Worker-Owned Firms: Lessons from the Pacific Northwest Co-ops

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Ownership and Management

Two primary questions may be asked of any firm:

1. who directs the firm's activities and
2. who appropriates the firm's net earnings?

Capital Hires Labor

In the conventional firm in the United States, the people who supply the organization's capital appropriate the enterprise's net earnings and, as a consequence, they are designated the firm's owners. These people also hire managers who direct the firm's activities. Such a firm is owned and indirectly managed by the people who provide the firm's capital assets. An economy dominated by such firms is aptly called "capitalist". In these firms, the managers, in turn, hire other workers. By this route, capital hires labor: those who supply the capital hire those who provide labor services.

Worker Co-ops

The opposite occurs when a firm is owned and managed by the individuals who provide the labor services. In this instance, the workers use their capital or borrow capital from others. Such worker-owned and worker-managed firms occur in various guises in some of the professions (law, investment banking, medicine, accounting) and in jobs such as taxi-driving, garbage collection, and trucking.

There are intermediate cases:

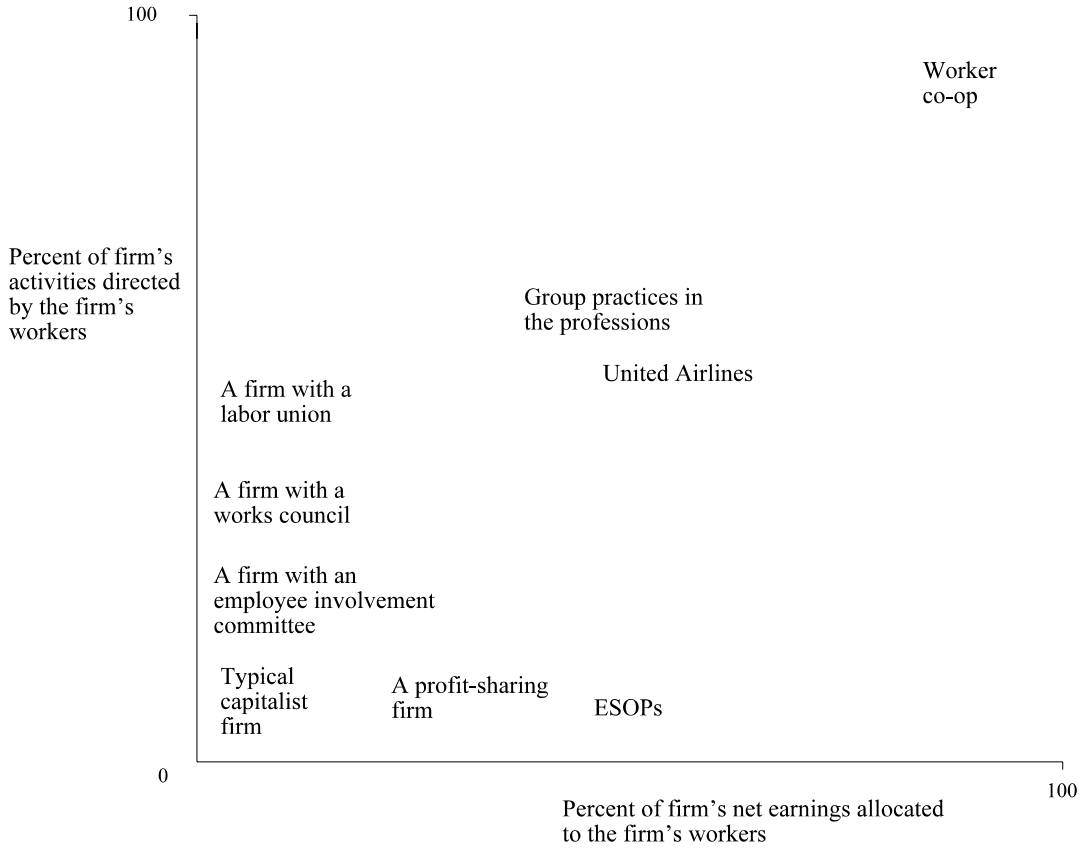


Figure 1: Types of Firms by Worker Ownership and Management

"Capital hires labor" occurs in most companies in the United States today. Why? Many reasons have been offered for this empirical regularity. I list these reasons and ask how these reasons help explain the incidence and behavior of two sets of worker co-ops in the Pacific Northwest.

Reasons:

1. labor input and the consequences for productivity
2. costs of governance
3. capital
4. "perverse" output supply behavior
5. "degeneration"

The Plywood Industry

The plywood industry has been the U.S. manufacturing industry in which worker ownership and management have extended most widely over the past eighty years. They constitute an especially interesting case study because

1. their internal behavior comes close to an ideal form of worker-owned and worker-managed firm;
2. conventional capitalist firms as well as co-ops operate in the industry so two types of firms may be compared in the same industry at the same time in the same place;
3. the key prices - the price of raw material timber (log) inputs and the price of plywood output - are predetermined to the plywood mills so strategic behavior in input and output markets may be ignored;
4. these prices are extremely volatile.

Points 2, 3, and 4 imply that we may determine whether worker co-ops adjust to shocks differently from capitalist firms in the industry.

