility depends on the amount spent on information by the one imposing it. Thus, information costs, not the option to avoid responsibility constraints, enable employees to retain rents from their employment. If employees can increase employers' information costs they can augment their rents.

The funding authority delegates his right to augment or extract

employees' rents to those employees, referred to as *managing employees*, who impose responsibility constraints on other employees. The term *managing employee* is used here instead of the frequently used term *manager* to emphasize that a managing employee is both a manager and an employee, and the analysis of constrained employee resource diversion behavior always applies to him. Depending on the authority granted to him by the funding authority or the managing employees above him, a managing employee places resource responsibility constraints on his employees. However, since managing employees maximize their own personal welfare subject to the constraints that they face, they do not necessarily impose the same responsibility constraints as would the funding authority. Either the funding authority or a managing employee can be an "employer." This term is used when the analysis applies to the behavior of either.

There are three types of resource responsibility constraints. One of these, *complete pricing overall responsibility* (CPOR), involves a set of prices on each of the employee's resources and a tax on his income, which lead the employee to maximize the achievement of his employer's objectives. It is so costly in practice to establish this type of responsibility that we can in most cases expect that one of the other two types, *overall value responsibility* (OVR) or *specific responsibility* (SR), will be imposed. The former of these holds the employee accountable for the estimated value of his output or contribution to output in relation to the estimated value of the inputs delegated to him; if the value of this contribution falls below a critical value, the employer obtains the contribution via another source, makes the necessary adjustments to do without the contribution, or switches to specific responsibility. Variants of overall value responsibility include whether or not cash prices are attached to inputs and outputs and an accounting profit is attributed to the employee's production domain.

Specific responsibility directly influences some of the employee's particular uses of individual resources and does not hold him accountable for the value of his output or contribution to output in relation to the value of the inputs delegated to him. The many alternative means for an employer to influence uses of resources can be direct or indirect: Among the former are penalties or rewards, whereas the latter include such measures as enforcing regular work hours to reduce alternative uses of the employee's time. The employer selects among these according to cost effectiveness in particular situations and often finds it preferable not to influence or only minimally affect many of the employee's uses of the resources delegated to him.

The costs of identifying and attaching values to the employee's inputs and outputs or contributions to outputs play a role in an employer's choice between overall value and specific responsibility; the higher these costs the more likely specific responsibility is imposed. Also affecting the choice are the cost effectiveness of the feasible variants of specific responsibility in the particular situation and the availability of alternative means of obtaining the employee's contributions to output or of substitutes for these contributions.

The second constraint on resource diversions, the *funding limit*, can reduce the combined resource diversions of an organization's employees below the sum of those allowed by the responsibility individually placed on them. In a private corporation, increased resource diversions reduce the return on invested capital and can thereby decrease the supply of investment funds. This responsiveness of investments to resource diversions constitutes the private corporation's funding limit. Employees' long-run gains from the organization can depend upon these investments; the degree of dependence is related to the nature of the industry and whether Schumpeterian competition or rapid technological change is present. When employees are willing to reduce resource diversions at the margin to encourage further investments, the funding limit is binding. In private nonprofit organizations and public organizations the funding limit is determined, respectively, by the responses of funding by donors and by the legislature to quantities of the organization's outputs that are disposed of according to the interests of these funders. When the funding limit is binding, it leads employees to develop means of coordinating their actions to reduce their combined resource diversions below those allowed by the responsibility placed on them individually.

Given an organization's production functions along with the information cost advantages that they impart, the discretion over inputs and outputs that is delegated to employees, and the responsibility imposed on employees, the organization's resource allocation can be analyzed in the short run and the long run. The short run is defined in the Marshallian sense as a time period over which the effects of investments, including those of employees, may be held constant. In the short run, positive refutable hypotheses can be derived about an employee's rate of output, given his budget; the response of the employee's budget to demand for his output; the implicit prices that guide his uses of resources, and the efficiency of the related resource allocation; and the behavior of employees in relation to technological spillovers among their production do-

mains. These hypotheses differ substantially depending on the type of resource responsibility imposed. Following Leonid Hurwicz's concept of analyzing effects of alternative resource allocation mechanisms on the information held by those possessing and not possessing information cost advantages, it is possible to analyze specifically how the type of responsibility placed on an employee affects both his and others' demands for information about his production domain and about the preferences of interested parties.

Employees' benefits from resource diversions can be currently consumed or invested for the purpose of increasing future benefits. Aside from devoting resources to coordinating themselves in their mutual interests, employees' investments include a variety of individual and coordinated actions that lead employers to change boundaries of production domains and the responsibility imposed. Employees' investments are also directed to increasing the internal and external demands for their outputs, and to altering the returns that employers expect from their own investments.

