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**Rights and Production  
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**I. Introduction**

It is traditional in the theory of the firm to define the production opportunity set available to the firm in terms of its boundary—the maximum attainable set of output quantities for various input quantities, given the state of technology and knowledge. This boundary is the production function of the firm. One of our purposes here is to point up the dependence of such production functions on the structure of property rights and contracting rights within which the firm exists. We redefine the production function in order to recognize the dependence of output on the structure of property and contracting rights. That

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We redefine the production function to incorporate its dependence on the structure of property and contracting rights within which the firm exists. The problems surrounding the role of labor in the firm for a variety of rights structures are analyzed recognizing this dependence. These structures include (1) the "labor-managed firm" system (in which common stock claims are legally prohibited), (2) the codetermination and industrial democracy movements (in which the law requires management participation by labor), (3) cooperatives and professional partnerships (i.e., quasi-labor-managed firms which arise out of voluntary contracting), and (4) the capitalist corporation. We criticize the claim that labor-managed firms are efficient.

expanded framework is then used to discuss a concrete set of problems surrounding the role of labor in the firm ranging from the "labor-managed firm" system (in which tradable capital value residual claims [common stock] are legally prohibited), and the codetermination and industrial democracy movements (in which management participation by labor is required by law), to cooperatives and professional partnerships (i.e., quasi-labor-managed firms which arise out of the voluntary contracting process), and the capitalist corporation.

## II. The Production Function Redefined

In Jensen and Meckling (1976, p. 310) we argue that most organizations such as the corporation are simply legal fictions which serve as a nexus for a complex set of contracts among individuals. Suppliers of inputs (labor, raw materials, capital, etc.) along with consumers of the product implicitly or explicitly enter into a set of contracts which delineate the rights and obligation of the respective participants in the activities of the organization. Moreover, the very notion that inputs are "supplied" already implies the existence of a system of "rights" in resources. In most cases the police powers of the state are available to enforce the rights and the contracts or impose penalties for violation of rights or noncompliance with contracts. Since such sets of contracts specify the disposition of rewards and costs arising out of the organization's activities, they are important in determining the behavior of the participants and thereby the behavior of the organization as a whole. In particular, in the case of the firm, the nature of the rights and the contracts effects output. This in turn means that the production function of the firm depends on the specification of rights and the laws or rules of the game governing contracting. The maximum attainable output of a firm is then *not* purely a matter of "physical" possibilities given the technology and knowledge; the production function depends on the contracting and property-rights system within which the firm operates. In a world in which the rules of the game prohibit certain kinds of contracts, for example, limited liability for investors, or the issuance of tradable residual claims on cash flows, production functions will reflect those prohibitions.<sup>1</sup>

All of this can be summarized more formally by representing the

1. At the Conference on the Effects of Labor Participation in the Management of Business Firms in the Western World, Armen Alchian pointed out to us that a parallel problem exists in defining utility functions, i.e., that the utility function is conditioned on the set of rights associated with the goods that enter the function. The utility of a good depends on the uses to which the good can be put, and those uses depend on the structure of rights. For instance, can I make wine out of "my" grapes as well as eat them, and can I drive "my" car at speeds in excess of 55 miles per hour. The content of the word "my" is ultimately a question of rights, as the "owners" of domestic oil and Lee Marvin can testify.

production function of the firm as  $Q = F_{\theta}(L, K, M, \phi; T)$  where  $Q$  is the quantity of output;  $L$ ,  $K$ , and  $M$  are, respectively, the labor, capital, and material inputs;  $T$  is a vector describing the state of knowledge and physical technology relevant to production;  $\phi$  is a generalized index describing the range of choice of "organizational forms" or internal rules of the game available to the firm given  $\theta$ ; and  $\theta$  is a vector of parameters or characteristics describing the relevant aspects of the contracting and property rights system within which the firm exists. The symbol  $F$  denotes a family of production functions whose members differ according to the characteristics  $\theta$  of the rights system, and  $F_{\theta}$  denotes a particular member of this set. Ignoring uncertainty,  $Q = F_{\theta}(L, K, M, \phi; T)$  represents the boundary of the actual output opportunity set of the firm in a rights system described by  $\theta$  which has available to it technology denoted by  $T$ , chooses an organizational structure  $\phi$ , and utilizes inputs of labor, capital, and materials of  $L$ ,  $K$ , and  $M$ .

The rights structure,  $\theta$ , is taken to be exogenously given to the firm by the political, social, and legal system within which it exists. It summarizes the external rules of the game, including not only illegal actions (both statutory and regulatory) and the penalties associated with their violation, but also the types of voluntary contracts and organizational forms which the powers of the state will be used to enforce. This exogenous rights structure,  $\theta$ , defines the set of potential organizational structures,  $\phi$ , available to the firm. The characteristics of the organizational structure or internal rules of the game which define the elements of  $\phi$  include such parameters as partnership or corporate form, divisionalized cost or profit centers, the degree of decentralization, whether to own or lease equipment, the nature of compensation plans (including profit sharing and incentive systems), unionization, conditions of employment, the nature of contracts with suppliers and customers, and so on.

Formally defining the production function in terms of  $\theta$  is a way to recognize through  $\phi$  (the internal rules of the game) the effects of the external rights structure on output. It is of little importance to know that it is *physically* possible to produce 100 units of a good with some given level of factor inputs if no one in the system has the incentive to do so (that is, can make himself better off). The rights and organizational structures,  $\theta$  and  $\phi$ , play an important role in motivating self-interested and maximizing individuals to achieve the physically possible output. For some purposes, such as the analysis of socialized firms, nonprofit organizations, and cooperatives, this characterization of the organization and its production function is a useful analytic framework.

The dependence of firm production functions on the organizational and rights structures is also important in the discussion of labor-managed firms, the codetermination movement in Europe, and the

“industrial democracy” movement in the United States. Section III focuses on the definition of these terms and a summary of the major policy issues involved. Section IV contains a detailed and critical discussion of much of the literature on the economic theory of the labor-managed firm. That discussion is an application of a subset of the general organizational issues raised above. Section V discusses the major operational example of the labor-managed firm—the Yugoslav labor-managed firm. Section VI discusses a more general set of organizational forms in the context of the theory developed in Section IV. Attention is given here to some characterizations of prototype organizational forms such as the Soviet-type firm, cooperatives, professional partnerships, and, finally, the codetermined firm. The purpose of Section VI is (1) to provide a somewhat wider perspective on alternative organizational forms which help us to understand better the traditional capitalist firm, (2) to provide some qualitative evidence (from the nature of cooperatives and professional partnerships) on the theory developed in Section IV, and (3) to stimulate others to view these organizations in a somewhat different light and to motivate additional work aimed at increasing our understanding of them.

### III. The Codetermination and Industrial Democracy Movements

The movement toward so-called “industrial democracy” is currently receiving much attention in Western Europe. Legal developments there are institutionalizing it in two forms. First, firms are being required to seat voting labor representatives on their policymaking boards—a movement hereafter referred to as codetermination. Second, various new legal constraints are being imposed on the rights of management and owners of firms to make decisions, for example, on their right to dismiss or lay off employees, their right to modify production processes, and their right to close plants. These “management rights” which are being constrained (as well as the right to organize corporations without labor representation on the boards of directors) are all specific examples of the general right of individuals to voluntarily enter into contracts. Before turning to an analysis of the effects of the contractual environment imposed on firms by the state (which is what industrial democracy is all about), we discuss some often ignored facts about organizations which have relevance for codetermination. We believe these facts constitute important evidence to be reckoned with in any discussion of this subject.

In most Western nations there is no prohibition against the development of firms which have labor representation on the boards of directors. Indeed, labor can start, and in rare cases has started, firms of its own. Moreover, firms are free to write any kind of contracts they wish with their employees. If they choose to, they can offer no-dismissal,

no-layoff contracts (tenure at universities). If they choose to, they can establish worker councils and agree not to change production methods without worker approval. Moreover, employers would establish such practices if the benefits exceeded the costs.

Furthermore, if laborers value the security and "self-realization" which such participatory contract arrangements afford them at more than their costs to the employer, they are in a position to offer voluntary exchanges which it will pay the employer to take. Again, one would expect to see such arrangements emerge voluntarily unless the contracts are forbidden by law. Since (with minor exceptions) these arrangements are not observed,<sup>2</sup> we infer that workers do not value the security, management participation, "self-realization," etc., at more than the costs of providing them.

Indeed, we infer from what is going on in Europe that industrial democracy can only be brought into being by fiat. We observe there the enactment of laws which specify that stock companies cannot exist unless 50% of their supervisory boards are labor representatives, or laws which say that such firms cannot lay off workers without the approval of workers' organizations, etc. A striking fact about industrial democracy is that it cannot be effected on any significant scale voluntarily. Without fiat, codetermination would be virtually nonexistent. Given a choice, potential investors will not voluntarily put their wealth in the hands of codetermined firms; and this includes labor itself, even though many unions in the United States could easily do just that by buying entire companies with their pension funds.

The fact that this system seldom arises out of voluntary arrangements among individuals strongly suggests that codetermination or industrial democracy is less efficient than the alternatives which grow up and survive in a competitive environment (i.e., one where organizational alternatives are on all fours legally). Of course, it is always possible that the frailty of industrial democracy is due to some "deficiency" which arises when individuals are given broader freedom in choosing organizational forms, but it seems reasonable to place the burden of proof on proponents of codetermination in this exercise.<sup>3</sup>

2. The closest things to exceptions are professional partnerships (law, accounting, etc.) and cooperatives. The latter have never been very important and the former are limited to specialized service industries. These institutional forms are discussed in more detail below.