Figure 2: Plywood Production in the Pacific Northwest, 1954-96

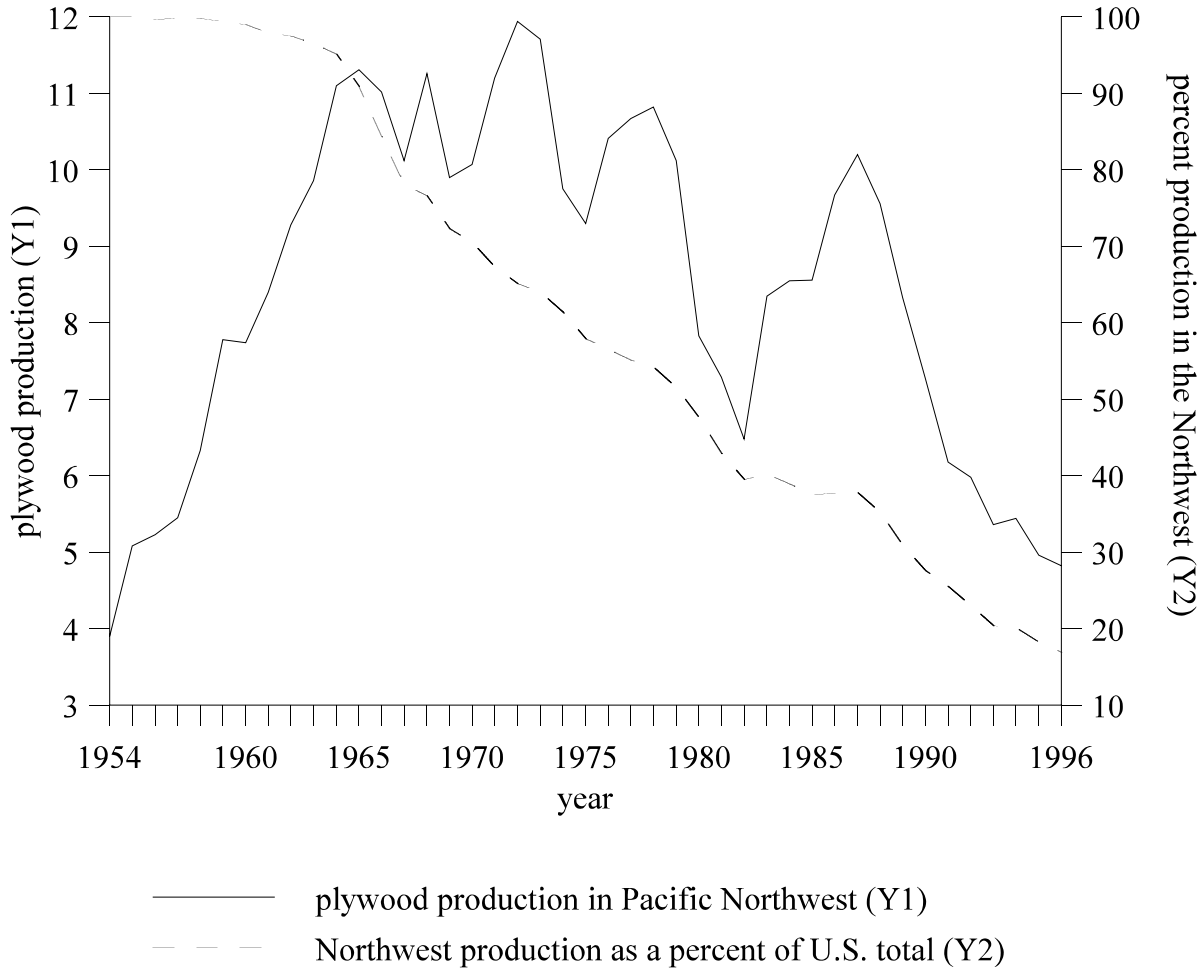
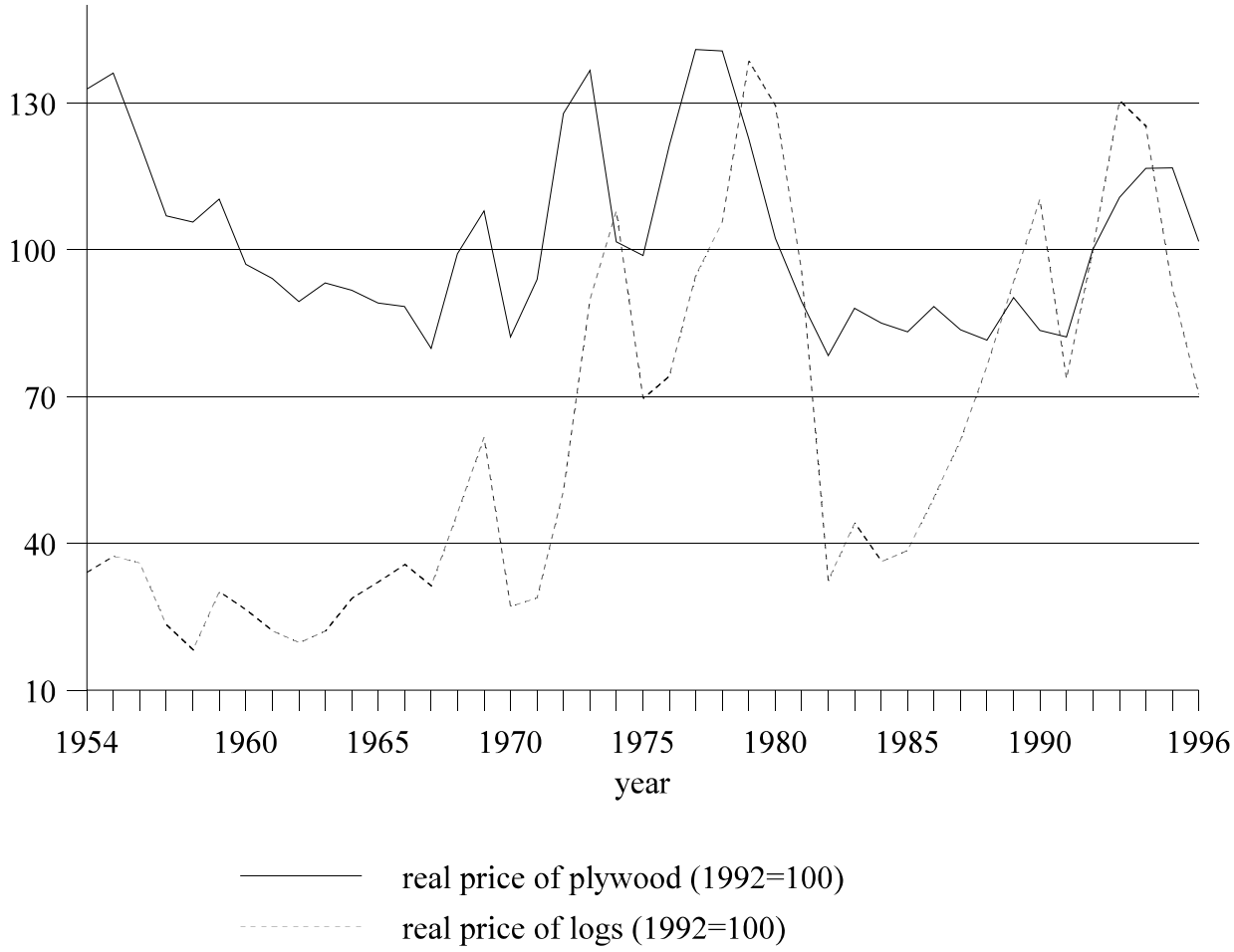


