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EDITED BY

Jeffrey Carpenter,
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REVIEWED BY

Larry Wigger,
University of Missouri-Kansas City,
United States
Romar Correa,
University of Mumbai, India

*CORRESPONDENCE

Gregory K. Dow
✉ gdow@sfu.ca

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The labor-managed firm, Herbert Gintis, and me

Gregory K. Dow*

Department of Economics, Simon Fraser University, Burnaby, BC, Canada

During 1990–96, Herbert Gintis co-authored an influential series of journal articles and book chapters with Samuel Bowles on the nature of the capitalist economy and the prospects for labor-managed firms (LMFs). Their theoretical model highlighted the lack of external contract enforcement in the labor and capital markets. Specifically, it is hard to have legally enforceable contracts about the effort of workers or the risks taken by borrowers. Hence, these relationships often rely upon contingent renewal, where the employer or lender offers an enforcement rent and threatens to end the relationship if unsatisfactory behavior is detected. The model suggested that LMFs would have advantages in the labor market but disadvantages in the capital market. Here I review the Bowles and Gintis model, compare it with research of my own, and conclude that the main empirical predictions about LMFs made by Bowles and Gintis have stood the test of time.

KEYWORDS

labor-managed firm, capital-managed firm, contested exchange, Herbert Gintis, Samuel Bowles

1 Introduction

Among his remarkably diverse contributions to economics, the other social sciences, and biology, Herbert Gintis helped blaze a new trail in understanding capitalism. This paper focuses on several articles and book chapters Herb published with Samuel Bowles during 1990–1996 (all the material to be discussed here was co-authored, and I will often abbreviate the authors as BG). These publications were influential at the time and still resonate today.

I will address two central subjects: how BG modeled the general workings of a capitalist economy, and how they explained the relative rarity of firms controlled by workers. Both have been prominent themes in my own work. Accordingly, in the process of describing the ideas of BG, I will take this opportunity to acknowledge some personal intellectual debts.

First, a brief note on terminology. When BG refer to a *democratic firm*, they mean “an enterprise whose management and administrative structure are chosen by the firm’s labor force using a democratic political process” (Bowles and Gintis, 1996a, p. 82). Elsewhere in the literature this is often called a *labor-managed firm* (LMF), and I will use that label here. As BG point out, an LMF may well have a hierarchical administrative structure. What matters is that ultimate control rights are held by labor suppliers, perhaps through a system in which elected worker representatives choose the firm’s top managers.

By contrast, a *capitalist firm* is “one whose management and administrative structure is determined by owners of the firm’s capital assets” (Bowles and Gintis, 1996a, p. 82). In these firms the ultimate control rights rest with capital suppliers, perhaps through a system where investors elect a board of directors that chooses the top managers. It will be convenient to call this a *capital-managed firm* (KMF), where the K reflects the standard economic notation for capital. BG often refer to power relationships and, in my terms,

this has a simple meaning: in a KMF the capital suppliers have the ultimate power to manage the firm, and in an LMF the labor suppliers have this power.

I first started thinking about how LMFs differed from KMFs, and why LMFs were rare in relation to KMFs, as an assistant professor in the early 1980s. I quickly came across Bowles and Gintis. Although their work throughout the 1980s was certainly of interest, in my view a turning point came with their 1990 *Politics and Society* article, which offered a comprehensive vision of capitalism as an economic system and showed how it differed from the Walrasian model that had dominated economic theory for decades.

The early 1990s were a period of ferment in the literature on labor-managed firms, with two major publications in 1993: a volume edited by Bowles, Gintis, and Gustafsson, based on a 1990 conference at the University of Uppsala (Bowles et al., 1993); and a survey article in the *Journal of Economic Literature* by Bonin, Jones, and Putterman. Both had much to say about why LMFs were rare, and by and large their diagnoses agreed (Bonin et al., 1993). With hindsight, these publications define a boundary between what can be called “the past” and “the present” of the LMF literature (Dow, 2018a).

Section 2 describes the theoretical framework of *contested exchange* developed by BG in 1990–1996. The crucial point is that in both labor markets and capital markets, it is impossible to contract on all aspects of an exchange and have this contract be enforced by a third party at zero cost. Instead, employers must extract effort from employees, and lenders must deter excessive risk-taking by borrowers, in ways that can be self-enforced. The most common way of solving this problem is *contingent renewal*: the employer (or lender) offers a wage (or interest rate) that remains available in future periods contingent on satisfactory behavior but ends the relationship if unsatisfactory behavior occurs.

Section 3 takes this idea and runs with it. In the 1990s, I began to wonder whether BG had gone far enough in assuming that contracts in labor or capital markets are incomplete. After all, they still assumed that wage rates could be enforced at zero cost as long as the employment relationship lasted, and that interest rates could be enforced at zero cost as long as the loan was renewed. But what if contracts were so incomplete that even these monetary transfers had to be self-enforced? What if employers or lenders could renege on their promises? In such markets every action (both the supply of inputs and the transfer of money among agents) would have to be self-enforced. This premise of *universal self-enforcement* led to models based on repeated games, and it added interesting wrinkles to the fabric of contested exchange.

During 1990–1996, Bowles and Gintis exploited the insights they derived from contested exchange in numerous papers discussing the advantages of LMFs and explaining why such firms did not tend to arise spontaneously in a capitalist economy. The short version is that LMFs have an advantage in the labor market but a disadvantage in the capital market, and the latter problem typically dominates. Section 4 will develop this argument.

Section 5 outlines my own solution to these puzzles. In several ways I follow the lead of BG, particularly in emphasizing the lack of third-party enforcement in labor and capital markets. However, I expand the list of market imperfections relevant for comparisons of

KMFs and LMFs to include adverse selection and collective choice. I also agree with BG’s observation that capital is *alienable* while labor is *inalienable*, in the sense that non-human assets are transferable to new owners while human assets are not. But relative to BG, I place more weight on the inalienability of labor and broaden the ways in which it could affect firm organization.

Section 6 concludes with an assessment of how well the contributions of BG to the LMF literature hold up today. Spoiler alert: they hold up quite well. Consistently with the arguments of BG, the literature has shown that LMFs are often at least as productive as similar KMFs and have survival rates at least as high. Furthermore, BG argued that worker wealth constraints and risk aversion were the principal barriers to LMF formation, and the empirical evidence supports these hypotheses. Both theory and evidence suggest that the problem for LMFs is not that they perform poorly once they exist, but that they are rarely created. This leads one to ask whether suitable policy interventions could improve on the prevailing capitalist equilibrium.

2 Contested exchange

Many readers will be familiar with Smith (1994) invisible hand argument for the social benefits of an economy in which individuals pursue their private self-interest. The modern version of the argument, the First Theorem of Welfare Economics, demonstrates that a *Walrasian equilibrium is Pareto efficient*. This assertion can be unpacked as follows.

