TECHNOLOGICAL PREFERENCES OF CAPITALIST
AND WORKERS' ENTERPRISES

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1. BACKGROUND

We start from the background of Dirickx and Sertel (1979) by considering a competitive economy of workers' cooperatives and capitalistic firms utilizing the same technology, giving output

$$Y = K^a L^b \qquad (0 < a, \ b; \ a + b < 1) \tag{1}$$

as a function of capital goods $K \geqslant 0$ and labor $L = \sum_{i=1}^{n} x_i \geqslant 0$

utilized, where x_i is the labor contributed by the worker $i \, \varepsilon \, N = \{1, \ldots, n\}$. Each worker i has utility

$$u_i = y - x_i^c \qquad (1 < c).$$

A *workers'* cooperative here is understood as a firm whose partners coincide with its workers, a *capitalistic firm* as one whose partners are all non-workers. It turns out that at long-run equilibrium the typical member of a workers' cooperative enjoys the utility.

$$u = \frac{c \, (1-a) - b}{b} x^c \tag{2}$$

and that profit per worker in the capitalistic counterpart is

$$p = \frac{c \, (1 - a - b)}{b} x^c \tag{3}$$

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where

$$x = \left[\left(\frac{a}{r} \right)^a \left(\frac{b}{c} \right)^{1-a} \left(\frac{1}{n} \right)^{1-a-b} \right]^{\overline{c(1-a)-b}}$$

(4)

is the labor contributed by each of the n workers when capital goods K are rented at a rental $r < 0$. Furthermore, we know from Sertel (1980) that the size n is the same for the two types of firm utilizing the same tchnology (1) as price-takers in a competitive economy, both in the long and in the short run, so long as a competitive worker-partnership market is operative, allowing workers to bid their way in and out of workers' cooperatives as members.

Finally, we know from Dirickx and Sertel (1979) that (2), (3) and (4) hold in the limit as $a + b$ tends to unity, i.e. as technology gets homogeneous of first degree (with constant returns to scale). [(See also Dirickx and Sertel (1978)].

2. RESULTS

In the limiting case, i.e. as $a + b \to 1$, (2), (3') and (4) become respectively,

$$u = (c-1) x^c,$$

(2')

$$p = 0,$$

(3')

$$x = \left[\left(\frac{a}{r} \right)^a \left(\frac{b}{c} \right)^b \right]^{\frac{1}{(c-1)b}}$$

(4')

Subject to the restriction

$$a + b = 1,$$

(5)

we now consider the marginal merit in an innovation increasing b (at the expense of a) for the two types of enterprise — the capitalistic firm and the workers' cooperative-considered at their equilibrium positions identified above through (2), (3) and (4) (or now through (2'), (3') and (4').

It is evident from (3') that $\partial p / \partial b = 0$, so that the capitalistic firm is indifferent to a change in $b = 1 - a$. Not so, however, for the workers' cooperative, since,

$$\partial \ln u / \partial a = \frac{c}{b^2 (C-1)} \ln \left(\frac{a}{r} \right).$$

(6)

The immediate question concerns the sign of (6).

In this regard, we recall from Dirickx and Sertel (1980) that (r/a) is nothing but the long-run capital/output ratio for both types of firm in our economy, so it exceeds unity (say, it appoximates 3). Thus (6) is negative. Consequently, $\partial u / \partial a < 0$ and so $\partial u / \partial b > 0$.

3. CONCLUSIONS AND CLOSING REMARKS

In conclusion we see that, considered at their equilibrium utilizing the same Cobb-Douglas production function with constant returns to scale, the capitalistic firm and the workers' cooperative greet the examined type of technological change differently. In particular, the workers' cooperative is willing to pay for a change, increasing the elasticity b of output with respect to labor expended, while the capitalistic firm is indifferent to such changes when production is constrained to exhibit constant returns to scale.

This, in turn, may imply at least one or both of two consequences for a socialistic sector of workers' cooperatives. Their higher propensity to invest in increasing b/a might lead to their admitting worker-partners with higher productive effectiveness than their capitalistic counterparts, or it could imply their greater investment in education and training or health programs increasing the productive effectiveness of their members. The willingness of a workers' cooperative to increase b/a may be seen as a relatively high propensity to invest in a greater productive effectiveness of their workers, in the sense of the elasticity b of output with respect to their efforts, all to the mutual benefit of these worker-partners. Either of these would indicate towards a tendency for the productively more effective citizens to congregate in the workers' cooperatives. These implications may be worth testing empirically.

Evidently, the background of Section 1 above can be used as a point of departure to compare the attitudes of capitalistic firms and workers' cooperatives toward technological change under more general conditions than constant returns to scale. In particular, it might be of interest to examine the matter with decreasing returns to scale where either

(i) $a + b = s < 1$ or
(ii) $a + b < 1$ but one is not constrained to

$da/db = -1$. Furthermore, the models of Dirickx and Sertel (1978, 1979), allow for a certain dosage of increasing returns to scale, and (i)—(ii) may be extended accordingly.

Finally, one has to return to the sequence of "nutshells" of comparative political economy (Dirickx and Sertel 1978, 1978 a, 1979) and question the robustness of their results to variously specified forms of possibilities in choice of technology. After all, Dirickx and Sertel (1978) had all firms using the same tehcnology *and* the same capital goods, and Dirickx and Sertel (1978 a, 1979) allowed each type of firm to pick its indigenous level of utilization of capital goods, whilst sharing the same production function with all its competitors. Since there is reason to believe (witness the simple results above) that workers' cooperatives may choose production functions differing from those preferred by their capitalistic competitors, there appears to be room for improvement on the nutshells of Dirickx and Sertel (1978, 1978 a, 1979), allowing firms now to settle at their chosen productions functions among those available.

This humble note will justify its having been written if the above avenue of research is pursued.

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TEHNOLOŠKE PREFERENCE KAPITALISTIČKIH I RADNIČKIH PREDUZEĆA

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Rezime

U članku se razmatra sledeće pitanje: da li radnički kooperativi (katkada nazvani »samoupravnim preduzećima«) imaju drukčije preference prema tehnologiji kojom se koriste nego kapitalistička preduzeća? Tamo gde je raspoloživa tehnologija predstavljena Cobb-Douglasovom proizvodnom funkcijom oblika $Y = K^{1-b}L^b$ — odgovor je potvrdan. Zaista, u stanju ravnoteže u konkurentnoj privredi u kojoj postoje i kapitalistička preduzeća, radnički kooperativi na koje se, kao i na kapitalistička preduzeća, može primeniti pomenuta proizvodna funkcija — biće zainteresovani za inovaciju koja povećava eksponent b u Cobb-Douglasovoj proizvodnoj funkciji, dok će kapitalistička preduzeća takvu inovaciju tretirati sa indiferencijom.