Figure 3: Real Prices of Plywood Output and Log Inputs, 1954-96



The Forest Workers' Co-ops

The forest workers' co-ops operated in the 1970s and 1980s in the same general region as the plywood co-ops. Around 1980, some 23 forestry co-ops were estimated to be operating in the Pacific Northwest with a total membership of almost 1,000 men and women. Their principal activity was the reforestation of land whose trees had been harvested. They also diversified into other tree and land maintenance activities.

The forest workers' co-ops grew in number and prosperity in the 1970s, but then suffered sharp reverses in the early 1980s because.....

1. the demand for reforestation on public lands where the co-ops principally worked fell sharply because of

    (a) the precipitous drop in log prices in the early 1980s which reduced logging and decreased the area needed to be reforested;

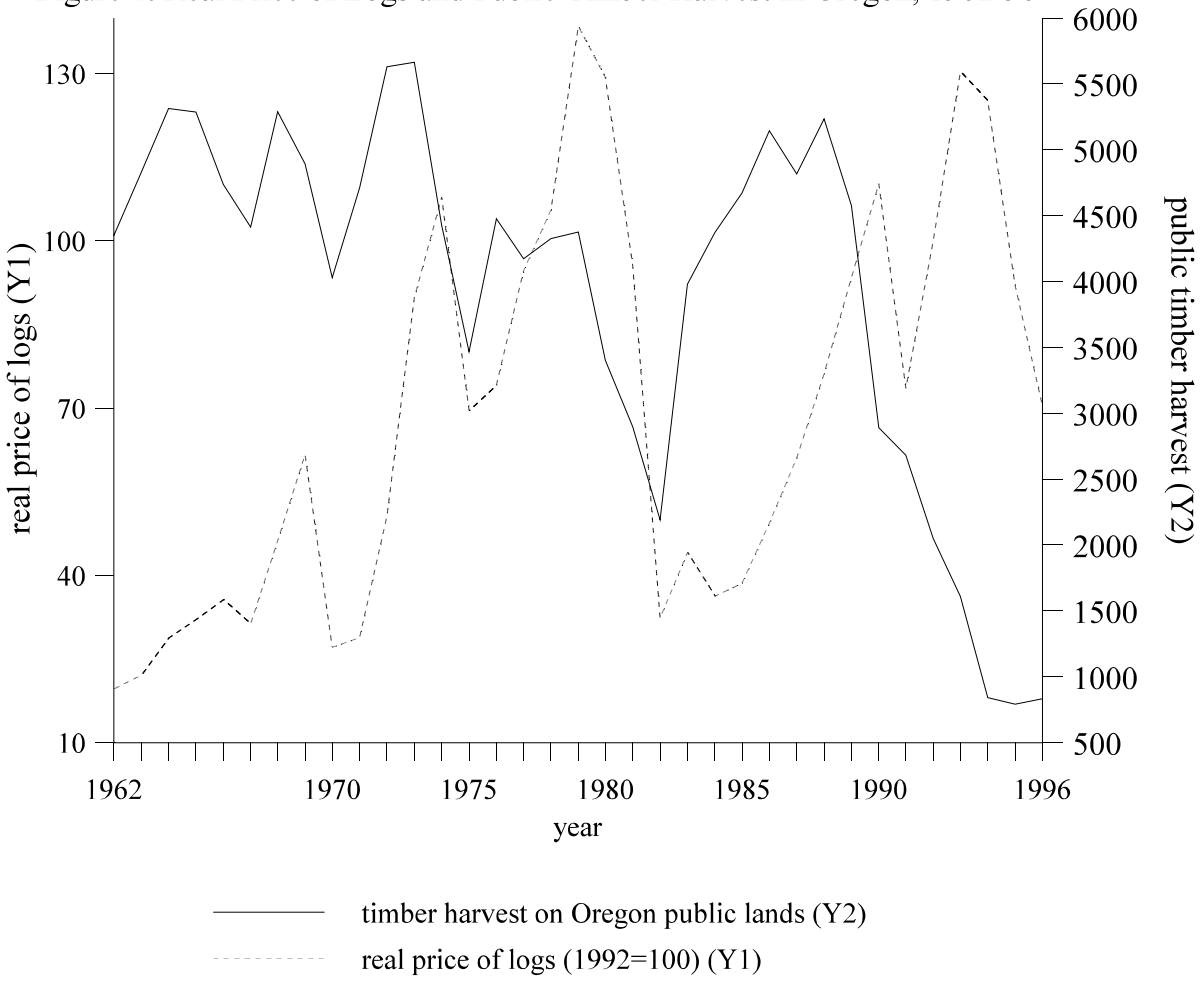
    (b) successive administrations in Washington cut the Forest Service budgets for reforestation;

    (c) general restrictions on logging in the region reduced the amount of cutting and, therefore, reduced the derived demand for reforestation.