First, all goods are assumed to be private goods, and individuals are concerned only with their own consumption. Public goods and externalities are excluded. Second, the set of markets is *complete* in the sense that there is a distinct price for each good or service someone might care about. This includes separate markets for different quality levels of the same physical good. All individuals know the quality levels involved, so there are no informational asymmetries. Third, all markets are *competitive* in the sense that individual agents do not perceive themselves to have any influence on prices. This rules out market power, such as monopoly or monopsony. Instead of directly choosing prices, individuals buy or sell their preferred quantities of goods, subject to budget constraints, given the prices established in the market. In a *Walrasian equilibrium*, these prices are determined by the requirement that all markets clear, so that supply equals demand for every good. *Pareto efficient* means that it is impossible to alter the allocation of goods in a way that makes everyone better off simultaneously.

Under these conditions, with a few other technical assumptions that need not detain us here, the First Theorem is a logical deduction where the conclusion follows from the premises. However, it does not necessarily describe any real economy. For a textbook presentation aimed at graduate students, see Varian (1992, chs. 17–18).

The theory of Walrasian equilibrium reached its apogee in the 1950s and 1960s. But in the 1970s, game theory and the economics of information introduced elements that departed from the Walrasian approach. This increasing focus on strategic behavior and informational asymmetries gave theorists the tools they needed

to move beyond a restrictive premise of the Walrasian framework: that all terms of a contract can be enforced at zero cost by an external party (generally interpreted as the state).

In the 1980s, several authors used asymmetric information and game theory to construct models in which labor or capital markets were non-Walrasian (Stiglitz and Weiss, 1981; Shapiro and Stiglitz, 1984; Bowles, 1985; Gintis, 1989). Often these models invoked *adverse selection* (where agents on one side of the market have private information about their own characteristics *before* contracts are signed) or *moral hazard* (where agents on one side have private information about their own actions *after* contracts are signed). The study of moral hazard is often called *principal-agent theory*. In other models, non-cooperative game theory was used to capture the idea that agents behave strategically when contracts are incomplete (MacLeod and Malcomson, 1989). With models of either kind, equilibria did not necessarily involve market-clearing: labor markets could exhibit unemployment, and capital markets could exhibit credit rationing. As a result, the inference of Pareto efficiency from the First Theorem had to be abandoned.

Bowles and Gintis (1990, 1993a) built on these developments in rejecting the Walrasian framework as a way of thinking about labor and capital markets in a capitalist economy. Here I focus primarily on Bowles and Gintis (1990), which includes algebraic derivations and longer discussions of the intellectual background. Bowles and Gintis (1993a) covers similar territory but is shorter and omits the algebra while sharpening some economic points. Bowles and Gintis (1993b) further elaborates the distinction between Walrasian and post-Walrasian economics.

Bowles and Gintis (1990, p. 167) define a *contested exchange* to be one where some feature of the exchange is not readily determined and enforcement of the terms of the exchange is carried out endogenously by the parties themselves. They assume that the key variable is an action taken by the informed party after a contract is in place, so their theory involves moral hazard rather than adverse selection and is closely related to principal-agent theory. For labor markets, this action is the effort of workers, which is hard for employers to observe. For capital markets, the action is the level of risk taken by borrowers, which is likewise hard for lenders to observe.

One fundamental contribution of BG was to stress that labor and capital markets shared a parallel departure from the Walrasian framework of external contract enforcement at zero cost. A second contribution was to argue that the most common solution to such problems is the same in labor and capital markets. In either case, the uninformed agent can offer the informed agent an *enforcement rent*, which is the difference between the present value obtainable by the informed agent in the current match and the present value this agent could obtain by seeking a new match in the market. In the labor market, this involves a wage that makes employed agents better off than unemployed ones, and in the capital market it involves an interest rate that makes current borrowers better off than those without an established credit relationship. The uninformed agent (employer or lender) monitors the informed agent (worker or borrower) and ends the relationship if unsatisfactory behavior is detected (excessive shirking or risk-taking). The enforcement rent is valuable, so unsatisfactory behavior is deterred. This strategy is called *contingent renewal*.

In the BG framework, agents on the uninformed side propose contract terms and agents on the informed side accept or reject these contracts before choosing their actions. For example, in a labor market employers offer a wage per unit of time. If the wage is high enough to provide a rent, employees will value their jobs and supply an effort level at which they are unlikely to be fired. The employers foresee how an employee will choose effort for each possible combination of a wage level and a monitoring intensity, and they propose contracts that maximize their profit. Because these contracts give rents to employed workers, they are accepted.

In such an equilibrium, there is involuntary unemployment because unemployed workers would like to have jobs (this would make them better off). However, if the unemployed workers try to undercut the wages of the employed workers, such proposals will be rejected by employers who understand that a lower wage leads to lower effort and would not be profit-maximizing. Bowles and Gintis (1990) note that unemployment of this kind creates *short side power*. That is, employers who are on the short side of the market (they can hire as many workers as they want) exercise power over the effort of workers who are on the long side of the market (labor is in excess supply).

The analysis is similar for the capital market except for the complication that lenders can offer contracts involving both interest rates and levels of collateral on a loan. In general, the use of collateral makes it easier for wealthy borrowers to obtain financing on projects where lenders cannot perfectly observe the level of risk chosen by the borrower. When borrowers are wealthy enough, collateral can fully substitute for contingent renewal and enforcement rents vanish. But with less wealthy borrowers, the outcome resembles the equilibrium in the labor market: the use of enforcement rents implies that borrowers who enjoy established lines of credit are better off than those who do not. Moreover, the market does not clear because some borrowers are unable to obtain loans even though they are indistinguishable from those who do.

In an important passage, Bowles and Gintis (1990, p. 188) remark that “contingent renewal is less effective in capital markets than it is in labor markets. First, the sums involved in a typical business loan (and hence the costs imposed on lenders by, say, the choice of an overly risky investment by the borrower) are orders of magnitude greater than the damage an employee can typically impose on the firm by enjoying on-the-job leisure. Second, potential borrowers have much to gain from misrepresenting their investment opportunities, since the discovery of the misrepresentation is generally difficult and in any case takes place only after significant gains may be reaped by the borrower and possibly losses suffered by the lender... Workers, by contrast, have less to gain, since they will be quickly discovered and dismissed.” This is a fundamental asymmetry between the capital and labor markets, one to which I will return in Section 5.

The power of the analysis in Bowles and Gintis (1990) derived in large part from its unified treatment of labor and capital markets. Use of contingent renewal in both markets led to enforcement rents in both, which had implications for income distribution. Moreover, in the BG model neither market cleared, so unemployment and credit-rationing were persistent characteristics of capitalism. BG showed that one could extend the model to an economy with

investors, managers, and workers, where managers are on the short side of the labor market but the long side of the capital market.

