INVESTMENT DECISIONS IN A WORKER-MANAGED FIRM

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1. FOREWORD

Along with the model of the self-managed firm which has been taking shape in Yugoslavia since 1950, in the last twenty — or, better, ten — years, rich economic literature[1] has been emerging.

The term "Worker-Managed Firm" (WMF) indicates a firm in which all the workers hold the decision-making power, both for current management and for investments. The entrepreneurial role attributed to the workers leads to a variability in their remunerations, settled *ex post* according to proceeds and non-labour costs. The workers, however, have no individual ownership rights on the net assets of the firm, the value of which they must maintain through adequate amortization in order to avoid the turning of capital into income[2]. In particular, this means that any decision to retain earnings is irreversible. In fact, individual workers cannot — even partially — regain them during their tenure with the firm, when resigning, or when the firm closes. The only benefit they can receive from such a decision is a higher flow of future earnings that will be enjoyed by the individual workers until they leave the firm[3].

The aim of this paper is, firstly, to consider carefully the problems linked to the evaluation of investments in the WMF and to stress the implications of the above-mentioned juridical order; secondly, this paper tries to make a comparison with the investment decisions of a capitalist twin-firm, and finally, the effects of intervention by public agencies to make WMFs more inclined to investment are examined.

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[2] Some authors, among them Vanek (1975, p. 15), distinguish between the WMF and the Labour-Managed Firm, the latter being characterized by the absence of collective ownership and by external financing only.
[3] The scheme of the WMF described follows, in some features, the juridical status of Yugoslavian associated working organizations after the 1965 reform. Producer Co-operatives are different from this model, and have different regulations from country to country, because of the co-existence of indivisible collective ownership and private ownership (in the shape of shares of generally limited amount, with the right of refund) of social assets. They can then be regarded as spurious types of WMFs.

2 .PROBLEMS LINKED TO THE EVALUATION OF INVESTMENTS IN A WMF

A proposal for the study of investment decisions in a WMF is given in the works of Furubotn and Pejovich (in particular: Furubotn and Pejovch, 1970; Pejovich, 1973), who introduced the concept of "adjusted rate of return", which takes into account the fact that the individual workers cannot regain the collectively-invested capital: the shorter the tenure with the firm, the lower the adjusted rate. The two authors compare this with the return on the assets that each worker could acquire on his own whenever the income was totally distributed.

Vanek (1970) suggests a criterion for the evaluation of the various alternative investments by assuming — unlike the above mentioned authors — totally external financing and varying membership. He starts from a comparison among the levels of "multi-period per-capita income" linked to each project. By stating this, he refers to the level of remuneration that, if paid to each worker in each period, would make the present value of the flow of expected outlays equal to that of expected receipts — whenever the rate of discount used was equal to the "market rate of interest".

Such attempts seem to suggest the possibility of evaluating the investment projects that a group of self-managers has to undertake according to a criterion similar to those adopted in the case of a privately-owned firm.

A first remark could refer to the applicability of the concept of rate of return on the newly-invested capital to the WMF, based, as known, on the expected variation of the cash flow, which includes labour remunerations among outlays. In the WMF, however, labour itself is given the role of a residual claimant on income, and an appropriate definition of cash flow should exclude payments to workers from costs. In order to obtain a comparable result, an imputed labour-cost could be adopted, settled on the basis of the per-capita income expected in the case of not carrying out any projects.

In such a way, the calculation of a rate of return is possible in the WMF as well. However, the following remarks suggest that it is no to be used as a measure of the advantage the workers can receive from the various projects.[4] First of all, it is computed by referring the expected economic results to the amount of the newly-invested capital. The fact that this clashes with the role of labour in the WMF is clearly shown if it is noticed that such a rate is not influenced by the fact that the number of claimants on the residual income can vary according to the alternative chosen. It can then be stressed that the profitability of a project for a worker depends on subjective factors much more than for a share-holder of a limited company. Therefore, a profitability calculation for the firm as such, based on the comparison between the rate of return and the cost of capital, is inadequate. It depends, first of

all, on the different lengths of the expected tenure of single workers with the firm, which give rise to a whole range of decisional horizons. Secondly, the imputation of a capital-cost for the use of non-distributed earnings demands the examination of sufficiently objective elements. For example, in a limited company, quoted in the stock exchange, the average rate of return on shares could be considered, in which case the discount rates of single share-holders should not be much higher or lower, given the possibility for them to buy or sell shares of the company. Since an equivalent of the share market does not exist for WMF partnership rights, the difference among the single discount rates cannot be eliminated.

With reference to what has already been stated on the non-coincidence between the profitability calculations for the firm as such and for individual members, it could also be said that an approach based on the cash flow does not take into account constraints on the settlement of labour remunerations as the probable prohibition of distributing expected future earnings and the obligation for amortization, both of which derive from the above-mentioned obligation to maintain the value of net assets.

To sum up, the flow of per-capita distributable income must be considered instead of the cash flow of the firm. This statement can be valid for other types of firms as well, but it is not as essential as in the WMF because, in the case of privately-owned assets, what is not distributed today — even if it cannot be distributed in the future either — increases the market value of the firm.

At this point, let us briefly discuss the acceptability for a self-managed firm of an employment reduction exceeding resignations and retirements.

If such a measure is unlikely to be adopted in order to attain a short-run optimum, it could be judged unavoidable when facing a structural crisis[5]. In this case, not only does the possibility of being dismissed strongly modify the economic evaluation of a project[6], but solidarity or justice feelings could be given prior consideration. For this reason, in the following, we shall refer only to projects for which the firing of members is not required.