Consequently, by 1998, timber harvested on Oregon public lands was 12 percent of that harvested ten years earlier.

2. legal and illegal workers from Mexico and central America were brought in to do the reforestation work and the supply prices of these workers were very much lower than those of the co-op crews. The average real wage of reforestation workers in the Pacific Northwest in 1998 was one-third of the wage in 1982. The impact on the co-ops was traumatic and they never recovered from this competition. Nowadays, much of the reforestation work still done, even that on U.S. Forest Service land, makes use of undocumented workers from Central America.

Figure 4: Real Price of Logs and Public Timber Harvest in Oregon, 1962-96



The Labor Input

Although each worker's income depends upon the firm's net earnings, the incentives provided by relating each worker's income to the firm's performance are meager because the firm's net earnings are divided among a large number of people. This means that the benefits to any single individual of harder work are small. Each worker wants others to work hard while he himself slackens off. Soon all individuals think this way and the firm consists of a body of malingerers. A supervisor is needed to ensure that incentives are not dulled and, in this way, the firm returns to the character of a capitalist firm where worker effort is carefully monitored. Alchian and Demsetz (1972), Holmstrom (1982)

In fact, the plywood co-ops make use of a manager, but the manager is a hired worker, not one of the owners of the co-op. So the manager monitors the firm's owners, the workers! However, the general manager of a co-op has less of a monitoring function than his counterpart in a capitalist mill because in a co-op all the workers function as monitors and they monitor one another. The number of supervisors is substantially smaller in the plywood co-ops than in the capitalist plywood mills. In the forest workers' co-ops, workers were explicitly to engage in "social supervision", i.e., to watch for the work performed by the planter to the left and the planter to the right.

The belief that worker co-ops were plagued with malingering leads to the inference that they tend to be relatively less productive than capitalist firms. Compare the plywood co-ops with capitalist plywood mills. Data on inputs (worker-hours, capital, logs) and outputs for 34 plywood mills in the state of Washington (roughly 50% of the output of plywood in the 1970s and 1980s).

The capitalist plywood mills were divided into unionized and nonunion mills. The levels of output and employment in the co-ops and unionized capitalist mills were similar; those of the non-union capitalist mills were much smaller.

Table 1

Proportionate Differences in Productivity and Output between
Co-ops, Classical, and Unionized Mills

		Proportionate difference between.....		
line	variable	Co-ops and Classical Mills	Unionized and Classical Mills	Co-ops and Unionized Mills
1.	Output per worker-hour	-0.36	-0.39	0.05
2.	Output per raw material input	0.36	0.19	0.19
3.	Simulated output evaluated at coop mills' inputs	0.063	-0.050	0.119
4.	Simulated output evaluated at unionized mills' inputs	0.116	-0.030	0.150
5.	Simulated output evaluated at classical mills' inputs	0.573	0.040	0.513

Note: The output differences in lines 3, 4, and 5 of this table are derived from instrumental variable estimates of log-linear production functions where the parameters of the functions are allowed to differ among the three types of firms.

What is the source for this difference in productivity?

Work practices within the capitalist and plywood mills are quite different. In a capitalist plywood mill, a worker is inclined to keep to his specified task. He avoids meddling in other employees' tasks and tends to resent the involvement of others in his own work. Typically, the outlines of each worker's obligations are defined with some precision and the worker is reluctant to stray beyond those bounds even if the entire production process may be enhanced by so doing. Workers do not set production targets nor determine the organization of the production process. They do as they are told. Management sets production goals and organizes production.

In the co-op mills, the demarcation of jobs is not as firm and workers are willing to go beyond their narrow responsibilities and make suggestions that will contribute to the team effort. Production is explicitly recognized in the co-op mills to be a collective process and collaboration is offered and welcomed. This conforms to the long-established belief that a co-op's workers will work more as a team than workers in a capitalist firm and this teamwork will show up in superior output. The co-op members directly or indirectly decide what and how much to produce and they control the manufacturing process.

On one important indicator of the quality of the production environment - safety - the co-op mills appear worse: all plywood mills are dangerous places to work, but the rate of accidents in the co-op mills is much higher than that in the conventional mills. The workers in the co-op are more inclined to compromise on safety in their desire to meet production targets. By contrast, workers in the capitalist mills tend to see the costs of attending to safety falling on their owners, not on them. There is even some evidence that OSHA is less assiduous in monitoring safety at the co-ops under the mistaken belief that worker-owned companies will not expose themselves to the same level of risk that capitalist firms tolerate for their workers.

Costs of Governance

Capital suppliers normally have a single objective: the maximization of money present values. By contrast, workers care about non-pecuniary features of the workplace and differ over the importance of current wages, future wages, job security, and working conditions. In circumstances where preferences differ, majority rule among workers may generate unstable outcomes or necessitates various ways to control agenda. This is especially a problem if workers are of different skills so wage differentials among workers have to be determined. Hence, "Most typically, employee-owners all do extremely similar work and are of essentially equivalent status within the firm. Rarely do they have substantially different types or levels of skills, and rarely is there much hierarchical authority among them....[E]mployee ownership works best when there is little opportunity for conflict of interest among the employee-owners" (Hansmann, 1996, p. 91-2).

How does this argument fare with the plywood co-ops and the forest workers' co-ops?

Plywood co-ops

The production technology in the plywood mills has involved a work force that is homogeneous by manufacturing industry standards and, although there are particular jobs involving specialized skills (such as electrician and machinist), there are no significant skill differentials that compartmentalize large fractions of the workers. Plywood workers are overwhelmingly male and White.