3. What little factual material known about the experiences with codetermination in Europe is largely due to the efforts of organizational psychologists. In addition, their work has completely dominated the reports of the various official commissions (German, English, and Swedish) responsible for studying the subject (see Biedenkopf 1970: *Bulletin of the European Communities* 1972, 1975; Batstone 1976; *Bulletin of the Press and Information Office* (Germany) 1976; Davis 1976; Martin 1976). Unfortunately, their results are not very useful in attempting to assess the social consequences of codetermination. They have tended to focus on how codetermination affects decision processes rather than on how it affects human welfare; whether, for example, labor representatives

This is especially important in view of the simple alternative hypothesis which can be advanced for codetermination, namely, that it is another case of a powerful special interest group using the political system to effect a wealth transfer from others to themselves (see Jensen and Meckling [1978] for a general exposition of this view of the political system).

The proponents of codetermination (including the official commissions nominally set up to study the question) have a delicate problem with the case they present. On the one hand, they want to reassure those who worry about the impact of codetermination on the rights of stockholders; on the other hand, they want to argue that codetermination bestows substantial benefits on labor. It is difficult to be on both sides of that fence simultaneously. If codetermination is beneficial to both stockholders and labor, why do we need laws which force firms to engage in it? Surely, they would do so voluntarily. The fact that stockholders must be forced by law to accept codetermination is the best evidence we have that they are adversely affected by it. But the evidence is not limited to this fact. Firms in the "Montan" industries<sup>4</sup> in Germany tried to escape the more extreme codetermination requirements which applied there after World War II by changing their organizational structure and activities. The practice was widespread enough to induce the government to enact a series of special laws (the so-called "Codetermination Protection Acts") to prevent avoidance. There is also evidence that under the less-than-parity<sup>5</sup> codetermination laws which prevailed outside the Montan industries in Germany prior to 1976 firms often created "executive" committees with review and

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end up being ineffective as agents for their constituency because they lack knowledge or because of legal sanctions; or whether the important decisions are in fact made by the supervisory boards. Their focus on organizational process leads them to rely on opinion surveys and informal discussions for evidence as to the impact of codetermination. They have shown little interest in the welfare effects of codetermination, i.e., what happens to economic growth or how codetermination affects costs, the rate of innovation, capital formation, and the like. Indeed, they have shown little interest in measuring the short-run impact on the welfare of workers. In industries and in countries where "codetermination" has been prevalent there has been little effort to measure the effect (if any) on the pecuniary and nonpecuniary aspects of employment.

While it is difficult to characterize accurately the views of a group by citing a single source, the following seems to us to be a fair statement of the position taken by the organizational psychologists writing on these issues: "In sum, then, a consideration of the European experience of worker representation at board level suggests that, to be even marginally effective as a meaningful form of industrial democracy, workers require parity representation on a meaningful board, a formal recognition of their link with trade unions, and a less restricted notion of board secrecy. Without such conditions worker directors are trivial in democratic terms. Even with such conditions the European experience suggests that conventional business interests will not be endangered" (Batstone 1976, p. 43). In brief, they take industrial democracy as desirable per se, and their primary concern is whether existing laws effectively bring it about.

4. Mainly mining and steel.

5. "Parity" is used in these circles to refer to equal representation on the board of directors for both workers and stockholders.

decision-making responsibilities from which labor was deliberately excluded. This evidence suggests that those who argue that codetermination either benefits stockholders or is innocuous have a difficult task in making their case.

#### IV. The Economics of the Labor-managed and “Pure-Rental” Firm

##### A. An Overview

Research on the “theory of the labor-managed firm” which is relevant to the codetermination issue has been receiving attention recently in the economics profession. Labor-managed and codetermined firms are two very different types of organizations. But if we can explain the behavior of the labor-managed firm it will help us to say something about codetermination. Along the spectrum of potential firm organizational structures the private corporation lies on one side of codetermination and the labor-managed firm lies on the other. Understanding how those two function allows us to bound the performance of the firm under codetermination. Unfortunately, with the exception of the work of a few individuals—like Pejovich and Furubotn—this “theory of the labor-managed firm” is not very helpful. Much of the economic literature on the labor-managed firm suffers from failure to specify clearly the institutional arrangements which the authors have in mind. The use of the modifier “labor-managed” to describe whatever it is they have in mind itself raises semantic problems because it focuses attention on only one aspect of the institutional milieu. Labor-managed cannot mean that labor owns the firm in the traditional sense, that is, it cannot mean that tradable residual claims on the firm are held by employees. If that is all it means we are back to the traditional profit maximizing firm. What the term “labor-managed” really means is that the models being used presume there are *legal prohibitions* against the existence of tradable residual claims on the entire sequence of future cash flows generated by the firm (what we usually think of as common equity).

Economists’ attempts to analyze labor-managed firms have generally taken the form of comparisons between the behavior of labor-managed firms and traditional firms.<sup>6</sup> These are not comparisons of the empirical results of alternative structures of the firm; instead they are comparisons of alternative theoretical models. What renders most of these efforts unproductive is the almost universal tendency in the modeling

6. Such comparisons can be found in Ward 1958; Domar 1966; Oi and Clayton 1968; Pejovich 1969; Vanek 1970, 1971, 1974; Maurice and Ferguson 1972; Meade 1972, 1974; Jan Vanek 1972; Furubotn and Pejovich 1973; Dreze 1974, 1976; Furubotn 1976; Steinherr and Vanek, 1976. For other discussions of relevance to the labor-managed firm and the codetermination movement, see Atkinson (1973), *Economist* (1976); DeVany (1977); Henderson (1977), Ryden (1978), and Shenfield (1978).

to ignore precisely those institutional factors which are most crucial for the comparisons.

In our analyses of the labor-managed firm below we criticize the claim that labor-managed systems are efficient. Many of our criticisms revolve around the fallacious assumption that the actual outcomes of the system are solely a function of physical production functions, and that these production functions are independent of the contracting and property-rights structure within which the firm exists. The analysis leading to the efficiency claim ignores the importance of the organizational arrangements and the structure of rights in providing the appropriate incentives for people to realize the productive opportunities offered by the purely physical laws of production. In the analysis to follow we focus on what we believe are the crucial factors which determine incentives and thereby govern human behavior under alternative economic systems.

## B. Pure-Rental Firms

The economics literature dealing with the so-called labor-managed firm has generated a special kind of labor-managed firm (or more accurately, a kind of economy) for which there is no real world counterpart. On page 402 Meade (1972) provides what is perhaps the best definition of a labor-managed firm when he summarizes Vanek's (1970) structure as:

. . . a system in which workers get together and form collectives or partnerships to run firms; they hire capital and purchase other inputs and they sell the products of the firm at the best prices they can obtain in the markets for inputs and outputs; they themselves bear the risk of any unexpected gain or loss and distribute the resulting surplus among themselves, all workers of any one given grade or skill receiving an equal share of the surplus; their basic objective is assumed to be to maximize the return per worker. . . the workers may be hiring their capital resources either in a competitive capital market fed by private earnings or else from a central governmental organization which lends out the State's capital resources at rentals which will clear the market.<sup>7</sup>

Although the term is ours and not one common to the literature, we think it better to describe this structure as a *pure-rental* system to

7. This quote from Meade provides an example of how writers on this subject gloss over the fact that what really characterizes these economies is a prohibition against other kinds of firms. An accurate statement would read, "A system in which *the only kind of organization legalized* is one in which, etc." While we are critical of Meade, his work certainly represents some of the better analysis in this area which is not couched specifically in the property rights framework.

emphasize the crucial nature of the system. Individual firms in this economy are the product of private initiative. Individuals are permitted to own full rights in durable productive assets, that is, to have claims on the revenue from productive resources and to have rights in deciding how those resources are to be used. Moreover, such rights are transferable in whole or in part to other individuals. What is unique about the pure-rental economy is that *firms* are forbidden to hold claims or rights in durable productive resources like those held by individuals.<sup>8</sup> Firms can, however, secure temporary use rights in such resources by renting them from the individuals who hold the “full” claims on them. All claims on the firms themselves are held by employees, but there is no market for these claims; that is, employees have claims on current net revenues which they cannot sell to anyone else because eligibility for claims is conditional on employment, and the right to become an employee is not legally for sale. What this effectively does is to ban the existence of common stock claims on the firm as we know them in the traditional capitalist firm. In the pure-rental firm hiring is controlled by management; somehow in the interest of the workers as a group (e.g., by maximizing net revenue per worker).

The rather peculiar institutional construct of the pure-rental firm has been generated in order to satisfy two conflicting objectives—on the one hand to create an analytical model which countenances private claims, private initiative in the creation of firms, and private markets, but on the other hand to restrict decision-making authority in the firms to the employees. The latter, of course, is the sense in which such firms are labor managed.

Within the context of this pure-rental firm Ward (1958), Domar (1966), Vanek (1970), Maurice and Ferguson (1972), and Meade (1972) purport to demonstrate a number of propositions, the more important of which are:<sup>9</sup>

PROPOSITION 1. Given costless entry and exit of new firms, perfect competition, perfect mobility of factors, and constant returns to scale, the long-run equilibrium of the pure-rental or labor-managed firm and industry is Pareto optimal in the same sense as the traditional firm and industry.

8. An alternative model sometimes postulated is one in which all claims on producer assets are held by a “central government organization which lends out the State’s resources at rentals which will clear the market.” There is no analysis or even a structure presented which implies that this rule would actually be used by a government agency if it were given the power to allocate producer assets. Our theory suggests that such a result is highly unlikely, and there is overwhelming evidence from the behavior of political systems around the world which is consistent with that theory. This perfectly functioning government organization is an excellent example of the Nirvana fallacy pointed out by Coase (1964) and Demsetz (1969).