Moreover, when a relevant number of workers — for any reasons — are going to leave the firm, a large reinvestment is unlikely to be imposed on them.

3. PROPOSAL FOR AN EVALUATION SCHEME

According to what has been said up to now, a scheme to evaluate an investment project by a member of a worker-managed firm can be set up using the following quantities:

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[4] We shall not make any remarks here about the use of the rate of return as a profitability index not regarding the peculiarities of self-managed firms. As to them, see ad hoc issues, e.g., Porterfield (1965).

[5] The case of an Italian workers' cooperative which decided on a drastic staff reduction, carried out by choosing the members to be fired through democratic voting, is quoted in Carpanelli (ed.) (1978).

[6] See: Steinherr and Thisse (1979).

n = expected length of worker's tenure with the firm;

d = discount rate of the worker[7];

L_o = number of workers — who, for facility purposes, are supposed to have the same working ability and reward — at 0 time, i.e. at the moment of decision;

L_t^* = expected number of workers in the t-th period ($t = 1, 2, \ldots, n$), in the case of not carrying out any projects (that will be indicated as "Alternative 0");

L_t = the same, in case of carrying out the project;

DI_t^* = expected total distributable income; t-th period; Alternative 0;

C = initial expenditure for carrying out the project (for facility purposes, we refer to the point input-continuous output case)[8];

ΔVA_t = expected change in value added in comparison with Alternative 0, reduced by the corresponding change in the costs for the use of primary non-labour productive factors (the costs imputable to the financing of the initial expenditure C excluded)[9];

ΔD_t = depreciation allowances relevant to new assets in the t-th period;

q = share of the initial expenditure externally borne;

i = rate of interest on the loan;

m = term of the loan;

b_t = share of principal already refunded in the t-th period;

I_t = interests on the loan in the t-th period. According to the previous definitions: $I_t = i \cdot q \cdot C (1 - b_t)$;

ΔNA_t = change in net financial assets (e.g., increase in bank deposits or short-term debt reduction) due to amortization and loan repayments. It will be:

$$\Delta NA_t = \sum_{j=1}^{t-1} \Delta D_j - q \cdot C \cdot b_t$$

r = average rate of return on ΔNA_t;

ΔFP_t = change in net financial proceeds in comparison with the Alternative 0, due to ΔNA_t. We then have: $\Delta FP_t = r \cdot \Delta NA_t$;

ΔDI_t = expected change in total distributable income, with respect to the Alternative 0, in the t-th period. We then have:

$$\Delta DI_t = \Delta VA_t - \Delta D_t - I_t + \Delta FP_t.$$

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[7] It can coincide with the rate of return on possible assets or with the rate paid on possible debts, but in general, much more cannot be said.

Anyway, a variability of d according to the amount of initial reinvestment will not be regarded.

[8] If the firm already has available funds to partially cover the initial expenditure, we indicate the rest by C.

[9] This apparently complicated definition is suggested by the need to have a quantity relevant to internal claimants and whose definition is independent of the financing of the initial expenditure. As will be seen, it is consistent with the definition of ΔFP_t.

Let us assume that, after the initial reinvestment of the amount $(1 - q) C$[10], no further cut in the distributable income is required for debt refunding[11], and that this measure is not taken for other reasons. As a result, the change in the present value of the flow of expected income for the worker — in comparison with Alternative 0 — can be indicated as follows:

$$V = \sum_{t=1}^{n} \left(\frac{DI_t^* + \Delta DI_t}{L_t} - \frac{DI_t^*}{L_t^*} \right) (1 + d)^{-t} - \frac{(1 - q) \cdot C}{L_o} =$$

$$= \sum_{t=1}^{n} \left(\frac{DI_t^* + (\Delta VA_t - \Delta D_t - I_t + \Delta FP_t)}{L_t} - \frac{DI_t^*}{L_t^*} \right) (1 + d)^{-t} -$$

$$- \frac{(1 - q) C}{L_o}$$

4. EFFECTS OF VARIATIONS OF q

By the expression of V, the effects of variations of the share of the initial expenditure externally financed, q — which can be bound not to exceed a certain $\bar{q}$ value in order to make the self-managers jointly responsible — can be examined.

For simplicity, let us assume that: $L_t = L_1$; $L_t^* = L_o$, where $t = 1, 2, \ldots, n$.

The sign of:

$$\frac{\partial V}{\partial q} = \sum_{t=1}^{n} \frac{\dfrac{\partial I_t}{\partial q} + \dfrac{\partial \Delta FP_t}{\partial q}}{L_1} (1 + d)^{-t} + \frac{C \cdot}{L_o} =$$

$$= C \left[- \sum_{t=1}^{n} \frac{i (1 - b_t) + r b_t}{L_1} (1 + d)^{-t} + \frac{1}{L_o} \right]$$

can be studied more easily by assuming that $r = i$. This does not

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[10] It is the share of initial expenditure not covered by other sources. Obviously, according to the definition, it must be: $1 - q \geqslant 0$.