The trouble with this argument is that a work force's heterogeneity is not some technologically driven datum, but is something that an organization can mold and design. There are clear pay and job differences among the workers in the capitalist plywood mills indicating that the technology of plywood manufacture permits alternative ways of doing things. The co-ops go some way toward instituting procedures that de-emphasize differences among workers whereas the capitalist mill

appears to abstain from these policies:

a) co-op member workers are paid the same hourly rate,

b) they work the same number of hours,

c) because some jobs are more unpleasant than others, rules exist in the co-op either to determine who occupies the job (seniority being a common principle) or to rotate these jobs among the workers.

Therefore, the homogeneity of the work force is as much a consequence of the organizational form as an independent cause.

Forest workers' co-ops

Even though the organizations were expressly designed to treat workers equally, disagreements emerged from the different time horizons of the worker-members. In part because of the physical demands of the work, labor turnover in reforestation has always been high and, even though the turnover in the forest workers' co-ops was considerably less than that in the contractor crews, it still meant that, in the co-ops, those with less than two years' experience were in a clear majority. Short tenure workers tended to be quit-prone people looking for quick returns. Members with longer-term goals could not institute policies compatible with those goals so they tended to quit the co-op further aggravating the "short-termism" of the organization. Although on some dimensions the workers in the reforestation co-ops appear relatively homogeneous, as with the plywood co-ops, there were important differences among them that critically affected the policies of the co-op.

Capital

There are several reasons offered for why co-ops face particular capital market difficulties:

If the workers are to provide the capital, then the capital of the firm is constrained by the workers' joint savings. Sometimes this constraint will mean that not enough capital will be available for the firm to reach a size that maximizes efficiency.

This capital limitation induces the co-op to borrow from financial intermediaries, but many banks find co-ops an unfamiliar organization and they fear the co-op's worker-owners will give priority to paying themselves dividends instead of paying back loans.

{Here is a conventional hold-up problem: any agent is reluctant to loan money to someone who will sink the money into a specific capital asset that may have little value to the lender if the borrower should bankrupt. To protect their loan, therefore, the lender often asks for some security or places restrictions on what the borrower may do with the loan or insists that the lender be a member of the borrower's decison-making group.}

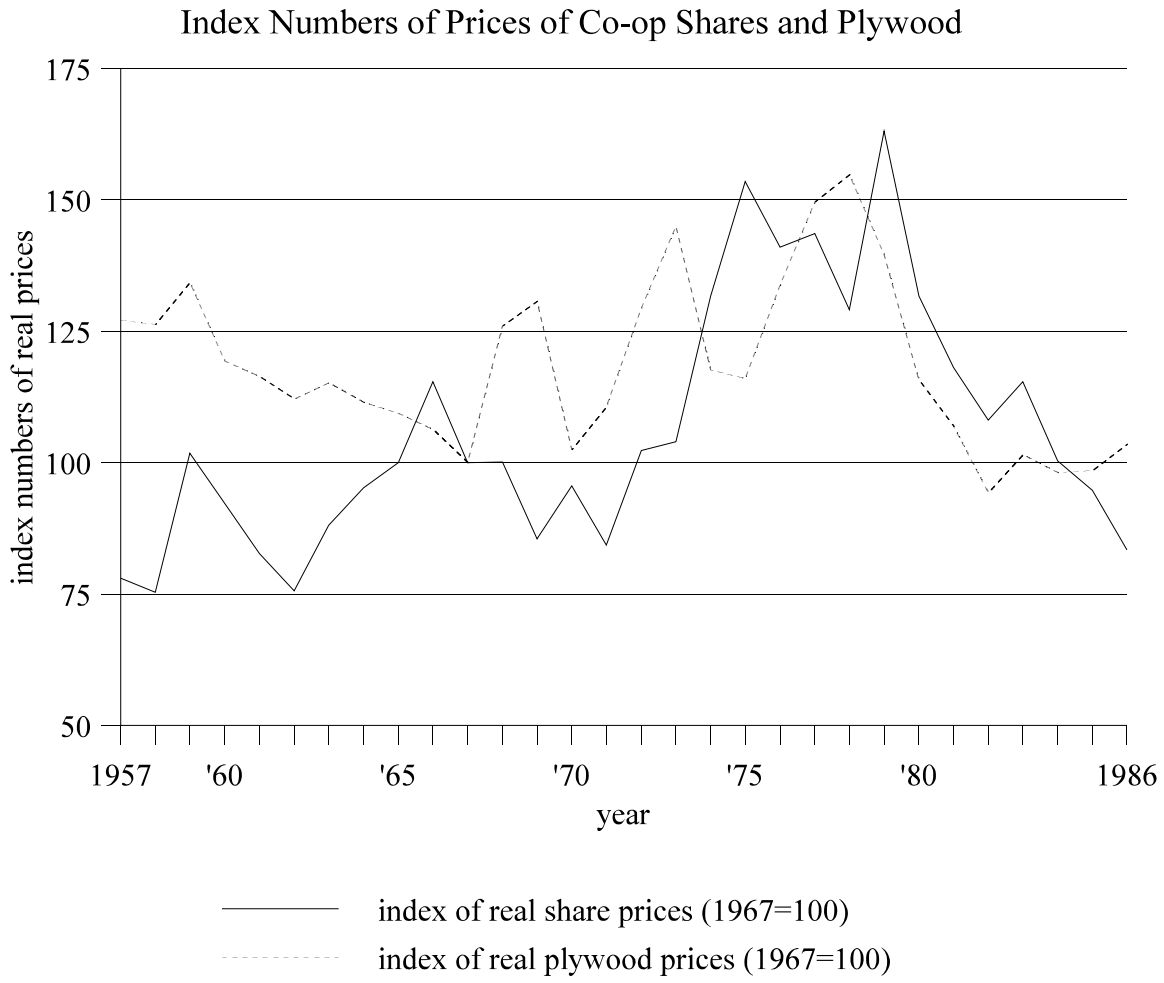
Hence banks are reluctant to lend to worker-owned organizations.