All this theoretical richness has a common source: dropping the assumption that contracts can be enforced at zero cost by a disinterested third party. This amounts to the elimination of the Walrasian assumption that markets are complete (Bowles and Gintis, 1993a, p. 97). BG retain other conventional assumptions including constrained optimization, competitive markets, and equilibrium behavior, although they modify the Walrasian definition of equilibrium to allow non-clearing markets.

Other theorists of the time also discarded the assumption of zero enforcement costs but went off in quite different directions. A prominent example is Williamson (1985), whose Transaction Cost Economics (TCE) framework sought to salvage the efficiency implications of the First Welfare Theorem in a second-best world where contracts are incomplete. Williamson held that capitalist firms were efficient (transaction-cost-minimizing) solutions to various contractual dilemmas. TCE had a theory of authority within the firm that could have been used to examine power relationships but failed to pursue this line of inquiry (for criticisms of the Williamsonian framework, see Dow, 1987; Williamson, 1987; Dow, 2022).

In addition to rejecting the axiom of exogenous contract enforcement, Bowles and Gintis (1990, 1993a) rejected the Walrasian axiom of exogenous preferences. They asserted that the prolonged and personalized relationships implicit in a system of contingent renewal create an environment in which preferences or attitudes can evolve over time, and in which each party can try to modify the other's preferences in strategic ways. I will not pursue this argument here because I want to stress the point that even a stark version of BG where preferences remain fixed has wide-ranging economic implications. It is also simpler to drop preference endogeneity in situations where this is not a central consideration. As Bowles and Gintis (1993a, p. 99) remark, "Fortunately for the tractability of our models, many important problems can be convincingly analyzed without taking explicit account of the endogeneity of preferences and norms."

3 Universal self-enforcement

Bowles and Gintis (1993a, p. 85) correctly note that asymmetric information is unnecessary for a problem of endogenous enforcement to arise. Similar issues arise when everything is perfectly observed by the parties directly involved in production, but no external party is willing or able to enforce contracts. In that context, the appropriate analytic tool is the theory of repeated games. Here I will discuss a pair of models that extend the concept of contested exchange in this direction.

Exogenous enforcement can be absent for many reasons (Bowles and Gintis, 1990, p. 177). There may be no third party to provide enforcement services, as in stateless societies or relationships between sovereign states; third parties may lack incentives to intervene; the actions of the parties may be unverifiable in court, even if the parties themselves observe everything; court procedures may be too costly or unreliable; there may be no means of redress, as when penalties cannot be imposed

due to limited liability or bankruptcy; or it could be impossible to write a complete contract that covers all possible future states of the world. This Section assumes that for one or more of these reasons, exogenous contract enforcement does not exist. Just as the Walrasian assumption of costless external enforcement represents one limiting case, the models in this Section without external enforcement represent the other limiting case.

Bowles and Gintis (1990, p. 184) recognized that endogenous contract enforcement can involve bilateral sanctions: "Where no costlessly enforceable contracts can be written at all, e.g., both agents may engage in endogenous enforcement activities, both may receive enforcement rents, and each may thus effectively pursue their interests by threatening to sanction the other." They mention that their analysis "abstracts from the problem of bilateral endogenous enforcement, in which *both* parties hold transaction-specific assets, and for this reason contract termination is costly to *both* parties" (Bowles and Gintis, 1993a, p. 91, emphasis in original).

During the 1990s, influenced by these observations of Bowles and Gintis as well as a series of articles by MacLeod and Malcolmson (1989, 1993, 1998) that applied game theory to labor markets, I began to work on models where all input contributions to the firm and all side payments among the agents had to be self-enforced. This resulted in two publications, one that studied an individual firm where the outside options of the agents were exogenous (Dow, 2004) and another that made these outside options endogenous by locating the firm in a labor market setting (Dow, 2000). The first case is logically prior to the second case, so I will discuss these articles in reverse order from their publication dates.

Suppose we generalize the Bowles and Gintis (1990, 1993a) framework to have multiple agents who supply inputs to a firm. Some provide various types of labor, some provide service flows from various types of physical assets, some provide raw materials, and so on. Time is discrete, agents have an infinite time horizon, all agents have the same discount factor, and all agents can obtain exogenous present values by quitting the firm. There is a production function of a quite general kind (e.g., it may be a Cobb-Douglas function with decreasing returns to scale, although many other functional forms are also admissible).

After production occurs in a period, the resulting output is divided among the agents via an exogenous system of shares. No restrictions are placed on the way in which output could be divided. For instance, in a capitalist firm with a single "owner", all output could be appropriated by one capital supplier, while in a workers' cooperative, output could be divided equally among the labor suppliers. Each agent has a personal cost of supplying his or her input, which could be linear (e.g., if effort has a constant cost per unit) or strictly convex (if the marginal cost of effort is rising).

Bowles and Gintis (1990, 1993a) study capitalist firms where the employer offers the employee a fixed wage. In the Dow (2004) model, I generalize this by allowing arbitrary pre-production transfers among the agents (called *wages*) and post-production transfers (called *bonuses*). Such transfers are non-negative because the agents cannot steal from one another, but there are no other limits. Any agent can make a payment of arbitrary size to any other agent, or refrain from making such payments. In this generalized framework, a "wage" payment before the production stage does not necessarily involve a payment from a capital supplier to a labor

supplier; payments in the reverse direction are also allowed. The same is true for the “bonuses” paid after the production stage. I assume every agent can observe the actions of every other agent.

From a repeated game perspective, the key task is to identify the input bundles and side payments that can arise in equilibrium. The appropriate equilibrium concept for a repeated game with complete information is subgame perfection. Readers familiar with game theory will recall that in a subgame perfect equilibrium, the strategies of the players must yield a Nash equilibrium starting from any point in the game. For readers unfamiliar with game theory, the requirement is that all threats and promises must be credible, in the sense that an agent would be willing to carry them out if the relevant situation ever arose.

The crucial simplification in the model is that all inputs are essential, so if an agent quits, the firm must dissolve, and all agents will receive their exogenous outside options. This implies that quitting is a best reply to quitting by other agents, and hence that mutual quitting at the end of a period is always a Nash equilibrium. As a result, dissolution of the firm can always be used as a punishment for any deviation from equilibrium behavior by an individual agent, whether this involves failure to contribute the equilibrium inputs or failure to make an equilibrium payment to some other player. For example, the employer in a capitalist firm cannot make a legally binding commitment to pay a particular wage in a future period, but if the employer fails to pay the wage workers expect to receive along the equilibrium path, the workers can retaliate by quitting. I also include a probability that the firm dissolves at the end of each period for exogenous reasons such as the death of a participant.