[11] It must be noted that the lower q is, the more reasonable it is to suppose a debt repayment not exceeding ΔD_t. But, even if the opposite is true, the existence of depreciation allowances relevant to other assets can make the transfer of further wealth from individual workers to the firm unnecessary.

change the essence of conclusions[12] and, therefore, we have:

$$\frac{\partial V}{\partial q} > 0 \text{ if and only if } \frac{i}{L_l} \sum_{t=1}^{n} (1 + d)^{-t} + \frac{1}{\cdot L_o} > 0$$

that is to say, if, and only if

$$\frac{L_l}{L_o} > \frac{\dfrac{i}{l}}{\displaystyle\sum_{t=1}^{n} (1 + d)^{-t}} = \frac{i}{d}\left[1 - (1 + d)^{-n}\right]$$

Notice that (the term in square brackets ranging between 0 and 1) an increased recourse to external finance makes the WMF better off for all "socially acceptable" projects if the interest rate i is not too much higher than the discount rate d.

5. COMPARISON WITH THE CAPITALIST FIRM

An attempt at comparing the investment decisions of a capitalist firm (CF)[13] with identical characteristics and operating in the same environment can be made by using the definitions of the WMF.

To do this in a more direct way, the following hypothesis relevant to the CF will be adopted:

a) in the initial period, the owners can increase the firm's net assets by reinvestment and/or by direct contributions (proportional to their shares), but in the following ones net assets are kept constant by drawing all profits or by compensating losses (in other words, the distributed income is equal to what we have referred to as distributable income).

If w_t is the expected unitary wage in the t-th period, and if the meanings of the other symbols are unchanged, the expected change in

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[12] If $i \neq r$, the summation in square brackets of the expression of $\dfrac{\partial V}{\partial q}$

is anyway included in the following interval:

$$\left(\frac{\min(i,r)}{L_l}\sum_{t=1}^{n}(1+d)^{-t}, \quad \frac{\max(i,r)}{L_l}\sum_{t=1}^{n}(1+d)^{-t}\right)$$

[13] That is to say, characterized by private ownership of assets and use of subordinate work. Subsequently, the paper will hint at owners regardless of the number (one or more) and of the juridical order of the firm (a partnership or a limited company).

the present value of the CF due to the investment is given — in the evaluation of an owner — by:

$$W = \sum_{i=1}^{n}\left[\Delta DI_t - (L_l - L_o)\,w_t\right](1 + d)^{-t} -$$

$$- (1 - q)\,C + (1 - q)\,C \cdot (1 + d)^{-n}$$

where the last addend is the present value of the increase in the market value of the firm at the end of the n-th period (if, in subsequent periods, the income is totally distributed and if the book value of the new fixed assets coincides with the actual one, the increase is equal to the undistributed earnings at zero time).

Similarly to what has been done for the WMF, the effects of variations of q — which is supposed to be under the firm's control — on W can be examined. It follows that:

$$\frac{\partial W}{\partial q} = \sum_{t=1}^{n}\left(\frac{\partial I_t}{\partial q} + \frac{\partial \Delta FP_t}{\partial q}\right)(1 + d)^{-t} + C\left[1 - (1 + d)^{-n}\right] =$$

$$= C\left\{-\sum_{t=1}^{n}\left[i\,(1 - b_t) + rb_t\right](1 + d)^{-t} + \left[1 - (1 + d)^{-n}\right]\right\}.$$

Similarly, again, to what has been done for $\dfrac{\partial V}{\partial q}$, the following implication is obtained:

$$\frac{\partial W}{\partial q} > 0 \text{ if, and only if } 1 > \frac{i \cdot \displaystyle\sum_{t=1}^{n}(1 + d)^{-t}}{1 - (1 + d)^{-n}} = \frac{i}{d}$$

In other words, as was easily foreseeable, for the CF the result is that a higher recourse to external funds is advantageous if, and only if, the interest rate is lower than the owner's discount rate.

Should the two firms initially be in the same situation, L_o, $DI_1^\circ, \ldots,$ DI_n° are the same for both.

The following hypothesis can then be considered:

b) the discount rate, d, and the time horizon, n, are the same both for the WMF worker and for the CF owner.

Given a specific project L_l, C and — when the same value of q is chosen by the two firms — ΔDI_1, $\Delta DI_2 \ldots$, ΔDI_n are given and coincide for both the WMF and the CF.

Let us consider then the two following expressions:

$$V = \sum_{t=1}^{n} \left(\frac{\Delta DI_t}{L_t} - \frac{L_t - L_o}{L_t} \frac{DI_t^o}{L_o} \right)(1 + d)^{-t} - \frac{(1-q)C}{L_o}$$

$$\frac{W}{L_t} = \sum_{t=1}^{n} \left(\frac{\Delta DI_t}{L_t} - \frac{L_t - L_o}{L_t} w_t \right)(1 + d)^{-t} - \frac{(1-q)C}{L_t} \cdot [1 - (1 + d)^{-n}].$$

The advantage of having divided W by L_t lies in the fact that $\frac{W}{L_t} - V$ does not depend on ΔDI_t. In fact, we have:

$$\frac{W}{L_t} - V = -\frac{L_t - L_o}{L_t} \sum_{t=1}^{n} \left(w_t - \frac{DI_t^o}{L_o} \right)(1 + d)^{-t} - (1-q) \cdot$$

$$\cdot C \left[\frac{1 - (1 + d)^{-n}}{L_t} - \frac{1}{L_o} \right].$$

If:

$$X = \sum_{t=1}^{n} \left(w_t - \frac{DI_t^o}{L_o} \right)(1 + d)^{-t}; \quad Y = (1-q)C;$$

$$Z = 1 - (1 + d)^{-n}$$

it is, more simply:

$$\frac{W}{L_t} - V = -\frac{L_t - L_o}{L_t} X - Y \left(\frac{Z}{L_t} - \frac{1}{L_o} \right)$$

While Y is the amount of undistributed earnings in the initial period, and Z — whose values range between 0 and 1 — the loss of present value due to the postponement in the availability of a monetary unit by n years, X can be understood both as the opposite of the present value of the flow of the CF profit per worker in Alternative 0, and as the difference between the present value of the flow of remunerations of a worker in the CF and in the WMF respectively — or, more briefly, between the "multi-period unit labour cost" in the former and (the imputed one) in the latter.

