9. Private ownership imposes definite constraints on social planning. Therefrom business cycles, unemployment and low long-run rate of development.

10. Most of the preceding defects require perpetual government intervention. The state bureaucracy expands with its deadening effects on efficiency and liberty.

In the preface to the book, Michel Drancourt writes: »Il faut que les moyens dont l'homme dispose, grâce notamment aux techniques qu'il met au point, soient largement utilisés pour une meuilleur affectation des resources. Seule cette dernière permet en effect de faire face à des besoins croissants... C'est parce que nous sommes ambitieux pour l'homme qu'entre l'autogestion et le capitalisme, nous choisissons — avec Henri Lepage — le capitalisme.« In view of what has been said above, is one really »ambitieux pour l'homme« when one opts for capitalism?

AN EXPLANATION OF EARNINGS' VARIATION IN THE YUGOSLAV SELF-MANAGED ECONOMY

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INTRODUCTION

This paper proposes a way to test hypotheses about self-managed firms, and presents some preliminary results from estimating the model on Yugoslav data. It is intended to focus empirical attention towards those observable variables which economic theory predicts would behave differently in a self-managed environment, and assess the relevance of the analysis for Yugoslavia.

In the literature on labour managed enterprises (i.e. 2, 11, 12), attention has been concentrated on comparing their equilibria and responses with those of technically similar capitalist firms. The possibility of a perverse short-run supply response is the central conclusion, which points empirical work to the estimation of supply elasticities, despite obvious problems of identification and interpretation. However, any difference in equilibrium between the firm types must be reflected in a divergence between earnings and the market wage, and average earnings between firms will vary according to the profit level that would have been earned under capitalism. A particular market economy reaches the same general equilibrium under either system (2), but the resource misallocation during disequilibrium occurs in different markets. Specifically, shifts in demand are reflected in an inter-industry profit distribution under capitalsm, but an average earnings dispersion under self-management. Since, in enterprise equilibrium, a co-operatives' chosen earnings equal the labour value marginal product, market disequilibrium is associated with a pareto inefficient labour market allocation. This is not true in capitalism since each firm equalises the value marginal product to the given market wage. Thus, any self-managed economy must be characterised by an average earnings dispersion outside full competitive equilibrium, and this could not occur under capi-

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talism,[1]) can be explained by determinants from the theory, and measures the particular resource misallocation of that system.

Because average earnings in each firm are the residual surplus per head, the determinants of their dispersion must be the same as those of the profit dispersion in capitalism. Economists normally assume that the entrepreneurial group maximises the surplus per member, which, being invariant with respect to the number of entrepreneur in capitalism, is formally identical to simple surplus maximisation. Because the surplus in self-management varies with the size of the entrepreneurial group — the labour force — the maximand must be average earnings per head. Thus, even if a shift to labour management left every enterprise equilibrium unchanged, the inter-firm earnings dispersion would alter according to the previous profit distribution. Any further adjustments because of the change in maximand (these have been discussed at length in the literature) would merely alter the dispersions further. This suggests four factors will determine the level of enterprise average earnings in Yugoslavia — efficiency, demand, market structure and marginal capital costs.

The self-managed firm chooses equilibrium inputs and outputs where labour and capital marginal products equal their prices — though the »price« of labour is a choice variable. A single price for capital ensures inter-firm equalisation of capital marginal revenue products, while pareto efficiency in the labour market is enforced through changes in firm numbers, which alter output prices to equalise earnings. In a full market equilibrium, any differences in average earnings must be caused by a dispersion in the efficiency of production of an idustry. Then the residual surpluses accruing to intramarginal firms would be observed in an earnings' dispersion.

The remaining determinants relate to the particular Yugoslav environment. Shifts in demand which alter output price always change average earnings (even in the absence of a perverse supply response), but cannot last if there is effective entry and exit. However, such mobility is rare in Yugoslavia, and weakly motivated by earnings (see 3) so an inter-product earnings dispersion, which is positively associated with output price, can be maintained into the long run.

Secondly, self-managed monopolies normally choose higher equilibrium earnings than comparable competitors (11). Empirical evidence (3) shows that the industrial structure is imperfect so differences in the market situation of enterprises are an additional source of earnings dispersion.