In a game of this kind, the BG concept of an enforcement rent becomes a *continuation surplus*. This is the aggregate present value (summed over all agents) of continuing the game using equilibrium strategies minus the aggregate present value (again summed over all agents) of ending the game by having everyone quit the firm. The key result of Dow (2004) is to show that there is a single aggregate incentive constraint for the firm, rather than a set of many individual incentive constraints, one for each agent. A particular input bundle and a particular distribution of payments among agents can be achieved in equilibrium if and only if two conditions are met: (i) the aggregate continuation surplus is greater than or equal to the aggregate temptation to cheat by deviating from the equilibrium input contributions, and (ii) each agent obtains a present value greater than or equal to their exogenous outside option. Whenever these conditions are satisfied, the bonus payments after the production stage can always be arranged so agents have incentives to supply the desired inputs, and the wage payments before the production stage can be arranged to achieve the desired distribution of the continuation surplus among the agents.

The aggregate incentive constraint may or may not bind, depending on several exogenous parameters (the discount factor, the probability that the firm dissolves for exogenous reasons, and the outside options of the players). When it does not bind, the firm maximizes profit in the usual way but does not require an external contract enforcer to achieve this outcome. Multilateral self-enforcement is sufficient. When the incentive constraint does bind, the maximum profit in a second-best sense depends on the

exogenous parameters mentioned above, and so do the profit-maximizing input levels. Therefore, if we find evidence that inputs, outputs, or profit vary with the discount factor, the exogenous dissolution probability, or the exogenous outside options, this supports the hypothesis that agent behavior is self-enforced rather than externally enforced.

These conclusions may seem quite surprising in relation to the BG analysis from Section 2. BG make a definite prediction about distribution: the enforcement rent goes to the employee who chooses effort (in the labor market model) or the borrower who chooses a risk level (in the capital market model). In each case, it is the agent choosing the non-contractible input who gets a rent, so the other agent can use the threat of ending the relationship as an incentive mechanism. Why does the Dow (2004) model imply that the distribution of the continuation surplus (that is, the aggregate enforcement rent) is arbitrary, subject only to minimal participation constraints?

The answer is simple. In the BG model, the wage is contractually enforced. It is only the worker's effort that must be self-enforced. But when the employer can renege on promises about wages, two things must be self-enforced: worker effort and the wage paid by the employer. This yields an aggregate incentive constraint where there is a degree of freedom in the distribution of the continuation surplus. The definiteness of the BG distributional prediction does not extend to a world in which all payments among the agents must be self-enforced.

One could defend the BG approach by arguing that contracts about wages are more open to external enforcement than contracts about effort. This is entirely plausible; courts may find it easy to determine whether the employer paid the employee, but hard to determine worker effort. However, two comments should be made. First, it is important to know what assumptions of the model are driving the results. For the BG version of contested exchange, it is a largely implicit assumption about the asymmetry of contract enforcement. Second, there may be circumstances where courts cannot be used to enforce promises about wages, either because the courts cannot verify the size of the wage payment or because going to court is too expensive for employees. Thus, the assumption that promised wages can be enforced at zero cost is not innocuous.

The model described above leaves the distribution of the continuation surplus among the agents undetermined. One way to address this issue is to make the outside options of the agents endogenous. In principle, this is straightforward: the present value of an unattached agent is just the present value of an agent attached to a firm after discounting for search time and investments in match-specific assets. Using the language of BG, I say that capital is on the *short side* of the labor market if employers can fill job vacancies more rapidly than unemployed workers can find jobs. Conversely, labor is on the short side if the opposite is true.

I develop a model of this kind in Dow (2000). A somewhat more readable version with identical mathematical results appears in Dow (2018b, ch. 16). The discussion here will be kept relatively brief. For a simple capitalist economy where employers can fill vacancies immediately and there are no specialized investments, it can be shown that employed workers must receive a rent. This vindicates the BG argument that enforcement rents go to employees when employers are on the short side.

We also get something more. In equilibrium firms cannot take away these enforcement rents by demanding that workers pay up-front fees when they are first hired, because this would give the firm an incentive to cheat by firing innocent employees and collecting further fees from their replacements. This justifies the suspicion expressed by Bowles and Gintis (1993a, p. 92, footnote 5) that up-front fees cannot be used to undo the distribution of rents to workers. Interestingly, the reason why this is infeasible in a world of self-enforcement is not that workers are unable to afford the fees, but rather that capitalists cannot make credible commitments to honor their promises.

The same paper develops a model where teams of workers collectively own the physical assets they use, but all other assumptions remain the same. When such firms can fill vacancies immediately and thus are on the short side of the market, the new members can pay non-negative fees to their firms in equilibrium. This is consistent with observations that worker cooperatives often require payment of up-front fees while capitalist firms do not. The difference reflects the lack of any temptation for firms controlled by workers to cheat their members by firing them.

In a world with universal self-enforcement of all input contributions and side payments, we can compare an economy where the physical assets are owned by investors with an economy where such assets are owned by workers themselves. It turns out that these cases are equivalent in the sense that any distribution of present values achievable in one economy is also achievable in the other. This result might be startling, given the frequent claims in the literature that effort incentives can be influenced by patterns of asset ownership. However, these claims all involve an assumption that certain contracts are enforceable at zero cost. The situation is different with full self-enforcement. When we switch from one asset ownership structure to the other without changing the input levels used by firms, the continuation surpluses within firms will not change. It follows that we can structure incentives so that individual behavior does not change, while at the same time giving each agent the same present value as before.

This poses a theoretical challenge for economists who want to explain the relative rarity of labor-managed firms. When we go to the limiting case where external enforcement is entirely absent, which is the extreme version of the BG idea of contested exchange, a capitalist economy and an economy of worker cooperatives appear indistinguishable. How then can we explain the asymmetry between KMFs and LMFs in the real world? I will return to this issue in Section 5.

4 The rarity of the LMF according to Bowles and Gintis

Many writers support labor-managed firms for political or social reasons. Bowles and Gintis (1993c,d, 1996b) make arguments based on principles of democratic accountability. Dow (2003, ch. 2) reviews arguments based on values of democracy, equality, and community. I do not want to understate the significance of these considerations, but I will focus on a different question: are LMFs desirable on economic grounds, and if so, why are they so rare?

Bowles and Gintis (1993c,d) suggest that LMFs might be rare because workers lack experience in democratic governance. Another possibility is that externalities across firms result in multiple equilibria, where KMFs thrive when there are many other KMFs, and conversely for LMFs. For example, an economy with KMFs may yield a highly unequal distribution of income, which may favor the formation of individual KMFs, while an economy with LMFs may decrease inequality, which may favor the formation of individual LMFs.

Of greater interest here, however, would be an explanation based on the theory of KMF behavior in labor and capital markets described in Sections 2 and 3. What BG need is a theory of how LMFs behave under parallel market conditions, a way of making the prevalence of the two firm types endogenous, and ideally a normative assessment of the equilibrium outcome. Their most systematic effort of this kind is Bowles and Gintis (1994), and I will trace the steps in their argument. A closely related presentation with useful graphs appears in Bowles and Gintis (1993e).