If the time horizon is given by the worker's expected tenure with the WMF, and if the discount rate is independent of the project being

examined, not even the values of X and Z depend on it. The value of Y, instead, depends on the project through the amount of initial expenditure C and, possibly, the share of external financing q.

For given X and Z the sign of $\frac{W}{L_t} - V$ as a function of L_t and Y is shown in figures 1A, 1B, and 1C, which refer respectively to the cases $X < 0$, $X = 0$, $X > 0$[14].

It is clear that, if a project is profitable for the WMF (that is $V > 0$), and if for the values of L_t and Y corresponding to it we have $\frac{W}{L_t} - V > 0$, it is no doubt profitable for the CF, too (that is $W > 0$); vice-versa, given a project for which it is $W > 0$ and $\frac{W}{L_t} - V < 0$, undoubtedly it is $V > 0$.

In other words, considering the set of projects for which the pair (L_t, Y) satisfies the inequality $\frac{W}{L_t} - V > 0$ (i.e., belongs to the regions of the plane marked by + in figures 1) the subset of those which are profitable for the WMF is included in the corresponding for the CF; the opposite is true when $\frac{W}{L_t} - V < 0$.

We can interpret the figure 1B by observing that, when the "multi-period unit labour cost" is the same for the two firms, the value of L_t influences $\frac{W}{L_t} - V$ only through the denominator of the second

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[14] Let: $\hat{Y}(L_t; X, Z) = \frac{(L_o - L_t) L_o X}{L_o Z - L_t}$ for $L_t \neq L_o Z$.

We have:

$$\frac{W}{L_t} - V \gtreqless 0 \iff \begin{cases} Y \lesseqgtr \hat{Y}(L_t; X, Z) & \text{for } L_t < L_o Z \\ 0 \lesseqgtr X & \text{for } L_t = L_o Z \\ Y \gtreqless \hat{Y}(L_t; X, Z) & \text{for } L_t > L_o Z \end{cases}$$

Being:

$$\frac{\partial Y}{\partial L_t} = \frac{L_o^2 (1 - Z)}{(L_o Z - L_t)^2} X$$

the sign of $\frac{\partial \hat{Y}}{\partial L_t}$ coincides with that of X, given that $Z < 1$.

term in the expression of $\dfrac{W}{L_l}$; hence, the result is that the CF is relatively advantaged as to investment by higher values of L_l[15]. But if the CF (resp., the WMF) faces a lower "multi-period unit labour cost" — that is $X < 0$ (resp. $X > 0$) — for $L_l > L_0$, besides the previous effect, a relative advantage arises due to a lesser cost increase with respect to the other one, and vice-versa when $L_l < L_0$, as is shown in figure 1A) (resp. 1C).

If the social limitations discussed at the end of paragraph 2. bring us to exclude the points (L_l, Y) on the left of the curve AA, we can draw the following conclusions. The property rights structure of the WMF reduces its ability to profitably invest with respect to the CF, with the exception of:

a) projects involving a slight reduction of employment and a limited reinvestment, if the WMF's imputed "multi-period unit labour cost" is higher;

b) projects involving an expansion of employment and a limited reinvestment if the WMF's imputed "multi-period unit labour cost" is lower.

It must be said that the last case (i.e. $X > 0$) implies a negative present value of CF's profit flow in Alternative 0, that is an overly high wage level and/or increase, with reference to the initial firm structure. But the WMF can continue operating though rewarding labour less, either if labour supply is rationed at the current wage level, or if people prefer a self-manager's to a subordinate worker's status[16]. But if this is not the case, the WMF should impute a labour cost equal to w_l, which implies that $X > 0$ could never occur.

If the choice of q by the two firms is not the same, as we were supposing until now, the comparison just made can be easily modified. If we observe that, given the assumed independence of i and d on q, neither $\dfrac{\partial W}{\partial q}$ nor $\dfrac{\partial V}{\partial q}$ depend on q, it follows that the choice of q by the two firms can be supposed to be $q = 0$ or $q = \bar{q}$. Given the "social constraint" on L_l, looking at the expression of $\dfrac{\partial V}{\partial q}$ we can conclude that the WMF almost certainly chooses to plough back as least as possible. So it is when $i > d$ — in which case the CF chooses $q = 0$ — that the two external financing shares do not coincide.

[15] The reason is, once again, that in the WMF those enjoying higher future incomes are not necessarily those who have the initial reduction in income.

[16] This is just what Steinherr (1977) assumes, including an index of the degree of participation to decision-making as an argument of the utility function, besides money income.