This argument is difficult to assess because co-ops themselves have been averse to borrowing from banks so the relative infrequency of bank loans may be attributable not to the reluctance of the lender but to the reluctance of the borrower. In fact, a number of loans have been secured by the plywood co-ops including loans from the Small Business Administration.

Evidence of capital market difficulties comes from an analysis of the plywood co-ops share prices. A plywood co-op member owns one share (and usually only one share) in the firm. The shares trade in open markets though co-ops often require a probationary period of employment for any new member. We collected data on the prices of shares for sale of 11 plywood co-ops in Oregon and Washington from 1957 to 1986.

Figure 5: Index Numbers of the Price of Co-op Membership Shares

and of the Price of Plywood Output, 1957-86



Analysis of the advertisements in the 1990s shows that the asking prices of shares listed in the 1990s indicate a sharp drop over those a decade earlier. Thus, a share in Linnton Plywood, one of the most profitable of plywood co-ops, was listed in 1980 at $90,000 whereas a decade later in 1990 a Linnton share was quoted at $55,000.

Use these share prices together with other information to calculate the returns to an individual working in a co-op compared with the returns to working in a capitalist mill. Consistently, although not invariably, we found the returns to being a member of a co-op exceeded - and usually exceeded by a large amount - the returns to working in a capitalist mill. In this sense, the prices of the co-op shares were undervalued: the shares were trading at a lower price - and, therefore, each share was furnishing the co-op mill with a smaller amount of capital - than that necessary to equate the net returns of working in the two types of mills, the conventional mill and the co-op mill.

This calculation is skewed in favor of making work in the capitalist firm appear more remunerative than it really is because we assumed that the worker is fully employed in every year. This assumption is appropriate for the co-op where employment changes little from year to year, but the capitalist mill is characterized by layoffs when demand for plywood falls in a recession. Hence one may argue that the monetary returns to work in the capitalist mill need to be discounted in any year by the probability of actually receiving those earnings and not being without work. However, if this were done, the appearance of the co-op share prices being undervalued would be even stronger.

Why? The undervaluation of the co-ops' share prices reflects the fact that the co-op organization is an inherently risky organization: not only is an owner-worker's labor income tied to the fortunes of the co-op, but the value of an important component of his savings, perhaps his entire savings, is linked to the co-op's experiences. Instead of diversifying his wealth, the owner-worker of a co-op is required to expose most or all of his wealth to the same source of uncertainty as his labor income.

While the labor income of a worker in a conventional mill will be affected by his mill's profitability, his capital can be invested in activities unrelated to the vicissitudes of the plywood industry. The heightened risk of being an owner-worker in a co-op reduces the supply of labor and the accompanying supply of capital to the co-op and can lead to the apparent undervaluation of a co-op's share prices. The owner-worker of a co-op must not merely have the necessary resources or have access to the resources to purchase membership in the organization, but he must also be sufficiently tolerant of risk to subject both his labor income and his wealth to the vagaries of the plywood market.

"Perverse" Output Supply Behavior

Ward (1958): a co-op selects its inputs to maximize net revenues per worker-owner where payments to worker-owners are not considered in the computation of costs. If X and Z_j denote, respectively, the level of plywood output and the level of input j (other than labor) in the production of plywood, if p is the price of each unit of X and r_j the price of each unit of Z_j, then Ward's maximand is $(pX - \Sigma_i r_i Z_i)/L$ where L denotes the input of labor (here synonymous with co-op membership) and the production function, $X = f(L,Z_1,...,Z_n)$, constrains outputs to be limited by the inputs applied. The income maximization hypothesis.

Under comparable conditions, the capitalist firm's supply function is likely to be more price-responsive than that of the co-op.....negatively-sloped?

Fit by least-squares to panel data on plywood mills - co-op mills and capitalist mills separately -

$$\log(y_{it}) = \delta_i + \alpha \log(p_{it}) + \beta \log(r_{it}) + \varepsilon_{it}$$

where p denotes real plywood prices,

r real log prices,

δ_i is a fixed effect for mill i,

ε is a stochastic disturbance, and

y_{it} represents, in turn, real hourly wages, employment, annual hours per worker, worker-hours, annual real earnings per worker, logs, and output.

Table 2

The Effects of Changes in Plywood Prices and in Log Prices by Type of Firm

$\log(y_{it}) = \delta_i + \alpha \log(\text{output prices})_{it} + \beta \log(\text{raw material input prices})_{it} + \varepsilon_{it}$

dependent variable	Worker cooperatives		Capitalist firms	
	plywood prices α	log prices β	plywood prices α	log prices β
Real Hourly Wages	0.978 (0.160)	-0.225 (0.192)	0.153 (0.151)	-0.044 (0.118)
Employment	-0.005 (0.084)	-0.065 (0.083)	0.657 (0.133)	-0.200 (0.126)
Hours per Worker	0.101 (0.133)	-0.095 (0.141)	0.443 (0.141)	-0.140 (0.083)
Worker-Hours	0.096 (0.131)	-0.160 (0.171)	1.100 (0.205)	-0.340 (0.151)
Annual Real Earnings per Worker	1.079 (0.145)	-0.320 (0.175)	0.596 (0.187)	-0.184 (0.145)
Logs	1.015 (0.396)	-0.982 (0.373)	0.910 (0.327)	-0.407 (0.296)
Output	0.196 (0.225)	-0.473 (0.215)	0.856 (0.274)	-0.423 (0.219)