Bowles and Gintis (1994) note that under Walrasian conditions, KMFs and LMFs behave identically (for more on this point, see Section 5). They correctly say that a meaningful comparison between the two requires some source of imperfection in the labor and capital markets, and they highlight the lack of exogenous contract enforcement as the key imperfection.

As described earlier, they model a KMF as offering a contract that specifies a wage and a monitoring level. Once the contract has been accepted, the worker chooses the effort level that is optimal under the contract, and the employer keeps the resulting output. The contract offered by the employer maximizes profit, taking account of how the worker will choose effort in response. The capital supplier is the *residual claimant* because this agent's income is the revenue left over after wages and monitoring costs have been paid.

BG point out that the resulting equilibrium is not Pareto efficient because from a social point of view monitoring has a real opportunity cost while the wage is just a transfer from one agent to another. Although the wage is a private cost for the employer, it has no social cost. In principle, therefore, both parties could be made better off with a higher wage, higher effort, and less monitoring. Such Pareto improvements do not occur spontaneously in the KMF because they cannot be enforced (for details, see Bowles and Gintis, 1993e).

One can solve this problem by having the workers rather than investors be the residual claimants. Bowles and Gintis (1994) depict the LMF as maximizing the present value of employment for the worker, subject to the constraint that worker income equal output per worker minus monitoring cost and capital cost per worker (the latter is the capital stock per worker times the interest rate paid by the LMF). BG suggest three reasons why such a firm could achieve greater effort for given inputs than a KMF: the *participation* effect, the *direct residual claimancy* effect, and the *mutual monitoring* effect. The first arises from reduced alienation compared to the KMF. The second arises because workers gain directly from higher incomes when they work harder. This is likely to matter most within small work teams. The third arises because workers have low-cost information about the effort of fellow workers, and residual claimancy creates an incentive for

mutual monitoring among workers. This could be important even in large teams. Bowles and Gintis (1993e) also include a *wage incentive* effect that reinforces the mutual monitoring effect. Bowles and Gintis (1994) do not model these effects explicitly but argue that LMFs generally have an advantage over KMFs in dealing with the problem of endogenous enforcement in labor markets.

Assuming all this to be true, why would LMFs have a competitive disadvantage relative to KMFs? BG look to the capital market for an answer, and make several points. First, workers typically do not have enough wealth to finance the assets of a firm themselves; second, they lack the collateral that would be required to borrow the required funds; and third, they are risk averse and do not want to concentrate their wealth in a single firm.

Bowles and Gintis (1994) do not assume that workers literally cannot borrow. However, they emphasize that the interest rate paid on external funds rises with the fraction of the firm's capital financed by debt, because lenders are worried about the possible insolvency of the firm (there is a temptation for borrowers to take excessive risks, and this temptation rises with the size of the loan). On the other hand, workers who finance a larger fraction of the firm's capital through equity investments bear a higher cost associated with the additional risk to their own portfolios. The LMF chooses a balance of debt and equity that minimizes its overall cost of capital, but nevertheless has a higher cost of capital than a similar KMF where wealthy investors value capital at its opportunity cost.

For clarity, it should be noted that the model of the capital market in this Section differs from the one involving enforcement rents and contingent renewal as in Section 2. When lenders use contingent renewal, they make a line of credit available to the borrower (here, the LMF) and renew the line of credit periodically provided that unsatisfactory behavior (here, excessive risk-taking) is not observed. The enforcement rent involves an attractive interest rate relative to the rate paid by an "unemployed" borrower (one without an established relationship to a lender).

The equity investments made by LMF workers in this Section are more akin to a system of collateral where incentives are aligned by having the borrower lose some wealth in the event of insolvency. The interest rate paid to an external lender rises when workers invest less equity because then LMF members are more tempted to engage in risky projects. Worker risk aversion helps with incentive alignment by making LMFs less prone to risk-taking behavior, but if a debt is large relative to worker equity, LMF members could still be tempted to run a risk of default.

To explain the rarity of the LMF, it is necessary to make the incidence of the firm types endogenous. BG do this by showing that the cost of capital to an LMF drops as worker wealth increases. Assuming capital suppliers are risk neutral, there is a level of worker wealth $W_{\min}$ at which the higher cost of capital for an LMF cancels out against its lower cost of labor, so such a firm has no competitive advantage or disadvantage relative to a similar KMF. If workers have too little wealth ($W < W_{\min}$) then only KMFs exist, but if workers are sufficiently wealthy ($W > W_{\min}$) then only LMFs exist. In practice, though, individual industries will vary in their capital intensity and the productivity advantages of LMFs, so we have a smooth relationship where the share of LMFs in the overall economy is low when worker wealth is low and gradually rises as worker wealth increases.

Bowles and Gintis (1996a) argue that a larger market share for LMFs will lead to greater worker wealth. Putting this together with the arguments from Bowles and Gintis (1994), worker wealth and the market share of LMFs are jointly determined, which can lead to multiple equilibria. Hence, it may be possible to adopt policies that simultaneously promote more LMFs and more worker wealth.

Bowles and Gintis (1993c) attach a caveat: because capital is readily diversified, efficient risk allocation argues for giving capital suppliers residual claimant status, although this has costs with respect to labor productivity. Indeed, on social grounds they believe that decisions about innovation should be based upon risk neutrality, and they express the concern that LMFs will behave in a more risk averse way than KMFs. While accepting a potential economic tradeoff between democracy and innovation, they conclude with a strong political argument for democracy within the firm.

5 The rarity of the LMF according to Dow

From the 1960s through the 1980s, the economic literature on labor-managed firms was dominated by the premise that LMFs would maximize net income per worker rather than profit. Today it is understood that because such models omitted a market for labor, they depicted LMFs as having unnecessary flaws relative to KMFs. At least in theory these flaws can be eliminated using a market for LMF membership, which restores the Walrasian framework of complete and competitive markets. As a result, KMFs and LMFs become indistinguishable in their behavior and performance (Dow, 2018a,b, chs. 2-5, Dow, 2020).

The point is not to show that LMFs are identical to KMFs in the real world (they are not). Rather, it is to show that any serious theoretical comparison of the two firm types must be carried out in an economic environment with market imperfections, one that departs from the Walrasian model. Elsewhere I have called this the *imperfection principle* (Dow, 2003, 2018b).

Furthermore, the analysis in Section 3 of this paper showed that even with one important type of market imperfection (the complete absence of exogenous contract enforcement), it is still difficult to find meaningful differences between KMFs and LMFs. Hence, market imperfections are necessary but not sufficient. One must also identify an asymmetry between capital and labor that can account for the differences between real KMFs and LMFs. Elsewhere I have called this the *asymmetry principle* (Dow, 2003, 2018b).

Bowles and Gintis skipped over the distracting debate about maximization of income per worker by the LMF and saw immediately that a serious comparison of capitalist and democratic firms required abandonment of Walrasian assumptions. They also identified a crucial difference between capital and labor: capital is alienable while labor is not. Thus, their theory of contested exchange respected both the imperfection and asymmetry principles.