If we explicitly state the dependence of W on q, from the expression of $\dfrac{\partial W}{\partial \bar{q}}$ we have:

$$W(0) = W(\bar{q}) + \int_{\frac{i}{q}}^{0} \frac{\partial W}{\partial q} dq = W(\bar{q}) + CZ\left(\frac{i}{d} - 1\right)\bar{q}$$

Let $Q = CZ\left(\dfrac{i}{d} - 1\right)\bar{q}$, which in the case being examined is positive; we obtain:

$$\frac{W(0)}{L_l} - V(\bar{q}) = \left[\frac{W(0)}{L_l} - \frac{W(\bar{q})}{L_l}\right] + \left[\frac{W(\bar{q})}{L_l} - V(\bar{q})\right] = \frac{Q}{L_l} +$$

$$+ \left[\frac{W(\bar{q})}{L_l} - V(\bar{q})\right].$$

Since the acceptance of a project by the two firms depends respectively on the sign of $W(0)$ and $V(\bar{q})$, we can conclude that the CF is less, equally or more inclined to investment with respect to the WMF according to:

$$\frac{W(\bar{q})}{L_l} - V(\bar{q}) \underset{<}{\overset{>}{=}} -\frac{Q}{L_l}$$

If $\bar{Y}$ denotes the amount of retained earnings when $q = \bar{q}$, the new situation — obviosly even less favourable to the WMF — is shown in figures 2A—2E[17].

[17] Let $\bar{\bar{Y}}(L_l; X, Z) = \dfrac{(L_0 - L_l)L_0 X}{L_0 Z - L_l} + \dfrac{Q L_0}{L_0 Z - L_l}$ for $L_l \neq L_0 Z$

we have

$$\frac{W(0)}{L_l} - V(\bar{q}) \underset{<}{\overset{>}{=}} 0 \qquad \begin{cases} \bar{Y} \underset{>}{\overset{<}{=}} \bar{\bar{Y}}(L_l; X, Z) & \text{for } L_l < L_0 Z \\ 0 \underset{<}{\overset{>}{=}} (1 - Z)L_0 X + Q & \text{for } L_l = L_0 Z \\ \bar{Y} \underset{<}{\overset{>}{=}} \bar{\bar{Y}}(L_l; X, Z) & \text{for } L_l > L_0 Z \end{cases}$$

Being

$$\frac{\partial \bar{\bar{Y}}}{\partial L_l} = \frac{L_0}{L_0 Z - L_l}[(1 - Z)L_0 X + Q]$$

the sign of $\dfrac{\partial \bar{\bar{Y}}}{\partial L_l}$ coicides with that of the term in square brackets.

Before accepting the previous results, it is time to briefly return to hypotheses a) and b) in order to consider their acceptability.

I. The assumption of a total income distribution for the CF and of a time horizon equal to that of the worker-managers does not substantially change the results relevant to it.

On the contrary, the adoption in the comparison of a positive reinvestment in a subsequent period would be clearly disadvantageous for the WMF.

II. The assumed equality of discount rates immediately demands a cautious evaluation of n by the WMF worker, so not to have to increase his discount rate by a premium for the higher variability of V in comparison with W, depending on the variability of n[18].
As to the pure time preference of WMF workers, it must be noted that it is not limited upwards by the possibility of trasforming into money their claims on the economic results of the firm (as, vice-versa, can be done by the CF owner).

6. THE EFFECTS OF GOVERNMENTAL SUBSIDIES TO THE WMF

The conclusion that the CF is more dynamic than the WMF, when operating at the same conditions, can appear obvious. It may then be worthwhile to examine the effects on the previous comparison of some measures taken by public powers in favour of the WMF.

We shall consider two kinds of incentives specifically linked to investment:

1) a capital contribution amounting to a fraction k of the initial expenditure C, which reduces the initial need for retained earnings[19].

2) a subsidy proportionate to the interest burden, which diminishes by Δi the rate effectively paid on the loan[20].

The effect of the first one on V is an increase equal to $\dfrac{kC}{L_0}$. It can

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[18] See, on this matter, Atkinson (1975).
[19] It could take the form of a tax reduction on retained earnings. See Stephen (1979, p. 151).
We suppose $k < 1 - q$.

[20] Obviously, $\Delta i < i$.

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be shown that, if the value of q is the same for the two firms, the previous results regarding the sign of $\dfrac{W}{L_I} - V$ are still valid if

$\hat{Y}(L_I; X, Z)$ is substituted by $\hat{Y}(L_I; \dfrac{X}{T}, \dfrac{Z}{T})$, where $T = \dfrac{1 - q - k}{1 - q}$[21].

If ΔI_t denotes the interest reduction in period t, the increase in V due to the second type of incentive is given by:

$$\sum_{t=1}^{n} \frac{\Delta I_t (1 + d)^{-t}}{L_I} = \frac{\Delta i q C}{L_I} \cdot \sum_{t=1}^{n} (1 - b_t)(1 + d)^{-t}$$

or, more simply, by $\dfrac{fC}{L_I}$, if:

$$f = \Delta i \cdot q \cdot \sum_{t=1}^{n} (1 - b_t)(1 + d)^{-t}$$

In this case the results regarding the sign of $\dfrac{W}{L_I} - V$ are obtained by substituting $\hat{Y}(L_I; X, U)$, where:

$$U = Z + \frac{f}{1 - q}[22].$$

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[21] From $\dfrac{W}{L_I} - V = -Y\left(\dfrac{Z}{L_I} - \dfrac{1}{L_0}\right) - X\dfrac{L_I - L_0}{L_I} - \dfrac{kC}{L_0}$,

noticing that $C = \dfrac{Y}{1 - q}$, we obtain

$$\frac{W}{L_I} - V \gtreqless 0 \Leftrightarrow Y\left(\frac{Z}{L_I} - \frac{\frac{1 - q - k}{1 - q}}{L_0}\right) \lesseqgtr \frac{L_0 - L_I}{L_I} \cdot X.$$

[22] From $\dfrac{W}{L_I} - V = -Y\left(\dfrac{Z}{L_I} - \dfrac{1}{L_0}\right) - X\dfrac{L_I - L_0}{L_I} - \dfrac{fC}{L_I}$

and $C = \dfrac{Y}{1 - q}$ we obtain

$$\frac{W}{L_I} - V = -Y\left(\frac{Z + \frac{f}{1 - q}}{L_I} - \frac{1}{L_0}\right) - X\frac{L_I - L_0}{L_I}.$$

As is easily understood, the effect of the two types of measures is to widen the zone marked by —. Relevant variations are obtained in the first case when $T < Z$ (i.e. $\frac{Z}{T} > 1$) and in the second when $U > 1$, as is shown respectively by figures 3 and 4.