9. See Meade (1972) for a lucid summary and “proofs” of these propositions as well as others.

PROPOSITION 2. In the short run when capital is fixed and the firm is not constrained by the supply of labor, an increase in industry demand leads the labor-managed firm to reduce its output and employment.<sup>10</sup>

PROPOSITION 3. In any given monopolistic situation the labor-managed firm will restrict output more than a comparable traditional firm.<sup>11</sup>

If true, Proposition 1, the Pareto optimality of the pure-rental or labor-managed system, is a surprising result. However, it is incorrect for a number of reasons, and we discuss the major ones in the remainder of this section.

### C. The Importance of Free Entry

As Meade (1972) emphasizes, Proposition 1 above depends in a crucial way on the assumption of costless formation of new firms and a smoothly running system of free entry into any endeavor. Proposition 2 says that all single-product labor-managed firms will have negatively sloped short-run supply curves. A price-increasing shift in demand will cause firms to *contract* their output and release labor rather than the usual expansion predicted for the traditional firm. In the short run this moves the labor-managed firm away from a Pareto optimum.

Suppose we start from an initial long-run equilibrium in which the value of the marginal product of labor is equal to the average earnings in each of the firms and equal across firms in industry A and all other industries. An increase in demand for the product of A leading to an increase in the price of A's product raises the value of the marginal product of labor and capital in each firm and the average earnings per worker. Since every firm is assumed to be maximizing the average earnings per worker, their reaction is to cut back on employment to raise the value of the marginal product of labor up to the average earnings per worker and thus increase the average earnings even further.<sup>12</sup> Furthermore, the value of the marginal product and average

10. This result requires the assumption that in the short run the cost of entry is infinite. On the other hand, Proposition 1 requires that entry is costless in the long run. The multiproduct firm will in general increase the output of the product whose price is risen but will reduce the output of all other products and will reduce the quantity of labor demanded so that on net the firm's labor force will fall.

11. To see this, recognize that at the traditional monopoly solution profits are at a maximum. Therefore an infinitesimally small reduction in labor input will cause a small reduction in output and no change in the level of profits but will cause an increase in average labor earnings (the ratio of "profits" plus wages to number of employees). Therefore, it pays the members of the labor-managed firm to restrict output below that of the usual monopolist (see Meade 1972, 1974).

12. The literature on the pure-rental firm generally says little or nothing about adjustment on the capital side. What is particularly troublesome is how newly formed firms induce production of new capital to accommodate increased demand. If the demand for capital rises, capital-goods-producing firms will want to contract output rather than expand it, and it is not easy to see in this case how newly formed capital-producing firms can come into existence to save the analysis, since they, too, will have to get capital somewhere.

earnings per worker in industry A are now greater than in all other industries. This situation is nonoptimal and can be corrected only by the formation and entry of new industry A firms.

It is argued that new firms will be made up of the unemployed from industry A (who were laid off because of the increased demand) and workers from other industries who now earn less than those in industry A. Entry continues until all released labor in industry A is employed and until the average earnings (and therefore value of the marginal product) of labor is again equalized across all industries. The result is a Pareto-optimal solution which satisfies all the marginal conditions familiar to the perfectly competitive capitalist industry.

Thus the competitive adjustment process through entry plays a vital role in bringing about optimality in the labor-managed economy. Given this, it is noteworthy that its advocates have spent little effort analyzing or developing a theory of entry within the labor-managed structure. We return to this issue below after discussing a number of basic issues associated with the labor-managed structure which imply that there is considerable difficulty with entry in this system.

#### D. Optimal Contracting and Rental versus Ownership

Dreze provides an even more recent example of the analysis of the pure-rental version of a labor-managed economy (one in which all capital goods are rented):

For our purposes here a labor-managed economy is an economy where production is carried out in firms organized by workers who get together and form collectives or partnerships. These firms hire nonlabor inputs, including capital, and sell outputs, under the assumed objective of maximizing the welfare of the members, for which a simple proxy is sometimes found in the return (value added) per worker. The capital can be either publicly or privately owned. To permit easier comparison, I will base this presentation on private ownership. [1976, p. 1125]

Again, we have a system in which firms are implicitly prevented by law from having "ownership" of durable productive assets, but individuals (in Dreze's "private ownership" case) are allowed complete ownership rights in capital assets.

There are many reasons why the rental of durable productive assets is not a universally observed practice in systems where both ownership and rental are allowed. Alchian and Demsetz (1972) discuss some of the conditions under which the rental of such assets will be dominated by outright ownership. We prefer to think of these problems in the framework of the agency problem as discussed in Jensen and Meckling (1976). In those cases where the agency costs (defined as the sum of the monitoring and bonding expenditures plus the residual loss) engendered by the rental arrangement are greater than the costs of outright

ownership, the asset will be purchased (if the law allows it). The obvious agency costs of the rental arrangement are those associated with the reduced incentives for the user to maintain the asset properly, to guard it from theft, and the increased incentives to misuse it. If the user does not bear the cost of improper maintenance, etc., and if his behavior cannot be costlessly monitored, he will have less incentive to care for it optimally. The magnitude of these costs along with the monitoring and bonding costs that would be incurred in an effort to control them explains why rental or leasing of most durable production goods is not observed. It is simply a more costly contracting arrangement. Ignoring the agency costs of alternative contractual forms in comparing two systems where the only difference between the two is the contractual form allowed is unlikely to shed light on the major issues. But Dreze as well as most others writing on the topic does exactly this. In his summary paper on the subject he states:

On the assumption that production possibilities are the same under profit maximization and under labor management, the following propositions are readily established (Dreze [1974]): (i) With every labor-management equilibrium, one can associate a vector of salaries such that the given allocation, the given prices, and these salaries, together, define a competitive equilibrium. (ii) The set of allocations that can be sustained, under suitable redistribution of initial resources, as competitive equilibria and as labor-management equilibria, are identical and coincide with the set of Pareto optima.

In other words, maximizing average value added gross of wages, or maximizing total value added net of competitive wages, leads to the same general equilibrium solutions. . . .

The propositions are useful in establishing the compatibility of labor management with efficiency. Conditionally on equilibrium, they establish compatibility of labor management with profit maximization, within a given economy or even within a single firm. The propositions also permit reliance upon the more developed theory of competitive economies to study such questions as existence, uniqueness, stability, and continuity of labor-management equilibria. [1976, p. 1127]

These conclusions (which are just Proposition 1 in the general equilibrium form) cannot hold unless the optimal form of the voluntary contract in the free contracting traditional system is always rental and never ownership—an empirical conjecture which is easily rejected by observation of the world.

#### E. Major Flaws in the Pure-Rental and Labor-managed Firm Structure

The special characteristics of the claims which individuals and firms have on producer assets in the pure-rental or labor-managed firm economy are the keystone to analyzing how those economies would

function. We concentrate here on five major flaws induced by particular aspects of the rights structures in these economies and their implication for Pareto optimality. In brief, they are

1. The Impossibility of Pure-Rental: induced by the necessity for any firm to acquire intangible assets which by their nature cannot be rented.
2. The Horizon Problem: induced by the truncated (nonperpetual) claims on firm cash flows.
3. The Common-Property Problem: induced by the equal sharing of firm cash flows among all employees.
4. The Non-Transferability Problem: induced by the fact that workers' claims on firm cash flows are contingent on employment with the firm and are nonmarketable.
5. The Control Problem: induced by the specification of the political procedures within the firm by which the workers arrive at decisions and control the managers.

### 1. *The Impossibility of Pure-Rental*

Suppose for the moment that a group of workers decided to form a new firm. Advocates such as Dreze and Vanek have never made clear how this group is to obtain the funds for rental of the equipment, the design and engineering of products, the establishment of distribution systems and inventories, advertising of the product, training of the labor force, and so on. Reviewing this list the reader will notice that many of these things, unlike a production line or a blast furnace, are intangible and yet essential to the success of any enterprise. Economists like Dreze and Vanek who claim efficiency for the mandatory pure-rental system have never explained just how a group of workers can go about "renting" these intangible organizational factors which oftentimes represent a major component of what is generally called "capital."

It is literally impossible to effect period renegotiable price contracts to "rent" intangible items. Since by their very nature intangible assets cannot be rented, if these assets are to be obtained they have to be financed either through the personal contributions of the workers or through a pure financial claim (such as a "bond" or "stock" issue). But if they are obtained in either of these ways, the claims of the workers or the claims of the bondholders or stockholders represent investments. As investments, they run head on into the "horizon" problem (discussed below) pointed out by Pejovich (1969), Furubotn and Pejovich (1973), and Furubotn (1976), and the horizon problem ensures that the system will not in fact arrive at a Pareto-optimal allocation.

### 2. *The Horizon Problem and the Reduced Demand for Capital*

Once we recognize that it is in principle impossible to have a pure-rental firm we are left with analyzing labor-managed firms—firms

which have the following organizational characteristics: (1) Workers have the option of investing in the firm. (2) The firm can issue debt claims. (3) Workers have nontradable claims on the year-by-year residual cash flows contingent on employment.<sup>13</sup>

Consider the case in which resources are obtained from the workers either through direct contributions or through retention of earnings in the firm. Since by law there are no ownership claims on the pure-rental firm, the workers have no claim on the principal amount they "lend" ("give" is the appropriate word) to the firm as they would if they were to lend the same amount to a savings bank. Employees have claims on cash flows which are contingent on employment. The horizon employees want used in the investment decisions of the firm is their expected employment termination date. To the extent that this date falls short of the productive life of potential assets, employees will use truncated flows in choosing investment projects including, for example, the investments in intangibles at start-up. Only those projects for which the present value of the truncated flows exceeds the present value of the outlays will be taken. This reduces the number of projects which the firm takes; it rules out some projects for which the present value of the total stream of expected cash flows is positive.<sup>14</sup>

If the interest rate obtainable at a savings bank<sup>15</sup> (or through personal lending) is  $i$ , workers will require a rate of return on the firm's investments which is higher than  $i$  before they will "loan" to it as long as they perceive their tenure in the firm to be shorter than the life of the investment project. Suppose all individuals in the firm have identical horizons of  $N$  years, and let us restrict consideration for the moment to

13. There is an alternative to 1 and 2 as a way to raise funds, namely, through a state agency which obtains the resources either through taxes or borrowing. This alternative is in fact the Yugoslav solution and we discuss it below.