It took me longer to work out my own theory of labor-managed firms, which I am now inclined to call the *alienability theory*. My framework builds on BG in various ways. First, BG focused on a

specific kind of market imperfection, involving what economists would nowadays call *moral hazard*. This can certainly be one part of a larger theory about the LMF. However, it is not the only kind of market imperfection that could be relevant. As was explained in Section 3, one could remove the assumption of informational asymmetry and focus on the lack of contract enforcement in a repeated game environment where agents behave in opportunistic ways while perfectly observing the actions of all other agents. One could also investigate a different type of informational asymmetry, *adverse selection*, where some agents have private information before contracts are accepted. Theories about LMF behavior could also address collective choice issues and free rider problems within the firm.

There are many empirical differences between KMFs and LMFs, including not just their numerical incidence but also their responses to economic shocks, the objectives they pursue, the industries where they are found, their internal wage distributions, their productivity and survival performance, and so forth (see Dow, 2018b, chs. 6–8, for a survey of recent empirical findings). It is difficult to explain all observations of this sort using a single type of market imperfection. I have therefore explored a wider variety of market imperfections than those considered by BG.

For similar reasons, I have broadened the ways in which alienability creates asymmetries between KMFs and LMFs. BG primarily used the alienability idea to stress that workers cannot pledge future labor income as collateral when applying for loans, which impedes their access to capital (for remarks on this subject, see Bowles and Gintis, 1990, p. 193 and 197). This is an important point that should not be neglected.

However, a deeper point is that the talents, skills, experiences, and time endowments of workers cannot be separated from the persons who make decisions about these assets. This has numerous implications. For example, labor must be supplied as a flow rather than a stock; firms must hire labor in human-sized packages; labor is difficult to diversify across firms and often has high mobility costs; workers get direct utility or disutility from working conditions; and workers obtain valuable information from their participation in production. None of these observations applies to capital, which is freely transferable (alienable) across individuals or groups.

Combining a wide range of market imperfections with a wide range of implications from the inalienability of labor, we obtain a very rich (albeit complex) theory that can explain not just why LMFs are rare, but many other observed differences between KMFs and LMFs. For brevity, in this paper I keep the focus on the rarity of LMFs, but the full scope of the alienability theory is described in Dow (2018b, ch. 19). The rest of this Section outlines a few core ideas.

First, we need to explain why LMFs are seldom created from scratch. I believe adverse selection is a central factor. Suppose entrepreneurs know the quality of their ideas but outsiders, including workers, do not observe this. If many entrepreneurs have bad ideas, or are simply dishonest, workers will not be prepared to pay much for membership in an LMF, and thus good entrepreneurs will not find it very profitable to create LMFs. However, good entrepreneurs can create KMFs, which might have lower productivity than LMFs but do not have parallel adverse

selection problems. This argument goes through even without worker wealth constraints or risk aversion (Dow, 2018b, ch. 10).

Second, we need to explain why existing KMFs are not often converted into LMFs. A similar adverse selection problem arises if the employees do not know what the true productivity of the firm would be as an LMF. For obvious reasons, employees contemplating a buyout cannot trust claims about this from the existing owners. If a significant fraction of KMFs would be less productive as LMFs, the adverse selection problem can impede the conversion even of the KMFs that would indeed have higher productivity when reorganized as LMFs.

Moreover, there is a free rider problem when employees engage in research to discover what the true productivity of the firm would be as an LMF. Even if the resulting information is credible, individuals or small groups have little incentive to conduct such research because any benefits from conversion to the LMF structure will be spread widely across the workforce while the costs will be concentrated on the subset of agents who expend resources to develop reliable information. Again, this argument is independent of worker wealth or risk aversion (Dow, 2018b, ch. 13).

Other collective choice problems emerge when workers have diverse preferences about public goods within the firm, while investors agree unanimously on the goal of profit or present value maximization. Gil Skillman and I have shown that the inalienability of labor can result in asymmetries of this sort, leading to asymmetries in the conversion of KMFs into LMFs and vice versa. In general, LMFs are vulnerable to investor takeover unless outside investors are barred from buying LMF membership shares. However, KMFs are more stable due to heterogeneous preferences within large employee coalitions (Dow and Skillman, 2007; Dow, 2018b, ch. 12).

Section 3 already outlined some theoretical issues emerging in the absence of external contract enforcement. It was not obvious from that discussion how this could lead to a theory capable of explaining the rarity of LMFs. However, the models discussed in Section 3 did not take the alienability distinction between capital and labor into account. Because physical assets can be owned by the firm as a stock while labor is only available as a flow, a difference arises in the intertemporal structure of capital and labor markets.

Specifically, having the LMF borrow a large amount to finance physical assets up front creates a temptation for the firm to depreciate the assets too rapidly, converting them into current income and reneging on promised repayments. The comparable temptation in the KMF is for the employer to stop paying wages, but because labor services are a flow, such opportunism triggers immediate quitting in response (note that these points resemble the argument from BG in Section 2 that contingent renewal is less effective in capital markets than labor markets). For reasons of this kind, it can be shown that more continuation surplus is usually needed to deter opportunism by LMFs than by KMFs (Dow, 2018b, ch. 17).

This will show up in practice as an inability of LMFs to obtain access to physical assets through leasing, borrowing, or sale of non-voting equity shares. Such problems will typically be more severe for relatively capital-intensive industries. This argument supports the general claim that LMFs are rare due to capital market imperfections, but it relies upon the absence of credible

commitment rather than the information and risk aversion issues stressed by Bowles and Gintis.

Lack of exogenous contract enforcement can also be combined with adverse selection in a repeated game setting. I will not go into the details here but in a model where capital and labor are symmetric, it can be shown that without adverse selection, KMFs and LMFs exist in equal numbers. With adverse selection about the quality of entrepreneurial projects, the temptation for controllers of firms to cheat non-controllers leads to multiple equilibria that differ with respect to income distribution as well as the market shares of KMFs and LMFs. Under certain conditions, this will include equilibria where only KMFs exist. In such equilibria KMFs are expected to pay the customary wage while LMFs are expected to cheat on leasing fees or loan repayments. For a symmetric environment, there will also be equilibria where only LMFs exist. But when we add the asymmetry that investors can pay in advance for labor while workers cannot pay in advance for capital, equilibria having only KMFs will exist for a wider range of parameter values (Dow, 2018b, ch. 18).

As this quick sketch indicates, I have followed Bowles and Gintis in several ways. I believe that the absence of exogenous enforcement is an important source of market failure for theorists who want to explain the rarity of labor-managed firms, and I believe the inalienability of labor creates subtle but critical asymmetries between KMFs and LMFs. Moreover, I would agree with Bowles and Gintis that worker wealth constraints and capital market imperfections play a major role in limiting the prevalence of LMFs.