The type of resource responsibility imposed on an employee influences investment behavior in two ways. First, it plays an important part in determining the net returns to his own investments and affects his influence over returns to the investments of others. Second, by determining the amount of his allowable resource diversions and the present and prospective uses to which he can place resources, the type of responsibility affects the employee's potential supply of resources to investments. Other factors affecting net returns to employees' investments are the costs of coordinating the actions of different employees with respect to mutually beneficial investments and whether the organization operates in an environment where new products are frequently introduced by competitors or in which there is rapid technological change.

The endogenous investment behavior leads to the organization's equilibrium in the long run, which is analyzed in two contexts. In the *first long run* we hold constant the organization's status as a private corporation, private nonprofit organization, or a public organization, as well as the nature of its final outputs. In this time period employees' investments can raise resource diversions allowed by responsibility up to the funding limit or as close to the funding limit as they can reach. The first long-run behavior of employees in increasing rents from their jobs provides a reason independent of owner's entrepreneurship for rising marginal costs in the long run. The *second long run* encompasses the effects of employees' investments on the numbers, sizes, and types of organizations. In this time context, additional con-

straints on employees become operative that are not necessarily controlled by funding authorities or managing employees. These include legal and governing institutions as well as costs of alternative institutional arrangements for supply of an organization's outputs. In the second long run, employees can affect an organization's choices of final outputs as well as the returns to mergers with or acquisitions of other organizations. With a given demand for final outputs, the funding limit on resource diversions is larger in public organizations than in private corporations. Thus, under some conditions unrealized potential for resource diversions can call forth employees' investments that lead to a corporation's outputs being produced instead by a public organization. However, the introduction of Schumpeterian competition or technological change creates offsetting incentives for employees to attract capital from private markets.

An analysis of economic behavior within a legislature makes it possible to derive a legislature's demands as a function of price for the outputs of other organizations. Legislative demands represent most of the demands for the outputs of public organizations and are often important parts of the demands for outputs of private corporations and private nonprofit organizations. An evaluation of the economic efficiency of an organization's resource allocation must take account of the degree to which a legislature's demand for its output reflects the welfare that citizens actually derive from it.

The analysis of legislative behavior depends on the same assumption that underlies Stigler's (1971) analysis of regulation. The citizens who would oppose a governmental action, if informed about it and if opposition were costless, often do not stand to lose enough individually to make them willing to bear the actual costs of deciding and registering their opposition. The winner of an election between an incumbent legislator and his opponent may dispense economic benefits to constituents. Candidates' platforms of commitments of these benefits are hypothesized to be responsive to marginal voters within informed interest groups, not the median voter in candidates' districts. Each legislator's share of the total economic benefits distributed by the legislature is determined by the value of his vote within the legislature plus whatever resource diversions are allowed to him due to any roles that he plays as a specialized legislator. By delegating the tasks of arranging vote trades to specialized legislators (i.e., committees) all members of a legislature benefit from economies in information and time. Given each legislator's share of legislative spending and his commitments of economic benefits to constituents, we can straightforwardly derive leg-

islative demand as a function of price and analyze the forces (e.g., information costs to constituents manipulatable by an organization's employees) that shift this demand.

The problem faced by legislators of economizing on the information needed for vote trading is an example of the general problem employees confront in any organization of economizing on the information needed to coordinate their actions for their mutual benefit. To deal with this problem, an organization's employees delegate to specialized employees the task of arranging the coordination. Specialized employees qualify by the possession of information cost advantages or particular coordinating capabilities. Depending on whether these employees also hold authority over the coordinated employees, they effect the coordination either through voluntary mechanisms that employees establish for this purpose or through use of authority that is often intended for other purposes. Each employee's benefit from voluntary coordination is based on his opportunity cost of participating in it, whereas his benefit from coordination via authority is based on his allowable resource diversions under the responsibility placed on him.

B Three analytical points and progress in connection with them

The presentation of the theory in the following chapters describes many respects in which it is related to and indebted to the large body of existing analyses of behavior within organizations or in relation to them. There are, however, important differences between this and other behavioral theories of organizations. The following discussion considers three analytical points that suggest limitations of many well-known theories and shows how some recent work provides a foundation for dealing effectively with them.

One point is that it is usually necessary to analyze separately individual employees' constrained optimizations, given the resource responsibility imposed, in order to introduce resource diversions and costs of imposing responsibility into the costs of employees' outputs that decision makers face. Without such analysis, it is not possible to account properly for the influences of these costs on employers' choices about rates of their employees' outputs or contributions to outputs. The second point is that unnecessary complexity is introduced by aggregating the goals of different employees. Finally, much generality is lost when a behavioral theory relies on highly restrictive assumptions about the particular objectives pursued by an