14. In principle, this problem could be solved or at least mitigated by entry of new firms made up of young workers (i.e., workers with longer horizons who would find it in their interest to take longer-run projects). For some projects, however (buildings, improvements to land, etc.), even their horizons would be too short. More importantly, there would be other real costs to that arrangement which would make it inefficient. There is no reason to believe that the youth population would have in its midst the optimal mix of skills and expertise required to organize and operate a new firm. In fact, there is every reason to believe this would not be the case. As existing tractor manufacturing equipment wears out, for example, we would expect it to be much less costly to replace that equipment in an ongoing tractor firm (with experienced personnel, etc.) than it would be to start an entirely new firm.

15. The existence of the savings bank per se is not crucial to this discussion. Even nondemocratic Yugoslav-type governments allow some individual wealth accumulation. They usually sanction private claims on productive consumer assets like precious stones, jewelry, art, antiques, fine china, tableware, and an array of what are usually referred to as consumer durables. These consumer assets represent nontrivial alternative investment opportunities with their own rates of return (pecuniary plus nonpecuniary) which workers weigh in deciding how much investment to make in the firm. Even these alternatives are not essential to the point at issue, however, since in their absence the relevant interest rate for comparison,  $i$ , is simply defined as the individual's own marginal rate of substitution between current and future consumption.

projects which have infinite lives with risks equivalent to the savings-bank investment and constant returns. In this situation the perpetual annual rate of return on investment,  $r^*$ , that leaves the workers indifferent between investing in the firm and investing in the savings bank at the annual rate is given by

$$r^* = \frac{i(1+i)^N}{(1+i)^N - 1} \quad (1)$$

where the right-hand side of (1) is just the reciprocal of the present value of an annuity factor at the rate  $i$ , for  $N$  years (see Pejovich 1969). Thus for  $i = 5\%$  and horizons of 1, 5, 10, or 15 years the workers required return on investment in the firm,  $r^*$ , is, respectively, 105%, 23%, 13%, and 10%. Furthermore, the problem is more general than this since projects in general do not yield uniform flows, and for equivalent-return projects those which pay off relatively more quickly will be most favored. Those projects which require long investment and development periods and whose payoffs occur far into the future are less likely to be taken. These effects are due to the absence of marketable claims on the future cash-flow streams, and they imply a reduction in the use of capital as compared with the traditional firm.<sup>16</sup>

It is worthwhile at this point to point out the full generality of this horizon problem. Economists who have analyzed these problems have never faced up to the fact that the real constraint on what the workers in a pure-rental or labor-managed firm can pay themselves as wages or perquisites (or more generally consume) at any point in time is the *net cash balance* available at that time. Therefore, the workers have strong incentives to behave in ways which maximize the near-term net cash flows of the firm. The tendency of economists to deal with a world in which all flows are uniform and perpetual masks this issue and along with it a set of serious problems. "Depreciation," for instance, is not a cash flow. In fact the maintenance of capital equipment or buildings is an investment decision itself. To the extent that today's workers can pay themselves higher salaries by reducing, postponing, or eliminating maintenance where the major negative effects on cash flows will occur in the future beyond their own horizons, they will be more likely to do so.

But there are many other ways in which workers can increase the near-term cash flows to the firm. They will prefer to borrow under

16. Jaroslav Vanek is successful in projecting the impression that he is open minded to many of the potential faults of the system he analyzes and advocates in his book. He also leaves the reader with the impression he has analyzed and explained away the potential problems. His comments on the horizon problem are: "The more or less philosophical problem arising from the fact that in the future over which the discounting operation is performed different individuals may be employed at different times we dispose of, as before, by postulating that all members of the labor-managed firm are equals, whether in time or space" (1970, pp. 296-97). Dreze (1976) never mentions the horizon problem.

conditions that place the repayment burden on future generations of workers; for example, by the issuance of long-term bonds with low coupons and no sinking-fund provisions. The cash proceeds from such borrowings can be paid out in wages or increased fringe benefits and therefore be consumed directly. Alternatively, to accomplish the same end the funds might be invested in projects whose near-term cash flows are high. In a similar vein, current workers have incentives to vote themselves large pension benefits which carry no funding provisions.<sup>17</sup> Current cash flows (and therefore worker payments) would not be reduced, and the full burden of the payment of the pensions would be shifted to future generations of the firm's workers. To overcome many of these difficulties we expect a myriad of legal constraints to be imposed by the political sector in a labor-managed system. In fact, as we discuss below, it is exactly these kinds of laws which have arisen in Yugoslavia—laws to control the aberrant behavior of the Yugoslav labor-managed firm.

### 3. *The Common-Property Problem*

In an important respect employees' claims suffer from a common-property defect. New employees acquire the same claims on cash flows as those already employed by the firm. This means that whenever investment is accompanied by additional labor old workers have to share with new workers the anticipated cash flows from past investments. Thus, the expectation that a new project will generate cash flows which have a positive present value to the *firm* will not be sufficient to induce the current workers to undertake that project.

Consider a one-period investment-decision model. Let  $C$  be the cash flow that would be generated at presently planned investment levels. If employment is  $E$ , each worker will receive  $C/E$  as his share of the flows. Let  $C^*$  be the cash flow that will be generated if the firm takes a new investment project involving employment of  $E^*$  workers. The project will be taken by the present workers only if

$$\frac{C^*}{E^*} > \frac{C}{E},$$

that is, only if the cash flow per worker rises.<sup>18</sup> This simple example illustrates the common property defect and also points up the symmetry of that problem. A subset of workers (those who do not lose their

17. We have plenty of evidence on this issue in the form of pension systems for government employees.

18. This result also holds directly if the flows  $C$ ,  $E$ ,  $C^*$ , and  $E^*$  are perpetuities. In the general multiperiod case with nonuniform cash flows, the present value of an individual worker's share in the cash flow generated by the new project must be large enough to reimburse him for the present value of the loss he suffers from having to share cash flows on past investments with new workers.

jobs) can make themselves better off by having the firm take a project which adds nothing to cash flows but simply decreases the number of workers. Indeed, they can also be made better off by “unprofitable” projects which decrease cash flows, so long as there is a proportionately larger decline in employment. Again, these incentives will tend to reduce aggregate welfare and prevent attainment of Pareto optimality.

#### 4. *The Nontransferability Problem: Monitoring and the Efficient Allocation of Risk*

The claims which workers have are not transferable, that is, they cannot sell their jobs. This fact has two important consequences for the operation of the firm: (a) the monitoring of management will be far less efficiently performed, and (b) employees will have serious “portfolio” problems which reduce their ability to diversify and therefore reduce their demand for capital.

a) *The monitoring problem.* There will be no market in which the value of the employees’ (common-property, truncated-flow) claims get capitalized and traded. Where such markets exist there are large potential gains to be made from ferreting out firms which are undervalued or overvalued. The mere existence of these potential gains leads to the development of specialists who make a business of analyzing the prospects for individual firms. One of their main interests will be in evaluating the management of the firms, and their management evaluations will be reflected in an impartial published measure—security prices. The existence of a well-organized market in which corporate claims are continuously assessed is perhaps the single most important control mechanism affecting managerial behavior in modern industrial economies.

Employees of the pure-rental firm will also have an interest in monitoring the performance of management, but no one in the pure-rental economy will have the same incentive to specialize in performance evaluation (monitoring) as exists in a corporate economy, because there is no way for any individual employee to capture more than a small fraction of the potential gains from such activities. It is therefore naive to believe that pure-rental managers will take the same pains as would corporate executives to seek out high-payoff new projects to weed out projects which have negative payoffs, to control waste and shirking, etc.<sup>19</sup>

A similar argument is made by Alchian and Demsetz (1972) who argue, for these reasons and others, that in order to reduce the costs of shirking, the monitor (i.e., manager) must be the residual claimant on

19. This point provides a good example of the subtle way that property rights structures or “rules of the game” influence human behavior and thus production functions.

the firm's cash flows. They argue therefore that this provides the incentive which leads the parties involved to adopt the entrepreneurial and corporate organizational forms which we observe. We agree with their analysis and recommend it to the reader.

*b) Portfolio problems.* When uncertainty is explicitly introduced into the discussion of the behavior of the pure-rental or labor-managed economy, great difficulties ensue. The nontransferability of employees' claims also means that employees face a serious constraint on diversifying their "portfolio." Vanek (1970) never mentions these issues in his book. Meade (1972, pp. 426–27) briefly points out the basic problem and hypothesizes that this is one of the reasons why voluntary labor partnerships occur primarily in occupations involving such labor-intensive services as lawyers, accountants, doctors, etc. Dreze (1976) summarizes the issues clearly and concisely, but arrives at some peculiar conclusions. We return to this below.

The basic problem with uncertainty in the pure-rental firm is that the worker's shares in the firm's cash flows would in fact be similar to nonmarketable finite lived shares of common stock.<sup>20</sup> The nonmarketability feature means that the workers cannot diversify their holdings across many different firms and assets. This leads to a non-Pareto optimal solution for two reasons:

1. There is no opportunity for specialization in risk bearing across individuals with different degrees of risk aversion and wealth, and therefore the resulting distribution of risk is inefficient.