We point out that the capital contribution is more proper and fair, due to the fact that it is enjoyed only by the workers who have the initial income reduction, whilst the interest diminution is enjoyed also by workers joining the WMF successively; subsequently, its efficacy for a given expenditure is as lower as L_l is bigger. Moreover, it can be noticed that, if the term of the loan exceeds the time horizon n, the interest reduction in the periods following the n-th has no stimulating effect.

CONCLUSIONS

The analysis carried out points to the shortcomings in the investments of a firm characterized by a collective ownership system like the one described at the beginning. In particular, a simultaneous rise in employment and self-financed capital — which is a necessary condition for safe growth — is much less likely to occur than in a firm characterized by privately-owned assets.

This result, moreover supported by the historical experience, does not seem to be determined by the simple peculiarities of the considered model; in particular, if the possible stimulating effect on investment due to a supposed higher productivity of participatory settings has not been included in the analysis, the introduction of the possibility of further future reinvestment decisions (also having been disregarded) would have a counterbalancing effect.

The development in a mixed economy of a self-managed productive sector of considerable dimensions consequently requires public support, especially in the form of investment incentives. In other words, the spreading of productive organizations in which the human dignity of each participant is enhanced by returning him the right to guide his own activity does have a cost. But if we consider that many Western countries are paying a similar cost to take over or to prevent the collapse of capitalistically-run enterprises, the self-management proposal cannot be *a priori* discarded as unfeasible.

It is worthwhile to stress again the dependence of the obtained results on the considered property rights structure. A way of attenuating if not eliminating the mentioned weak points of the self-managed firm can be sought in a better recognition of individual contributions to accumulation, i.e., allowing (with opportune limitations) the right to regain retained earnings.

This argument is deserving of more attention, a task which will be undertaken by the author in the near future.
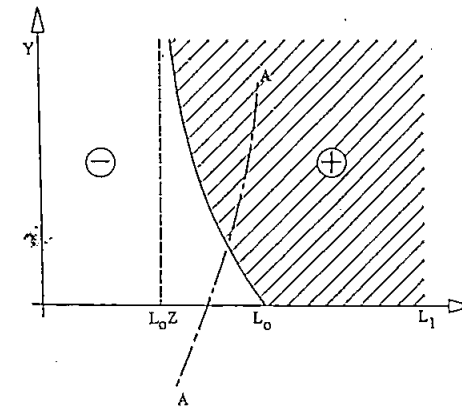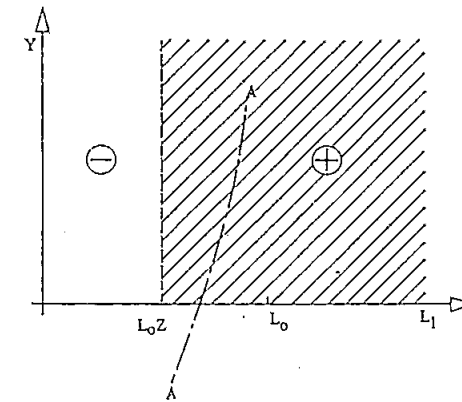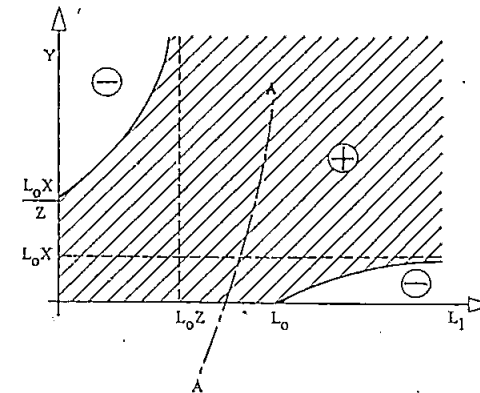
Fig. 1A
x < 0

Fig. 1B
x = 0

Fig. 1C
x > 0

Fig. 2A

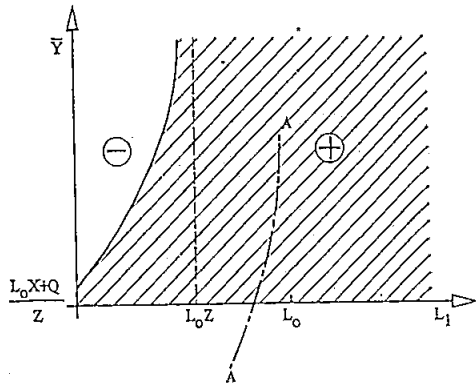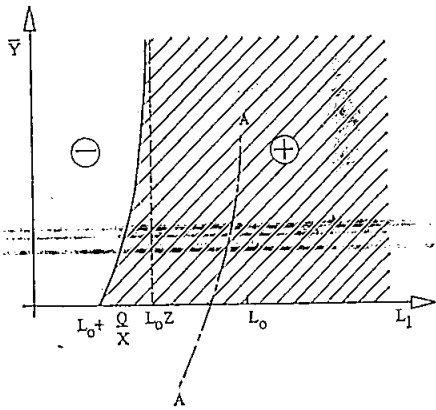$$x < 0 \wedge \frac{L_o + Q}{Z} > 0$$