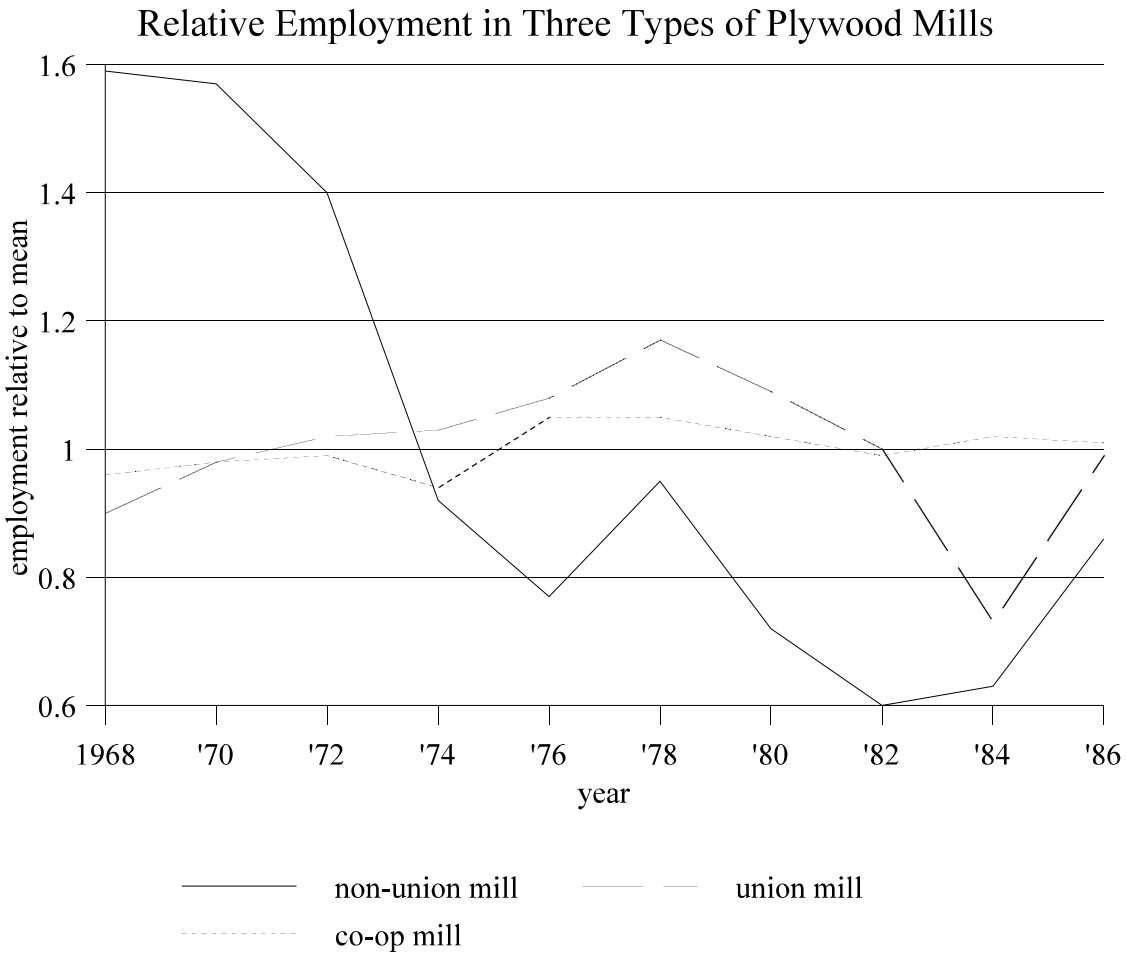
{Formal tests of the income maximization model for the co-ops and profit maximization model for the capitalist firms are contained in Pencavel and Craig, JPE, 1994.}

The elasticity of the output supply function of the capitalist mills is over four times greater than that of the co-op mills (0.856 compared with 0.196). This corroborates the theoretical research implying that a co-op's output supply function would be less price-sensitive than that of the capitalist firm. It is also compatible with anecdotal evidence according to which the capitalist mills regularly complain about the co-ops' readiness to continue full production in times when plywood prices are depressed.

When plywood prices fall, capitalist firms cut back on employment and hours worked and real wages barely change; when plywood prices fall, worker cooperatives cut back on pay and their employment and work hours barely change at all. The volatility of employment in the capitalist firms compared with the co-ops is indicated by the data in Figure 8: the range of employment expressed as a percentage of average employment is 99.0 percent for the non-union mill, 44.7 percent for the union mill, and 11.2 percent for the co-op mill.

The line "Annual Real Earnings per Worker" in Table 2 shows the association between changes in plywood and log prices and changes in a typical worker's annual earnings: a ten percent increase in plywood prices is associated with about a ten percent rise in each co-op's worker's annual earnings; there is little evidence here that the co-op mitigates the fluctuations in earnings for its workers. The fluctuations in earnings for the co-op worker are almost twice that experienced by the employed worker in the conventional firm. Again, are co-op workers are much more risk tolerant than workers in conventional firms?

Figure 8: Employment (Relative to Average) in Three Plywood Mills, 1968-86



Notes: Each line represents employment in a given mill relative to average employment in that mill. The three mills are of different sizes: the nonunion mill's average employment is 114.1 workers; the union mill's average employment is 577.3 workers; and the co-op mill's employment is 241.3 workers.

"Degeneration"

The perennial concern among advocates of worker co-ops has been that the co-op form of organization will "degenerate" into the capitalist firm.