I also believe Bowles and Gintis were quite correct in emphasizing the advantages of the LMF with respect to labor effort. Indeed, as I will discuss in Section 6, LMFs often seem to have productivity advantages in comparison to similar KMFs. In my view, these advantages have two sources. First, the inalienability of labor implies that workers often derive valuable information from production activities. Second, LMF workers are normally more willing than KMF workers to reveal private information, invest in firm-specific skills, and the like, because LMF managers are credibly committed not to abuse workers while KMF managers will behave opportunistically toward workers when this serves the interests of investors.

6 Thirty years later

In the decades since Bowles and Gintis developed the idea of contested exchange and applied it to labor-managed firms, economists have done a good deal of high-quality empirical research on LMFs (Dow, 2018b, chs. 6–8; Dow, 2024). Datasets are much better than they were in the early 1990s, econometric methods are more sophisticated, and extensive information is available for multiple countries (notably Italy, Spain, France, and Uruguay). In these countries and others, the LMF population is large enough that LMFs can be compared directly with KMFs operating in the same industries. Such research was virtually non-existent when Bowles and Gintis were writing the papers discussed in earlier Sections.

So how well do the BG predictions hold up? One crucial prediction is that LMFs should be better at solving the labor discipline problem than similar KMFs. This expectation has been supported empirically. For example, Fakhfakh et al. (2012) used two

large French datasets, one with seven broad industries and the other with four manufacturing industries. Given the existing LMF input levels, in most industries the LMFs had significantly greater output from their own technology than they would have obtained by using the KMF technology. But given the existing KMF input levels, the KMFs often would have had significantly greater output if they had used the LMF technology. These results indicate that KMFs find it hard to replicate the performance of LMFs (in most industries, the KMFs would have had more output if they could have imitated what the LMFs do). The reasons probably include the factors mentioned at the end of Section 5.

This and other studies indicate that LMF productivity advantages are largest in labor-intensive or knowledge-intensive industries, suggesting that worker effort and creativity play an important role (for details, see Dow, 2024). Many writers believe LMF productivity advantages stem in part from mutual monitoring among workers, a point stressed by Bowles and Gintis (see the discussion in Section 4). This interpretation is buttressed by the observation of Fakhfakh et al. (2012) and others that LMFs often have fewer managers and supervisors than similar KMFs, suggesting that LMFs have less need for hierarchical monitoring.

If LMFs enjoy productivity advantages relative to similar KMFs, this might sometimes result in an LMF survival advantage. Burdín (2014) examined LMF survival in Uruguay using firm-level panel data for 1997–2009 for 112 economic sectors. The overall dissolution hazard for LMFs was 29% lower than for KMFs. Survival differences for manufacturing or transport were insignificant, but the difference for services was large. LMF survival advantages have also been discovered for other countries, time periods, and industries (Ben-Ner, 1988; Olsen, 2013). With French data, Fakhfakh et al. (2023) found that the survival outcomes were similar for KMFs and LMFs after entrants were matched using characteristics of firms and entrepreneurs at the time of entry. Overall, these findings support the view that LMF survival performance is at least as good as that of KMFs in industries where both types of firm exist.

The other major assertion from Bowles and Gintis is that worker wealth constraints and risk aversion are the main barriers to LMF formation. If so, one would expect LMFs to be less common in industries that are more capital intensive and have larger profit fluctuations. Using panel data for 90 U.K. manufacturing industries during 1981–1983, Podivinsky and Stewart (2007, 2009, 2012) found that industry-level capital intensity and risk had stronger negative effects on LMF entry than on KMF entry. For a large sample of Italian manufacturing firms during 2003–2007, Belloc (2017) found less LMF entry when firm-level capital intensity and industry-level risk were higher. Again, expectations from the BG model were borne out.

In view of the empirical evidence, and contrary to the opinions of early critics, I believe the rarity of LMFs has nothing to do with poor operating performance and everything to do with low formation rates (Dow, 2024). I will make only a few brief comments on policy implications. BG suggested offering subsidies to LMFs that would compensate for their higher capital costs in relation to KMFs. I think this makes sense in situations where employees are buying out KMFs over time. However, wealth constraints and risk aversion are not the only reasons why LMFs are seldom started from scratch (adverse selection and collective choice also matter), so this solution seems inadequate if we want to raise the LMF birth

rate. I think the best approach in this regard is likely to be the establishment of LMF federations (Dow, 2003, ch. 12; Dow, 2018b, ch. 20).

I will close on a personal note. I came to know Herb Gintis in the early 1990s when he was co-authoring the papers discussed here. I found him to be a jovial man with a razor-sharp mind. An anecdote will illustrate the latter point. One time my friend Gil Skillman and I were visiting with Herb and Sam Bowles. We got into a long argument with them about a technical point involving game theory. As we were departing, Gil and I felt reasonably sure that we had been correct. But a few years later, we realized that Herb (and Sam) had been right all along. In view of this experience, I am not surprised that Herb's work has stood the test of time. He was a smart, passionate, and creative scholar, and we are fortunate to have benefited from his insights.