2. The worker-investors are forced in the aggregate to bear risks which are in fact "insurable" by diversification. Therefore, there is an additional net deadweight welfare loss.<sup>21</sup>

The inefficiencies introduced by this nonmarketability problem do not end with these allocation effects. Both of these effects lead the participants to demand higher rates of return on potential investments, and this must result in a reduction in the demand for capital as compared with the traditional system<sup>22</sup>—again violating Pareto optimality. In addition these misallocations of risk will also affect the types of projects undertaken by the labor-managed firm. Those projects whose total variance of returns is large but whose "social risk" or "covariance risk" is small or zero (because they are independent of returns elsewhere in the economy) will tend not to be taken even though their expected returns are above the riskless rate. This also is non-Pareto optimal.

Dreze (1976) clearly understands these issues. He comments on a

20. We ignore here the horizon problem introduced by the finite life of individuals.

21. See Jensen (1972) or Fama (1976) for a survey of the literature on portfolio theory, the nature of risk, and the pricing of capital assets in a stock-market economy.

22. See Bailey and Jensen (1972) for an exposition of these points and how they affect the social rate of discount for governmental projects.

suggestion by Vanek (1974) that labor-managed firms be financed by a combination of bonds, negotiable shares of stock issued on the market, and nonnegotiable shares of stock issued to workers.<sup>23</sup> Considering the case where worker shares are identical (but nonnegotiable) with those issued on the market Dreze states (and we agree) that

Efficiency analysis of [this] case is straightforward. It is always desirable for a labor-managed firm to issue on the market shares representing 100 per cent of future output and to divide the proceeds of the sale among the workers, who may then allocate freely their income between current consumption and a diversified portfolio acquired on the stock market. The workers cannot gain from tying up part of their income in a risky asset that cannot be traded.

Furthermore, Dreze also mentions the implications of this for the management control issue:

In this simple model, where asset diversification by firms and future labor inputs are ignored, an efficient allocation of risk-bearing in private ownership labor-managed economies requires the organization of a stock market, so as to permit portfolio diversification. Given the existence of a stock market, efficiency of production decisions requires that control rights be vested with the shareholders.

It is worth emphasizing this last point regarding control. What Dreze does not mention is that, efficiency aside, it is highly unlikely that potential investor demands for the residual claims on a labor-managed firm would be large without some sacrifice of the control right by the workers. It seems to us unlikely that outside investors would voluntarily entrust their funds to a labor-managed enterprise in which the workers maintained complete control and the investors were allowed to hope that the worker-managers would behave in such a way as to leave something for them, the residual claimants.

Dreze (1976, pp. 1136–37) goes on to point out that in fact there is a basic and unavoidable problem associated with the “solution” which accomplishes an “efficient” allocation of risk between labor and capital. This “solution” is not compatible with appropriate production incentives in a decentralized environment. This is nothing more than the agency problem which we have written about extensively in Jensen

23. The nonnegotiability provision is required because without it voluntary exchanges by the workers of their shares and the reluctance of new workers to buy shares would soon result in a structure which would be identical with the traditional corporate form. Note also that the structure with labor owning nonnegotiable shares is very close to the codetermined firm—the major differences being the exact definition of the voting rights and powers attached to the negotiable and nonnegotiable shares.

and Meckling (1976). There, we define the concept of “agency costs” and use it to show how the conflict of interest between management and outside owners (a special case of the problem raised by Dreze) of the firm is resolved. When we take account of the fact that such costs are an inevitable by-product of joint activity by more than one person, both parties to the effort have the incentive to reduce these costs by the formation of the optimal form of contracts and the establishment of the socially (and privately) optimal amount of monitoring, bonding, and other control activities. To speak of the resulting solution as inefficient is to commit the Nirvana fallacy, and it is comparable with saying that a world in which iron ore does not jump out of the ground at zero resource cost is “inefficient.”

What is surprising is that after pointing out this “agency” problem (and without any analysis) Dreze (1976) concludes that there is a

need to reconcile the interests of both groups through some form of participatory decision making [p. 1137] [in which] both capital and labor [define] criteria for managerial decisions affecting the future incomes of both groups [p. 1136]. Tentative as this conclusion may still be, I regard it as providing theoretical justification for the participation of both labor and capital—whether it be publicly or privately owned—in decisions affecting the future of the firm and hence of its workers and capital owners. [P. 1137]

Ignoring the fact that Dreze is appealing to an unexamined alternative for a solution, we emphasize that neither he nor any other advocate of the labor-managed or codetermined system has provided any justification for why this participation does not arise as a result of voluntary contracting and why it must in fact be imposed on the respective parties by the force of law.

### 5. *The Control Problem*

Other than vague suggestions about the establishment of “workers’ councils” elected (somehow) by the workers, none of the advocates (or analysts) of the pure-rental or labor-managed firm have suggested just how the workers can or should solve the control problem. No one has specified a well-defined set of procedures for solving the decision-making problem within the firm when the preferences of the workers are not all identical. It is usually simply assumed that the workers will have a common set of preferences and that no conflicts will arise in translating these into operational policies at the firm level. For some purposes of analysis this can be a useful simplification, but if we are ever to develop a positive model of the behavior of a pure-rental or labor-managed firm and economy this is a crucial element. Unfortunately, this is essentially a political problem, and no one today has a

viable theory of such political processes. We postpone further discussion of this issue to Section V where we discuss the general problem in the context of the behavior of the Yugoslav-type firm.

#### F. The Difficulty with Entry in the Pure-Rental System

Recall the crucial role of entry in the establishment of Pareto optimality in the pure-rental system. In the short run the pure-rental firm will respond to an increase in demand with a *reduction* of output and employment (Proposition 2). The increase in output and employment of the affected industry is accomplished in the long run by the costless formation and entry of new firms into the industry. Thus, as discussed earlier, Proposition 1 depends in a crucial way on free entry.

In considering the entry problem it seems clear that, if the equal sharing of income provision among all workers is enforced,<sup>24</sup> the incentive for any potential entrepreneur to incur the necessary effort to start a new firm is substantially reduced. In the capitalist system the entrepreneur can capture all or a substantial part of the *present value* of the entire future stream of profits of his successful venture. This constitutes his reward for entrepreneurship and thereby creates the incentive for prospective entrepreneurs to incur the costs involved in building a new enterprise.

But what is true in the labor-managed environment? First, the entrepreneur does not legally obtain claim to the present value of the stream of earnings he creates for two reasons. (1) The common-property problem: He must share equally the fruits of the enterprise with all labor in the enterprise so he obtains roughly  $1/N$ th of the total increment in earnings his creation makes possible (where  $N$  is the average number of employees over his tenure).<sup>25</sup> (2) The horizon problem: He has no legal claim whatsoever to the incremental earnings stream created by the enterprise which continues beyond his own tenure with the firm. This reduction in the reward to entrepreneurial activity tends to reduce substantially the quantity of entrepreneurial effort supplied, and for any given level of social benefits to entry this tends to reduce the rate of formation of new firms in the labor-managed economy. In effect, the prohibition of private ownership of the capital value claims

24. The strictly egalitarian sharing rule must be abandoned to prove optimality. Instead, workers are given "shares" in the total earnings which depend on the quality and quantity of their labor. Exactly how these shares are in fact determined is never spelled out. What Dreze argues is that in principle it is possible to set these shares such that the usual marginal productivity conditions hold and this is the presumption used in the "proof" of Proposition 1 (see Dreze 1976, p. 1127). Without establishing the incentives which cause the firm to set the shares in exactly this manner, the proof is little more than a "possibility theorem." This issue is discussed in more detail in Section V.

25. This aspect of the sharing arrangement in fact amounts to forcing the entrepreneur to enter into a contract to share future earnings with future workers whose identities are unknown and for which he receives no compensation—a peculiar contract, to say the least.

on the future streams of cash flows to the firm drives a wedge between the social and private benefits of entrepreneurial activity and therefore drives the pure-rental and labor-managed economies away from a Pareto-optimal solution.

Vanek (1970) is the only advocate of the labor-managed economy who has attempted to face this issue. He devotes an entire chapter in his book to the "Entry, Expansion, and Exit of Labor-managed Firms," arguing at one point that the "government" will start new firms and turn their management and control over to the workers. He provides no analysis showing why bureaucrats or elected officials would (1) choose to start only those new firms where the expected risk-adjusted benefits exceed the costs, and (2) why if they start *any* firm they would find it in their interest to relinquish control of it. Vanek presumes, as do so many economists, that upon taking office the politician or bureaucrat goes through a metamorphosis—he sets aside his own tastes and preferences and concerns for his own welfare, adopts the "public welfare" as his objective function, and chooses among alternatives solely on the basis of the "public good." We know of no empirical evidence supporting this model of "political man."<sup>26</sup>

Vanek (Jaroslav) also argues that existing firms will foster, finance, and nurture the formation and entry of new firms—again ignoring the workers' own self-interest when it suffices to help solve a problem. Several chapters earlier he rigorously derives the negatively sloped supply condition of Proposition 2 based upon the self-interest of the firm's participants. He then passes off all of that analysis based on self-interest with the following assertion: ". . . the resistance to the creation of competing firms, which is so natural to the capitalist system, is mitigated in the labor-managed environment by the fact that the 'new competition,' socially, is nothing but part of the old working collective. As between parents and children, resentment of competition may turn into the pride in good performance" (1970, p. 236). He goes on to argue that yet another force bringing about entry is the "bee-swarm effect" (pp. 286 ff.). Apparently, this is meant to refer to the spontaneous collection of unemployed workers into firms after the fashion of a bee swarm in nature. We say "apparently" because after promising at several points in the book to "explain . . . more thoroughly" (p. 4) and to "substantiate" (p. 12) the "bee-swarm effect," Vanek gives the reader nothing more in his chapter on the topic than the repetition of the phrase (p. 286).