Fig. 2B

$$x < 0 \wedge \frac{L_o + Q}{Z} <$$
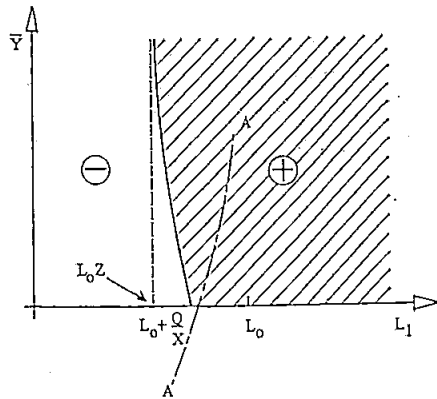
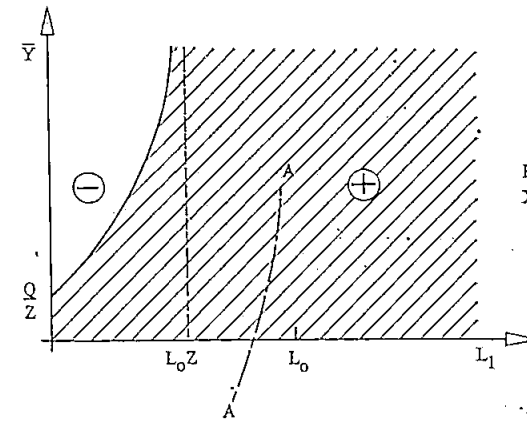$$< 0 \wedge \frac{L_o(1-Z)X + Q}{Z} > 0$$

Fig. 2C

$$x < 0 \wedge \frac{L_o X(1-Z) + Q}{Z} < 0$$

Fig. 2D
X = 0
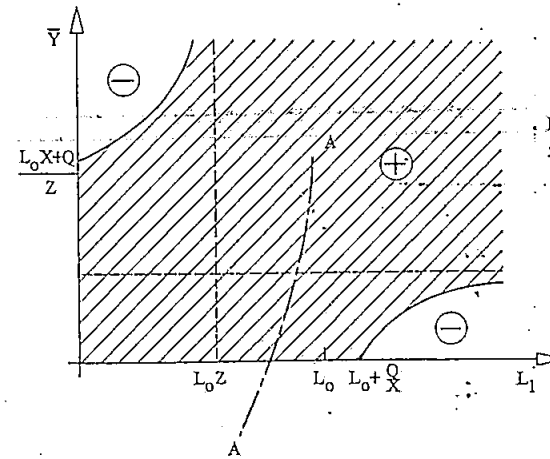
Fig. 2E
x > 0
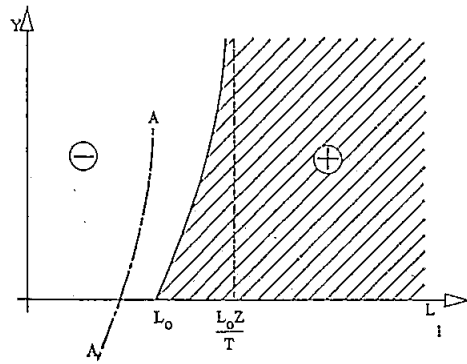
Fig.3A

$x < 0$
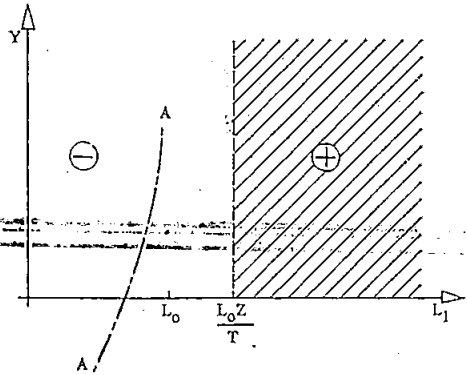
Fig. 3B

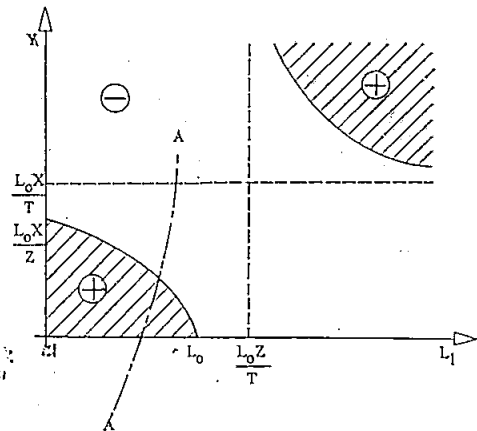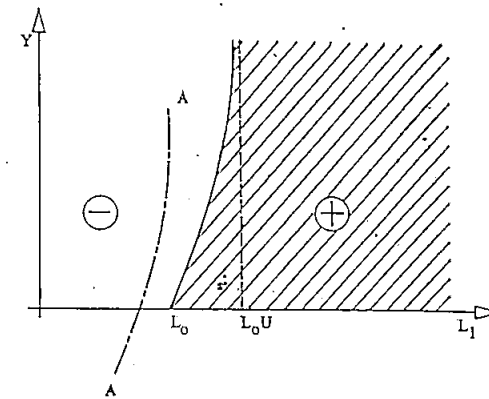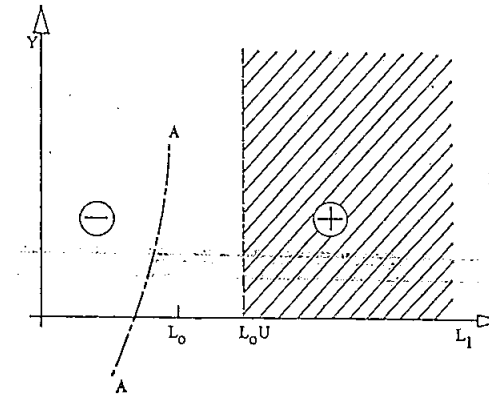$x = 0$