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References

- Belloc, F. (2017). What deters labor-owned firm creation? Evidence from Italian manufacturing sectors. *J. Comp. Econ.* 45, 139–153. doi: 10.1016/j.jce.2016.12.001
- Ben-Ner, A. (1988). Comparative empirical observations on worker-owned and capitalist firms. *Int. J. Ind. Organ.* 6, 7–31. doi: 10.1016/0167-7187(88)90003-3
- Bonin, J. P., Jones, D. C., and Putterman, L. (1993). Theoretical and empirical studies of producer cooperatives: will ever the twain meet? *J. Econ. Lit.* 31, 1290–1320.
- Bowles, S. (1985). The production process in a competitive economy: Walrasian, neo-Hobbesian, and Marxian models. *Am. Econ. Rev.* 75, 16–36.
- Bowles, S., and Gintis, H. (1990). Contested exchange: new microfoundations for the political economy of capitalism. *Pol. Soc.* 18, 165–222. doi: 10.1177/003232929001800202
- Bowles, S., and Gintis, H. (1993a). The revenge of Homo Economicus: post-Walrasian economics and the revival of political economy. *J. Econ. Perspect.* 7, 83–102. doi: 10.1257/jep.7.1.83
- Bowles, S., and Gintis, H. (1993b). “Post-Walrasian political economy, ch. 1” in *Markets and Democracy: Participation, Accountability and Efficiency* eds. Samuel Bowles, Herbert Gintis, and Bo Gustafsson (New York, NY: Cambridge University Press), 1–10. doi: 10.1017/CBO9780511983580.002
- Bowles, S., and Gintis, H. (1993c). A political and economic case for the democratic enterprise. *Econ. Philos.* 9, 75–100. doi: 10.1017/S0266267100005125
- Bowles, S., and Gintis, H. (1993d). “A political and economic case for the democratic enterprise, ch. 9” in *The Idea of Democracy* eds. David Copp, Jean Hampton, and John E. Roemer (New York, NY: Cambridge University Press), 375–399.
- Bowles, S., and Gintis, H. (1993e). “The democratic firm: an agency-theoretic evaluation, ch. 2” in *Markets and Democracy: Participation, Accountability and Efficiency* eds. Samuel Bowles, Herbert Gintis, and Bo Gustafsson (New York, NY: Cambridge University Press), 13–39. doi: 10.1017/CBO9780511983580.003
- Bowles, S., and Gintis, H. (1994). Credit market imperfections and the incidence of worker-owned firms. *Metroeconomica* 45, 209–223. doi: 10.1111/j.1467-999X.1994.tb00020.x
- Bowles, S., and Gintis, H. (1996a). “The distribution of wealth and the viability of the democratic firm, ch. 5” in *Democracy and Efficiency in the Economic Enterprise* eds. Ugo Pagano and Robert Rowthorn (New York, NY: Routledge), 82–97.
- Bowles, S., and Gintis, H. (1996b). “Is the demand for workplace democracy redundant in a liberal economy? ch. 4 in *Democracy and Efficiency in the Economic Enterprise* eds. Ugo Pagano and Robert Rowthorn (New York, NY: Routledge), 64–81.
- Bowles, S., Gintis, H., and Gustafsson, B. (eds.) (1993). *Markets and Democracy: Participation, Accountability and Efficiency*, New York, NY: Cambridge University Press. doi: 10.1017/CBO9780511983580
- Burdin, G. (2014). Are worker-managed firms more likely to fail than conventional enterprises? Evidence from Uruguay. *Ind. Labor Relat. Rev.* 67, 202–238. doi: 10.1177/001979391406700108
- Dow, G. K. (2020). The labor-managed firm, Jaroslav Vanek, and me. *JPEO* 3, 123–134. doi: 10.1108/JPEO-07-2020-0020
- Dow, G. K. (1987). The function of authority in transaction cost economics. *J. Econ. Behav. Organ.* 8, 13–38. doi: 10.1016/0167-2681(87)90019-9
- Dow, G. K. (2000). On the neutrality of asset ownership for work incentives. *J. Comp. Econ.* 28, 581–605. doi: 10.1006/jcec.2000.1663
- Dow, G. K. (2003). *Governing the Firm: Workers' Control in Theory and Practice*. New York, NY: Cambridge University Press. doi: 10.1017/CBO9780511615849
- Dow, G. K. (2004). The firm as a nexus of strategies. *Int. Game Theor. Rev.* 6, 525–554. doi: 10.1142/S0219198904000344
- Dow, G. K. (2018a). The theory of the labor-managed firm: past, present, and future. *Ann. Public Coop. Econ.* 89, 65–86. doi: 10.1111/apce.12194
- Dow, G. K. (2018b). *The Labor-Managed Firm: Theoretical Foundations*. New York, NY: Cambridge University Press. doi: 10.1017/9781316459423
- Dow, G. K. (2022). The labor-managed firm, Oliver Williamson, and me. *J. Inst. Econ.* 18, 219–236. doi: 10.1017/S1744137421000448
- Dow, G. K. (2024). ch 2: The formation and performance of labor-managed firms: an economic perspective, in *The Routledge Handbook of Cooperative Economics and Management* eds. J. Warren, L. Biggiero, Jamin Hübner, and Kemi Ogunyemi (London, Taylor and Francis Group), 34–45. doi: 10.4324/9781003449850-4
- Dow, G. K., and Skillman, G. L. (2007). Collective choice and control rights in firms. *J. Public Econ. Theor.* 9, 107–125. doi: 10.1111/j.1467-9779.2007.00300.x
- Fakhfakh, F., Magne, N., Mirabel, T., and Perotin, V. (2023). Employee-owned firms in France. *J. Particip. Employ. Own.* 6. doi: 10.1108/JPEO-10-2022-0025

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- Fakhfakh, F., Perotin, V., and Gago, M. (2012). Productivity, capital, and labor in labor-managed and conventional firms: an investigation on French data, *Ind. Labor Relat. Rev.* 65, 847–879. doi: 10.1177/001979391206500404
- Gintis, H. (1989). Financial markets and the political structure of the enterprise. *J. Econ. Behav. Organ.* 11, 311–322. doi: 10.1016/0167-2681(89)90032-2
- MacLeod, W. B., and Malcomson, J. M. (1989). Implicit contracts, incentive compatibility, and involuntary unemployment, *Econometrica* 57, 447–480. doi: 10.2307/1912562
- MacLeod, W. B., and Malcomson, J. M. (1993). Wage premiums and profit maximization in efficiency wage models. *Eur. Econ. Rev.* 37, 1223–1249. doi: 10.1016/0014-2921(93)90132-T
- MacLeod, W. B., and Malcomson, J. M. (1998). Motivation and markets, *Am. Econ. Rev.* 88, 388–411.
- Olsen, E. K. (2013). “The relative survival of worker cooperatives and barriers to their creation,” *Advances in the Economic Analysis of Participatory and Labor-Managed Firms*, ed. D. Kruse (Leeds: Emerald Group Publishing Limited), 14, 83–107. doi: 10.1108/S0885-3339(2013)0000014005
- Podivinsky, J. M., and Stewart, G. (2007). Why is labour-managed firm entry so rare? An analysis of UK manufacturing data. *J. Econ. Behav. Organ.* 63, 177–192. doi: 10.1016/j.jebo.2006.02.001
- Podivinsky, J. M., and Stewart, G. (2009). Modeling proportions: random effects models of UK firm entry. *Singap. Econ. Rev.* 54, 367–377. doi: 10.1142/S0217590809003380
- Podivinsky, J. M., and Stewart, G. (2012). “On the choice between capitalist and labour-managed production: evidence from a panel of entrants into U.K. manufacturing industries,” *Advances in the Economic Analysis of Participatory and Labor-Managed Firms*, ed. A. Bryson (Leeds: Emerald Group Publishing Limited), 13, 77–95. doi: 10.1108/S0885-3339(2012)0000013008
- Shapiro, C., and Stiglitz, J. (1984). Equilibrium unemployment as a worker discipline device. *Am. Econ. Rev.* 74, 433–444.
- Smith, A. (1994). *The Wealth of Nations*. New York, NY: Random House.
- Stiglitz, J. E., and Weiss, A. (1981). Credit rationing in markets with imperfect information. *Am. Econ. Rev.* 71, 393–410.
- Varian, H. R. (1992). *Microeconomic Analysis, 3rd Edn*. New York, NY: Norton.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York, NY: Free Press.
- Williamson, O. E. (1987). Transaction cost economics: the comparative contracting perspective. *J. Econ. Behav. Organ.* 8, 617–625 doi: 10.1016/0167-2681(87)90038-2