### G. The Choice of Working Conditions

Dreze argues that "competitive profit maximization does not imply an efficient choice of working conditions" (1976, p. 1130). His analysis

26. See Meckling (1976) for an expanded discussion of these issues.

leading to this conclusion treats the problem as one of “choosing a vector of semi-public goods.” However, the only limitation which prevents each individual laborer from obtaining the exact working environment he would prefer in the traditional competitive environment is whether there are enough other workers with tastes identical with his to make it profitable for some firm to specialize in producing its product with the preferred working conditions. Suppose enough workers value any particular set of working conditions so much that they would accept a wage reduction with a present value large enough to more than cover the costs of providing this set of working conditions. Given these circumstances, some profit-maximizing employer will discover that he can make both himself and potential laborers better off by offering them the “optimal” set of working conditions and a correspondingly lower wage.

Of course, if the homogeneous groups are individually so small that it does not pay employers to provide a complete variety of conditions, we are back in the usual public-good situation. But to call this inefficient is to simply ignore the costs associated with increasingly finer specification of the goods.<sup>27</sup> The competitive capitalist firm has the correct incentives to take account of these costs and thus generate an efficient solution. The labor-managed system might accomplish this same thing, it might do even better (if the costs were lower), or it might do worse. We do not know, and Dreze provides no analysis to eliminate our ignorance. Instead, he commits the classic Nirvana fallacy. He deduces that some system does not perform ideally (because some costs are not zero) and, proclaiming failure, appeals to an unexamined alternative as a superior solution.

## V. The Yugoslav-Type Firm—an Alternative Specification of the Labor-managed Firm

### A. A Spectrum of Organizational Forms

We concentrated in the previous section on a detailed analysis of the pure-rental firm which forms the basis for most of the analysis in the economics literature. In this section we analyze in some detail the characteristics of the Yugoslav version of the labor-managed firm—the major operational example of this phenomenon. The Yugoslav system differs in important ways from the pure-rental construct of the literature and an analysis of the differences is instructive. Before proceeding

27. This is exactly equivalent to why we cannot buy a Cadillac built exactly to our specifications at the same price as an “off the shelf” version. Furthermore, the additional costs that would be incurred in producing a tailored Cadillac fully explains why we are not now driving one. It isn’t worth it!

to this task, however, it is useful to point out that a number of interesting structures for firms exist, ranging from the Soviet firm to the private corporation. Six of them, arranged according to the degree to which the residual claims on the firm can be capitalized and sold by the claimants, are

1. The Soviet Firm,
2. The Yugoslav Firm,
3. The Pure-Rental Firm,
4. The Cooperative Firm,
5. The Professional Partnership,
6. The Private Corporation.

Except for the pure-rental firm which is purely hypothetical, we use these titles to characterize idealized firms or structures which roughly correspond to their popular prototypes (without attempting to be faithful in every respect to the actual complexities). We concentrate on the Yugoslav-type firm next and then go on to discuss in Section VI the Soviet-type firm, the cooperative firm, the professional partnership firm and, finally, the codetermined firm.

## B. Definition of the Yugoslav-Type Firm

The major difference between a Yugoslav-type firm and a pure-rental firm is that in the Yugoslav economy neither firms *nor individuals* are allowed to possess full ownership claims on productive assets. Each Yugoslav-type firm is permitted to set output prices and to decide what quantity it will produce. Existing firms, the state, and individuals can create new firms. Decisions within the firm are made in accord with legally prescribed political procedures. Workers elect a workers' council which appoints a manager. The authority to decide output level, output prices, and the organization of production is delegated to the manager.

While individuals are prohibited from having personal claims on the assets of any firm, the employees of firms are given a "communal" claim on current period "net revenues" which are determined by a set of accounting rules. Roughly speaking, net revenues are sales minus outlays minus depreciation. The workers' claims on net revenues are contingent on continued employment and are not transferable. Compensation plans are subject to state-set maxima and minima and are submitted each period (year) to a referendum of the workers. Net revenues can be retained in the firm and invested. Firms face a legal prohibition against consuming their capital assets, that is, they cannot generate net revenues for workers by using up the assets. The firm also cannot sell its assets and distribute the proceeds to workers. The state lends money to firms at prescribed interest rates.

### C. Problems with the Yugoslav-Type Firm

The Yugoslav-type labor-managed firm has all the defects of the pure-*rental* and labor-managed systems discussed in the last section plus some more. It is subject to all the difficulties associated with the horizon problem, the common-property problem, the nontransferability problem, the control problem, and the entry problem—and for all the same reasons. Except for the control problem, which we shall discuss in more detail here, there is little to be gained from repeating any of the discussion of the other problems.

The discussion of the Yugoslav-type system proceeds in three sections: (1) the control problem (or the worker vs. the worker), (2) the definition of net revenues (or the worker vs. the state), and (3) the savings-investment problem.

#### 1. *The Control Problem (or the Worker vs. the Worker)*

The Yugoslav-type rules assign a major role to a one vote per employee political process for decision making within the firm. Unfortunately, there is no generally accepted theory about how such political processes operate. Simple majority-rule models do not predict very well in the political sector at large. They cannot explain the mass of minority-interest legislation that gets enacted in Western democratic societies. Vote trading or log rolling (the formation of coalitions which constitute majorities) helps explain how some of this legislation can come about, but leaves us with the question of why particular coalitions are formed and are viable while others are not. The same problem arises in economics in a different guise, namely, our inability to explain what it is that determines union behavior. What is it that unions maximize?

Without a theory of political processes, it is difficult to put together a fully satisfactory theory of the Yugoslav-type firm. We have no good theoretical or empirical reasons for believing that the firm will actually behave as though it were maximizing the average income per worker. We know there are divergences of interests among employees of the firm; for example, that employees aged 60 and over will have a different time horizon from those under 30. When investment decisions are made, how are these conflicts of interest resolved? Such conflicts will be the rule rather than the exception. They will also be present in decisions about the nonpecuniary aspects of employment. If it is possible (as it actually is in Yugoslavia) to use part of the wage fund each year for community facilities—housing, sports arenas, hospitals, etc.—those decisions will also be a source of conflict.

It is worthwhile to reflect for a moment on why we do not expect these “political” factors to be such an important matter for concern

when predicting the behavior of the large capitalist corporation. The first is purely empirical—in fact, we observe private corporations behaving in ways which are consistent with value maximization and in very different ways from nonprofit organizations like universities and government agencies like the post office. Although we (Jensen and Meckling 1976) and others (especially Alchian and Demsetz 1972, Myers 1977, Fama 1978, and Smith and Warner 1979) have begun to develop a positive theory of the corporation, there is much we do not understand about the workings of the corporate form of organization. The unexplained problem, however, is not why the corporate form is so inefficient, but exactly the opposite—Why is it as efficient and robust as it is?

We believe that one of the reasons for the enormous success of the corporation with investors and workers and one of the major reasons it can be treated as a black box for many purposes in economics is because it severely restricts the opportunities for any individual shareholder or group of shareholders to reallocate wealth away from other shareholders to themselves. The proportional sharing rules which govern distributions and the fact that the nonpecuniary aspects of share ownership are usually either zero or small make it difficult to benefit some shareholders at the expense of others. If the manager decides to take an investment project which has positive net value all shareholders benefit, and the extent to which any individual benefits depends solely on how many shares he owns. There is, in other words, a clear-cut rule outside of the control of the manager or anyone else for determining how benefits are to be distributed.<sup>28</sup>

When the manager of the Yugoslav-type firm decides on investment projects, however, he will, if he wants to be reelected, have to consider how it will affect the election outcome. He certainly cannot be presumed to maximize net revenue per employee.<sup>29</sup> He will be led to consider the distribution effects which any investment will have on the welfare of workers. While we cannot with any confidence specify a model which yields an equilibrium for this process, we can say some things about the impact it will have. However the conflicts are resolved, it would be very surprising, indeed, if they brought the firm close to Pareto-optimal performance.

Meanwhile, the process is certain to impose costs. Workers will find it in their interest to organize and engage in various political activities within the firm. When new hires are to be made, those in control will want to see that the new employees conform to their tastes, or at least

28. For a discussion of how this problem is resolved among holders of different types of financial claims on the corporation, see Jensen and Meckling (1976), Myers (1977), Fama (1978), and Smith and Warner (1979).

29. Furubotn (1976) solves this problem by assuming that an original majority, all of whom have identical utility functions, maintains political control and the manager maximizes their utility.

can be induced to vote for their side. They will similarly want to force nonconformist employees out of the firm.

## 2. *The Definition of Net Revenues (or the Worker vs. the State)*

The desire on the part of the Yugoslav state to limit the kind of claims that individuals can have on producer assets leads to the flaws outlined above, and these in turn lead to a labyrinth of other problems. If the state grants the firms unlimited authority to decide the total compensation package each year, it will in effect be giving authority to the workers to "eat up the assets of the firm."<sup>30</sup> Employees would (with state blessings) be able to convert firm wealth into personal wealth via the annual vote on compensation.<sup>31</sup>

In an effort to prevent this practice the state lays down rules for computing the amount which will be available each year for distribution among employees and ordains that the firm must "maintain its capital." These rules define what we have called "net revenues."

Unfortunately, where REMMs<sup>32</sup> are involved, invoking rules is no guarantee that the intended purpose will be approximated. Workers will still have the incentive to convert firm wealth into personal wealth. This incentive, of course, exists in private corporations as well. The difference lies in the opportunity set facing workers in the two cases. In the private corporation management has an incentive to monitor the behavior of the workers to prevent such transfers. To the extent that managers fail, their failure will be reflected in stock prices for all to see, and stockholders and bondholders have incentives to monitor managers to prevent them from engaging in such transfers themselves. Since the management of the Yugoslav firm is responsible to and elected by workers, however, the management will have less incentive to prevent such transfers and it will be very difficult to tell whether they are doing so.