Fig. 3C

$x > 0$

Fig. 4A

Fig. 4B

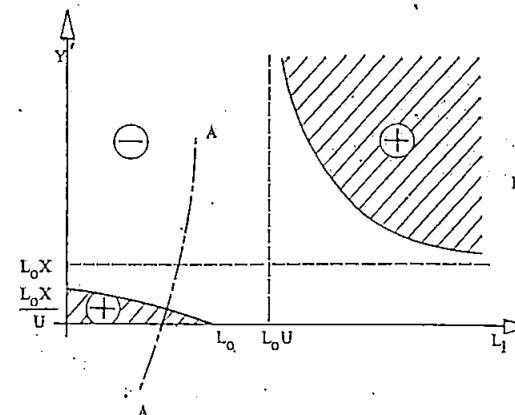Fig. 4C

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INVESTICIONA ODLUČIVANJA U SAMOUPRAVNOM PREDUZEĆU

Benedetto GUI

Rezime

Članak počinje razmatranjem dva predloga kriterijuma za ocenu investicionih projekata samoupravnog preduzeća u kome radnici nemaju pravo individualnog vlasništva nad kapitalom.

Prvo pravilo, koje su predložili Furubotn i Pejovich, pretpostavlja u potpunosti interno finansiranje i bazira se na konceptu "adjustirane stope prinosa" na novo-investirani kapital. Ovo pravilo predstavlja adaptaciju najčešće upotrebljivanog indeksa rentabilnosti u kapitalističkom preduzeću. Iako je ovaj kriterijum pravilno upotrebljen, i dozvoljava jednostavno poređenje investicionog ponašanja samoupravnog i kapitalističkog preduzeća, on ne uzima u obzir činjenicu da u samoupravnom preduzeću rezidualni dohodak pripada radnicima. Ovo dovodi do toga da, kada broj radnika nije fiksan (što Furubotn i Pejovich implicitno pretpostavljaju), kriterijum prestaje da bude ispravan. Štaviše, adjustirana stopa prinosa mora da bude upoređena sa oportunitetnim troškom kapitala za radnike, koji je, pod pretpostavkom nepostojanja tržišta kapitala, bezuslovno različit za svakog od njih.

Drugi predlog, koji je dao Vanek, pretpostavlja potpuno eksterno finansiranje. Vanek upotrebljava koncept "više-periodnog dohotka po radniku" koji bi, ukoliko je isplaćivan radniku svakog perioda, činio sadašnju vrednost toka očekivanih izdataka jednaku očekivanim primanjima, kad god je stopa diskontiranja jednaka "tržišnoj kamatnoj stopi". Nedostatak ovog predloga leži u verovatnoj zabrani, zakonom ili od strane samih ponudioca kapitala, raspodele budućih očekivanih primanja (kao što to kriterijum predviđa) i u činjenici da kriterijum nije u stanju da obuhvati problem reinvestiranja.

Autorova teza je da sadašnja vrednost očekivanih (distribuiranih) primanja mora biti uzeta u obzir pri oceni projekta. Jednostavan model definisan je za opšti slučaj mešovitog (internog i eksternog) finansiranja i promenljivog broja radnika. Upotrebom ovog kriterijuma dobija se uslov za izbor između dva izvora finansiranja za samoupravno preduzeće. Ovaj uslov upoređen je sa odgovarajućim kriterijumom za istovetno kapitalističko preduzeće, iz čega proizlazi da je ovo poslednje sklonije upotrebi internog finansiranja. Poređenje dvaju preduzeća je dalje prošireno na to da li je sadašnja vrednost različitih projekata pozitivna ili negativna. To je učinjeno postavljanjem uslova, u pogledu broja radnika i visine ukupnih potrebnih reinvesticija za koje će dati projekat, ako je rentabilan za samoupravno, biti rentabilan i za kapitalističko preduzeće i obrnuto. Razmatrane su sledeće situacije: (a) kada je finansijska kompozicija ista za oba preduzeća, (b) kada je različita, (c) kada postoji državno dotiranje samoupravnog preduzeća.

Sumirajući rezultate, možemo reći da je još jednom potvrđeno da samoupravno preduzeće ima manju sklonost ka investiranju (pod ceteris paribus uslovima). Isto tako, autor smatra da se, ukoliko je zajednica već spremna da na sebe preuzme deo troškova proširenja participatornih formi organizacije preduzeća, doprinos u kapitalu čini ispravnijim i pravednijim rešenjem od smanjivanja kamatne stope.

Na kraju, autor se pita da li bi se, priznavanjem ograničenih prava radnika na vlasništvo kapitala preduzeća, povećale šanse za uvođenje samoupravnih formi organizacije kao i njihova efikasnost.