Suppose the number of shareholders, L, and the number of hired workers, H, are selected to maximize the net returns per member: $L^{-1}[pX(H,L) - vH - C]$ where p is the price of each unit of output, X is the level of output, v is the wage paid to each hired worker, and C denotes fixed costs. Suppose an increase in profitability is indicated by a rise in p. If $\partial^2 X/\partial H.\partial L < 0$, then $\partial L/\partial p < 0$ and $\partial H/\partial p > 0$. In other words, in response to an increase in the profitability of operations, the co-op will hire more non-member workers and not replace departing shareholders.

If hired workers are available at a wage lower than the income enjoyed by the shareholders and if after a point the marginal product of shareholders falls as more hired workers are employed, there is an incentive for a profitable co-op to replace departing members with cheaper hired labor.

Plywood Co-ops

Some workers in the plywood mills are employees, not owners. Some are on probationary employment or are waiting until a share becomes available for purchase. Usually the plant manager and production supervisors are hired workers. Many of the office workers - typists, accountants, sales manager - are hired. The hired workers tend to be those workers who would dilute the homogeneity of the membership. Hired workers are more likely to be discharged when plywood prices tumble and they are not consulted in the management of the mill. When hired workers are present, the co-op is not, strictly speaking, an enterprise of workplace democracy.

Table 3

The Employment of Shareholders as a Percentage of Total Employment by Firm and by Year

Firm	1958	1963	1967	1972	1976	1977	1982
A	62.9	64.7	66.2	68.8	71.1	65.6	70.5
B							94.3
C	73.5	82.8	69.7	52.9		54.0	
D	63.6	57.5	60.5				
E	67.0						
F		93.4	97.3	89.8	91.2	96.8	96.8
G		82.3	66.9	68.1	60.8	61.6	76.9
H		74.6	79.0	66.2		60.8	37.5
I	88.6	85.0	81.3	94.4	76.6	76.0	85.8
J	100.0	97.3	78.0	76.4	81.7	71.2	53.3
K	100.0	83.1	77.5	74.5	80.0	76.6	
L	100.0	95.9	93.6	87.6	90.6	89.6	83.7
M	54.7	43.2	49.2	52.6	51.3	45.1	75.2
N	77.3	78.0	76.2	81.9	58.6	59.8	69.6

An empty cell means that data could not be obtained.

After accounting for fixed differences across these mills in the membership fraction, these data do suggest declining relative employment of shareholders over time.

{In other words, if the shareholder percentages are regressed on firm dummies and year dummies, the coefficients on the year dummies imply that the fraction of workers who were shareholders in 1982 is 11.1 percent below that in 1958 and this difference is highly significant in a statistical sense. This way of measuring "degeneration" tends to understate its incidence because the sample consists of continuing co-ops.}

Some firms are less prone to "degeneration" than others. What accounts for this difference?

The Forestry Workers' Co-ops

The workers differed in their industriousness and in their commitment to cooperative principles of decision-making. Because individuals were free to move from crew to crew, differences in work performance and in collaborative attitudes among crews that could have been minimized by the autocratic assignment of people to crews actually were accentuated as the hard workers with desirable group attributes tended to gravitate toward one another. The locus of decision-making, work, and allegiance was the crew and not the wider cooperative. The result was that "good" crews increasingly split off from the original cooperative organization and formed their own, new, cooperative: the better workers are leaving the "mother" co-op leaving it less effective than it was originally.

Is "degeneration" a sign of failure or of success? When a single proprietor becomes a public corporation, most judge that the firm has been a success.

Conclusions

Explanations are needed that allow for the simultaneous presence of both capitalist and worker-owned firms. For example, while the plywood co-ops have thrived in the Pacific Northwest, they have not driven the capitalist firms out of business. The persistence of both capitalist firms and worker co-ops in the same industry, in the same region, and over the same period calls into question many of the commonly-offered reasons for the pattern of worker ownership. The most common explanations draw attention, first, to the difficulty that worker co-ops face in obtaining capital and, second, to technologically-driven distinctions among workers so that heterogeneous workers cannot resolve their innate differences. It is not clear how these explanations are able to account for the simultaneous presence of co-ops and capitalist firms in the plywood industry in the Pacific Northwest. Most of the explanations would suggest a dominance of one type of firm to the virtual exclusion of the other, not the coexistence of both varieties of firms in significant numbers.

An explanation emphasized here is that the two types of firms appeal to different classes of workers. The co-op is by its very nature a very risky venture for a typical worker and only those tolerant of high risk will be willing to hazard both their labor income and their capital income to the unpredictable fortunes of the enterprise. This high risk is the major cause, I believe, of the undervaluation of the prices of the co-ops' shares. Employment in capitalist firms is not without risk, of course. However, the employee can place his capital income in a venture whose returns are uncorrelated with his labor income. The more risk tolerant workers prefer employment in the co-op while the more risk averse prefer employment in the capitalist firm. The employees of a capitalist firm face more employment-risk than the worker-members of the co-op. However, unless the capitalist firm is in dire distress, most capitalist firms make marginal employment adjustments and,

with seniority, many employees of capitalist firms feel they are protected from all but the most drastic of business shocks.

Individuals who are tolerant of risk are inclined to work in the co-ops while those more risk-averse choose to work in the conventional mills so the persistence of both firm types represents a separating equilibrium allowing a choice for workers with different attitudes to risk.

The experiences of the co-ops in the Pacific Northwest testify to the difficulty that such organizations face: they are intrinsically risky enterprises and often their very structure may contain incentives for their own evolution to capitalist firms. Yet, at the same time, the experiences of the co-ops attest to the fact that they can be durable organizations appealing to many workers. Their appeal is based on the facts that

- they offer an opportunity for workers to participate in shaping the environment in which they earn their living,
- they offer much more security against cyclical layoffs than conventional firms, and
- they are typically no less efficient, probably more efficient, than capitalist firms.

Can these benefits - the opportunity to shape the production environment, the greater security of employment, the gains in production efficiency - be extended to workers in other organizations by some sort of structural reforms?