The dependence on accounting rules for limiting the annual wage package is particularly susceptible to manipulation. Accountants in the United States have struggled in vain for years to develop acceptable rules for computing income. This is the same problem faced by the Yugoslav state. Depreciation, for example, is a completely artificial and unreliable way to impute the cost of using assets. Moreover, insofar as accepted depreciation practices depend on experience, the

30. According to Jan Vanek, "The danger often referred to in Yugoslavia of the work collectivities 'eating up their factories' can therefore be seen not merely in its crude form of lack of maintenance and of replacement of physical assets, excess distribution and pilfering of resources forming the enterprise's circulating capital, but also in the more subtle form of greater or lesser depreciation of all assets in real terms through improper or inadequate operation of the enterprise" (1972, p. 220).

31. This does not mean that the workers would find it desirable to take all of the assets out of the firm, though those approaching retirement would want to do just that.

32. Resourceful, *Evaluating, Maximizing Man* (see Meckling 1976).

depreciation rules for the Yugoslav firm will in time simply reflect the fact that workers have an incentive to “consume” more of their equipment.

The opportunities for Yugoslav-type workers to avoid the constraints which the state tries to impose, however, go far beyond simply running down inventories, failing to maintain machinery, etc. Real difficulties arise over the opportunities which they have to transfer cash flows from the future to the present—opportunities to take actions which expand current cash flows in exchange for reducing future ones. Investment projects, for example, which yield cash flows that decline over time but can be financed by borrowing where the loan is repaid in level amounts will be attractive to the current Yugoslav-type workers. For the same reasons Yugoslav-type workers will welcome inflation, and they will not be interested in adopting LIFO (last in first out) for valuing inventories or in replacement costs for valuing fixed assets.<sup>33</sup> Neither will they find it desirable to capitalize R & D expenditures, or for that matter any cash outlay which can be construed as an expense. If they capitalize any items such as R & D, the law requires that they depreciate them *and* maintain their book value, and this would limit further potential withdrawals from the firm. Given the demonstrated ability of American accountants to get around many of the IRS, SEC, and various accounting-principles boards’ rulings, one can only presume that the Yugoslav Worker Accountants will prove to be similarly ingenious at mitigating the efforts of the state to constrain the workers’ current consumption proclivities.<sup>34</sup> In brief, models of the Yugoslav-type firm which simply assume that all of the constraints imposed by the state are effective will not be very successful in predicting actual behavior.<sup>35</sup>

33. Jan Vanek provides an example: “The balance sheet capital values of the worker-managed enterprises would have become utterly meaningless in the course of time, were it not for several general revaluations of fixed assets of enterprises, imposed on the economy by Government Orders or (later) special legislative enactments (amounting to approximately 17 per cent for each two year period, while a 60 per cent revalorization of assets was a part of the 1965 Reform)” (1972, p. 221).

34. Ward gives an example reminiscent of the voting habits of Chicagoans under the Daley Machine: “A phenomenon known as the ‘dead brigades’ (mrtvi brigadi) may have been an instance of this, *Ekonomska Politika* [1953, 2, 1034], Kardelj [1955, p. 487]. For example the coal mining concern mentioned . . . above might hire an unskilled worker for 6000 dinars per month, which would add 8100 dinars to the calculated wage fund, i.e., to labor cost in the accounting sense. This would substantially reduce accounting profits and hence the amount of taxation under the steeply progressive profits tax law. If the firm expected to make a fairly high level of profits, this could be to the monetary advantage of the ‘in-group’ workers even if the newly hired worker performed no work at all. From the above descriptions it seems that the dead brigades in fact had little to do. In some cases the dead brigades were in fact ‘dead souls,’ fictitious employees” (1958, pp. 584–85).

35. Furubotn (1976) assumes, for example, that the constraint imposed by the state on maintenance of capital is effective, and he takes the state definition of income as binding in the determination of the annual wage fund.

### 3. *The Savings-Investment Problem*<sup>36</sup>

Because there are no private rights in productive assets, however, the Yugoslav-type system will have a much lower level of voluntary saving and investment. Investment opportunities available to individuals will consist primarily of durable consumer assets such as art, automobiles, housing (unless socialized), antiques, precious stones, jewelry, fine china and tableware, and assets used in home production. Interpersonal lending (perhaps through the medium of a savings bank) provides the only alternative investment or savings alternative for the individual. Such "investments," of course, do little to increase the productive capacity of the economy and in general offer lower yields than producer assets.

In this situation the state must provide the productive assets if they are to exist at all. There are only three sources of resources to finance these assets: taxes (on both consumers and firms), borrowing (through debt issues and the establishment of a state bank), and the printing press (money). There are no forces based in the self-interest of the decision makers to determine the correct amount of savings and investment as in the pure-rental economy. The state must set the level of interest rates, and it will have very little information for use in doing so. In addition to all these problems the most difficult problem faced by the state is the establishment of the incentives to cause those demanding capital goods to reveal the correct information regarding the expected payoff and risk of each project and to cause those granting the requests to fund only the most desirable projects. The experience with state-financed activities throughout the world leaves us with little hope that these incentive problems are likely to be solved.<sup>37</sup> The result is that not only does the state have enormous problems in arriving at the appropriate level of investment, but it is also highly likely to misallocate it among projects.

## VI. **The Soviet Firm, Cooperatives, Professional Partnerships, and the Codetermined Firm**

### A. **The Soviet-Type Firm**

In this section we discuss the remaining organizational firms outlined above. The Soviet firm is of interest here mainly because it occupies one end of the spectrum of possible firms. It is an example of the extreme in eliminating individual rights in productive assets, and we briefly summarize the implications of that aspect of the Soviet institutional structure.

36. Pejovich (1969) also discusses these issues.

37. For example, consider the U.S. Post Office, the U.S. Army Corps of Engineers activities, and the English railroads.

In the Soviet economy neither individuals nor firms are permitted to have claims on returns generated by nonhuman productive resources or rights in deciding how such resources will be used. Even individual rights in human resources are severely restricted. Compensation policy is decided by the state; individuals are required to work and the state has the authority to assign individuals to particular occupations, firms, or locations. Each Soviet firm is a creature of the state responsible for carrying out some part of the central plan, much like an operating division of an independent firm. In the Soviet economy, production and distribution (what, how, how much, etc.) are centrally directed (Gosplan and/or the Central Committee). The terms of trade are fixed by the state. All decisions regarding the organization of firms (vertical and horizontal integration) and involving the creation, expansion, contraction or dissolution of firms or enterprises are made by the state.

Once the Soviet state has denied individuals and firms the right to claims in producer assets, it must, if it wants to avoid social chaos, take responsibility for the operation of the entire economy. It is a physical fact of life that uses of resources conflict with one another. The same axe cannot be used simultaneously to cut down two different trees; the same piece of land cannot simultaneously support the Empire State Building and serve as a pasture. Somehow, one or the other use must prevail. The social function of systems of individual rights is precisely to resolve these conflicts. The system of private rights specifies which individuals can do what, with what.

The Soviet alternative to individual rights is centralized decision making. Even if we ignore the overwhelming information requirements which have to be satisfied if central authorities are to set prices and output at Pareto-optimal levels in a Soviet economy,<sup>38</sup> we are left with a staggering problem of divergence between private and social costs. Since no one in the entire system, including the central authorities, has a claim on the capitalized value of productive resources, changes in the value of those resources brought about by "better" or "worse" uses of them are simply dissipated throughout the economy.

If the Soviet state literally limits rewards for productive activity to more or less egalitarian wages with a guaranteed minimum, workers and managers will be supremely indifferent about producing. This is why authorities in the Soviet-type state end up instituting "bonus schemes" (e.g., bonuses based on output) or, in cases like Yugoslavia, attempting to emulate the private firm with schemes like the labor-managed firm. In brief, even if the central authorities in the Soviet economy set all the "correct" (i.e., Pareto-optimal) prices (which they

38. Setting all prices and output centrally is such a huge task that in fact it cannot be done. See Roberts (1969) for a detailed discussion of these issues.

cannot) the system would not produce the corresponding optimal quantities of goods and services because individuals would not have the appropriate incentives. Thus the Soviet-type system has all the problems of the pure-rental and Yugoslav systems plus many more.

## B. The Cooperative Form

The cooperative is an institutional form which is a close relative of the pure-rental firm but is in certain respects distinctly different. The cooperative is of interest because it survives in societies where choice of organizational form is largely voluntary. It holds full claims on productive assets; unlike the pure-rental firm it has transferable use rights in assets. Like the pure-rental firm, the members of the co-op hold the claims on the cash flows, claims which are conditional on membership. Each member of the co-op usually has an equal claim in the assets and cash flows. In contrast to the Yugoslav-type firm, however, co-op members can if they wish sell off the assets of the firm and divide the proceeds among the membership. The co-op also differs from the private corporation in that it will admit new members without charge. In addition, the claims which co-op members hold are not individually marketable. The members elect a manager who hires the employees.

If membership in the co-op is open to anyone at a zero price, the cooperative suffers from the common-property problem just like the pure-rental and Yugoslav-type firms. It also suffers from the horizon problem, but this effect is to some extent mitigated by the fact that members can sell the firm either in whole or in part and distribute the proceeds among themselves.

The co-op also suffers from the nontransferability problem—but not to the same extent as do the pure-rental or Yugoslav-type firms. While the lack of a market for claims in the co-op creates some difficulty for workers in evaluating the performance of management as in the pure-rental case (the monitoring problem), this effect is mitigated by the opportunity for competitors to set up private firms in competition with the co-op. That is, competition in the establishment of organizational forms coupled with voluntary choice on the part of workers and capital suppliers regarding which organization they “join” will ensure that neither organizational form will be significantly less productive than the other—otherwise it would be driven out of existence.

While cooperatives arise and persist in societies characterized by freedom of choice in organizational form, they have never been a significant factor on the economic scene. Moreover, in the United States, at least, they are not labor managed. Members of the co-op are generally not employees, they are customers (consumer co-ops) or suppliers (producer co-ops). We hypothesize that one of the reasons

these forms of organization have arisen rather than the employee co-op (i.e., labor managed) is closely related to the second difficulty associated with the nontransferability problem—the portfolio diversification problem. Producer- or consumer-managed co-ops do not as a condition of membership directly tie the individual's labor income to a risky proportional claim on the residual flows of the firm. Thus, the individual's portfolio diversification opportunities are not limited to the same extent as they are in a labor-managed organization.

The list of organizations that generally fit under the rubric of "cooperative" is diverse and itself a separate subject for study. It includes mutual savings banks and mutual insurance companies, retail cooperatives, agricultural marketing cooperatives, and private clubs (e.g., golf, tennis, athletic, dining). The success of some of these is clearly due to special legal and tax treatment which they receive (or received at the onset). In other cooperatives, like the mutual savings banks and mutual insurance companies, the members "claims" on the cash flows of the firm are related to the size of the member's interest in the firm, that is, the claims are not equal across members. Others, like the private clubs, charge rather large initiation fees, and where memberships are limited, members can sometimes sell their memberships to new members with the approval of the club.

### C. Professional Partnerships

While little attention has been paid to them as a specialized organizational form, professional law, accounting, brokerage, and consulting partnerships in the United States are in important respects labor-managed firms. Partners generally hold claims on annual residual flows. These claims are usually nonmarketable, though some firms offer to repurchase them at stipulated prices upon retirement or death. Partnership is generally by invitation, and many of the employees, professional as well as nonprofessional, are not partners. The initiation of new partners is usually accompanied by a redistribution of claims, and new partners sometimes are required to pay a price for entrance into the partnership. Often, shares in net flows are decided on a year-to-year basis, taking into account the performance of each partner during the year in question.

The existence of these professional partnerships is interesting for a number of reasons. First, of course, is that they have survived the test of competition from alternative organizational forms in an environment where choice is possible. Therefore, they perhaps can provide us with some ideas and evidence regarding situations in which some variant on the labor-managed or participatory form of organization in fact dominates not only the corporate form but other alternatives as well.

The professional partnerships have many of the defects of the pure-rental system. To the extent that there is no charge for entry to the partnership and to the extent that the partnership shares are equal for each member they are subject to the common-property problem. However, these problems can be reduced somewhat by charging for entry to the partnership (as is done in some instances), by giving "newer" partners smaller shares than "older" partners, and by not giving partnership to all employees. Large law firms, for instance, not only do not grant partnership standing to all lawyers employed by the firm but generally do not grant partnership rights to any other employee—such as secretary, legal assistant, or other office help—and the same is true of accounting and consulting firms.

The professional partnership is also subject to the horizon problem. The difficulties arising from this defect can be mitigated to some extent by agreements to repurchase the partner's share upon his retirement from the firm at prices that reflect to some extent his share of the accumulated "capital stock." This apparently is done in some circumstances.

The control problem poses difficulties for the professional partnership for exactly the same reasons as for the pure-rental and Yugoslav firms. Close study of these partnership organizations can potentially lead to a much better understanding of how alternative internal structures help to reduce or amplify the costs from this source of conflict.

The nontransferability problem in principle also poses difficulties for the professional partnerships, although we shall argue below that the monitoring and diversification problems can be such in some industries that these aspects in fact provide a strong positive advantage for the partnership form. Meade argues that we will find labor-managed cooperative

. . . structures only in lines of activity in which the risk is not too great, and this means in lines of activity in which two conditions are fulfilled: first, the risk of fluctuations in the demand for the product must not be too great; and, secondly, the activity must be a labour-intensive activity in which the surplus accruing to labour does not constitute a small difference between two large quantities, the revenue from the sale of the product and the hire of capital plus the purchase of raw materials. This may help to explain why such labour partnerships as do exist are usually to be found in labour-intensive services, such as lawyers, accountants, doctors, etc. [1972, pp. 426–27]

Meade's argument makes sense if we believe that the standard deviations of percentage changes in revenues and costs are not strongly negatively related to the levels of these quantities. If the standard

deviations do not show strong negative relations to their levels, and if they are not highly positively correlated with each other, then as the labor value added as a percent of total cost falls the standard deviation of percentage changes in labor value added will increase—thus the portfolio problems will become more severe.

We also expect to find professional partnerships (or modified labor-managed systems) to be more successful in situations where the optimal production technology involves very little capital relative to labor. In these situations the inefficiencies arising from the horizon problem will be much smaller and so, too, will those from the common-property problem (although to a lesser extent). Casual observation seems to be consistent with this implication of the theory.

What are the possible advantages of the professional partnership organizational form? Alchian and Demsetz (1972) in their insightful paper on organization argue that “profit sharing” (as in our professional partnership) is appropriate in “team” (joint) production when the size of the team is smaller and when the cost of monitoring to prevent shirking among team members is larger. They argue that the monitoring issue becomes an even stronger force encouraging profit sharing when we are dealing with artistic or professional situations where an individual team member’s productivity is more difficult to relate to his observable behavior. Profit sharing will also tend to be more efficient when the team members themselves have a comparative advantage over an outsider in monitoring the behavior of other team members; profit sharing will increase each member’s incentive to monitor the productivity of his colleagues.

Finally, in circumstances in which a disproportionately large fraction of an individual’s wealth is represented by his human capital and when the cash flows on that human capital are highly uncertain from period to period we also expect to see profit-sharing partnerships arise. In such a situation it will be difficult for the individual to capitalize (sell off) a portion of his future labor income because of the effect such a sale would have on his incentives to produce in the future.<sup>39</sup> This itself is not sufficient to prevent such a sale. It is the combination of these incentive effects and the difficulty of devising monitoring or bonding arrangements to limit it that makes the sale uneconomic.<sup>40</sup> Under such circumstances, it is conceivable that some of the diversification effects could be achieved by a group of such individuals with less than perfectly correlated labor income banding together in a partnership-sharing arrangement. The desirability of such arrangements would clearly be enhanced if they were able to monitor each other at less cost

39. This phenomenon has been given the “moral hazard” label which carries with it some unfortunate moral connotations of no aid to positive analysis.

40. This is another example of the agency costs defined and analyzed in Jensen and Meckling (1976).

than an outsider and if there were any economies of scale to be gained from cooperation.

In summary then, it appears that the professional partnership form of labor-managed firms is more likely to dominate other organizational forms when

1. the capital/labor ratio is small,
2. the ratio of labor value added to all nonlabor costs is high,
3. there are economies of scale to team production,
4. external monitoring costs are high and/or the monitoring of the productivity of team members is more cheaply performed internally,
5. the size of the team is small,
6. the returns to the human capital of the individual team members are farther from perfectly positively correlated,
7. the agency costs associated with the capitalization of future labor income are high.

#### D. The Codetermined Firm

Efforts to analyze the behavior of the codetermined firm face a serious problem just getting off the ground. We do not have a theory that will tell us how supervisory boards will behave, or at least none in which we have any confidence. Even in the "parity" representation case the supervisory boards could end up behaving as if they represented only the stockholders. Given the German law, for example, where the chairman, who is elected by stockholders, has the deciding vote in case of ties and where one of the labor representatives is from the salaried ranks, it is possible that the stockholders will have complete control over the affairs of the firm. Certainly in the short run this is a reasonable prediction of how codetermination will work. In the long run, however, it is possible that codetermination will lead to the other end of the spectrum, that is, codetermination could end up effectively turning the firm over to labor.

If labor gets complete control of supervisory boards what will happen? Our prediction: It will likely turn into the Yugoslav-type system with state ownership of productive resources and all the problems of the pure-rental and Yugoslav firms. In brief, they will have (1) the horizon problem, induced by the truncated (nonperpetual) claims on firm cash flows; (2) the common-property problem, induced by the equal sharing of firm cash flows among employees; (3) the non-transferability problem, induced by the fact that workers' claims on firm cash flows are contingent on employment with the firm and are nonmarketable; (4) the voting problem, induced by the rule requiring one vote per employee in the political process for decision making within the firm; (5) the savings-investment problem, induced by the illegality of personal investment in productive capital goods and the

necessity for the state to set interest rates, choose projects, and supply all producer capital.

If the workers were to get complete control of the codetermined firm, the scenario leading to the Yugoslav-type firm is likely to come about in the following way. Upon gaining control of the firm the workers will begin "eating it up" by transforming the assets of the firm into consumption or personal assets through many of the procedures we discussed above in the context of the Yugoslav-type firm. As this continues and the process becomes clear to the capital markets the value of the stock will go to zero. It will become difficult for the firm to obtain capital in the private capital markets. As this continues some firms will simply go out of business and others will reach the point where the returns on investment are so high that even given the horizon bias further reduction in the capital of the firm makes the workers worse off. The result of this process will be a significant reduction in the country's capital stock, increased unemployment, reduced labor income, and an overall reduction in output and welfare. This state of affairs will lead to unfavorable international comparisons, outcries of outdated technology, foreign exchange problems, and a general clamor for state subsidies to capital accumulation to augment the "failures" of the private markets. As the state provides capital loans to firms it will impose additional controls to prevent the workers from simply transforming the new resources into consumption. These controls will take many of the forms discussed in the Yugoslav case; requirements for maintenance of the capital stock, maximum possible wage payments, etc. The final result will be fairly complete, if not total, state ownership of the productive assets in the economy. If there is a minimum size below which firms are not subject to the codetermination laws (2,000 employees in the case of Germany), many firms will simply shrink through dissolution or spin-offs to sizes below this level to avoid the laws. If the laws are not changed to include these firms in the codetermined sector the process will end there, with those firms for which economies of scale are very large being socialized and most of the rest of the economy remaining private but incurring the inefficiencies resulting from the diseconomies of small-scale operation.

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