Finally, the Yugoslav capital market is sufficiently imperfect for a dispersion in the price of borrowed funds, and reliance on internal funding. If all capital were borrowed, different interest rates would cause identical firms to choose differing quantities of capital input, and therefore different labour value marginal products (and earnings) at each

[1]) It should be noted that if trade unions can absorb some proportion of profit into wages, there will be an inter-firm wage dispersion so the systems differ quantitatively rather than qualitatively. If γ is the constant proportion of profit appropriated (<1) the wage dispersion will be explained by an identical equation, but each coefficient will be multiplied by γ.

level of employment. The same argument holds if there is a dispersion of internal discount rates.

The following section develops a formal estimable model of the determinants of enterprise earnings, and extends this to fit the available data. Sources and tables of preliminary results are contained in the Appendix and discussed in the final section, which concerns estimation on cross section and pooled data for nineteen Yugoslav industries from 1964-1972. inclusive.

The model is intended as a particular example of a feasible analytic approach for self-managed firms and economies. However, the testing proves unsatisfactory because of institutional sectors and data inadequacy. For example, while Yugoslavia might formally be regarded as market self-managed from 1965-1972, actual changes probably lagged reforms in 1965, while pressure to equalise incomes probably pre-dates the 1972 incomes policy. Therefore the explanatory power of the model improves during the middle years 1966-1970 of the sample period. Moreover, in so far as the authorities intervened in enterprise decision making, or regulated markets, the model will fail to reflect Yugoslav behaviour. During the sample period some 70% of product prices were regulated; the authorities directly controlled around 20% of investment; less than half of total imports were liberalised; and no free capital market was permitted (13). Thus, one might expect that independent variables based on free market behaviour might prove insignificant, and this points to a difficulty in specifying the null hypothesis. Successful estimation suggests that the model of the self-managed firm can explain the observed earnings' dispersion, and therefore that Yugoslavia suffers from the particular resource misallocation in the labour market discussed above. However, the model might fail because Yugoslav enterprises do not operate in the market self-managed environment; or because they do not behave as predicted in such an environment; or because the specification of technology is incorrect. Much of the last section can be interpreted as an attempt to distingiush between these three null hypotheses.

The model is addressed to the determinants of enterprise equilibrium earnings, and should therefore be employed to explain the inter-firm earnings' dispersion. In fact, data availability limits estimation to an inter-industry level, so, while OLS estimates are unbiased, the aggregation to industry is done in groups of uneven size and the disturbance is heteroskedastic. Moreover, since the values of independent variables are not the same in each group, the grouping causes a loss of efficiency. One might expect the $\bar{R}^2$ calculated on group data to be higher than that for the underlying sample (9).

II. THE DETERMINANTS OF EARNINGS IN A SELF-MANAGED FIRM

This section derives the long run equilibrium value of average earnings (y) for the self-managed firm in terms of the parameters faced under competition and monopoly. In a competitive environment, the firm chooses equilibrium (denoted by a star) output (q), labour (L) and capital (K) to maximise earnings, given the rate of interest (r) output price (p) and a production function.

To make this general formulation estimable, a particular production function of the form:

$$q e^{\theta q} = A L^{\alpha} K^{\beta} \tag{1}$$

is henceforth employed. The self-managed firm (see 4) will only choose a unique positive equilibrium output provided returns to scale are variable, and pass through unity, and this is the simplest production function consistent with the assumption that these firms actually produce a positive determinants output in long run equilibrium.

It is assumed that $\alpha + \beta > 1$, so that returns of scale, which equal $\frac{\alpha + \beta}{1 + \Theta q}$, monotonically decline from an initial value greater than one.

The production function can be shown to be homothetic, strictly concave in each factor, and with a unit elasticity of substitution.

Therefore, for the competitive case, the firm chooses q^*, K^*, L^*, given p, r, α, β, Θ, A to

$$Max \quad y = \frac{pq - rK}{L} \tag{2}$$

subject to (1) $q e^{\theta q} = A L^{\alpha} K^{\beta}$.

1st Order Conditions:

$$\frac{p \alpha q}{(1 + \Theta q) L} = \frac{pq - rK}{L} \tag{3}$$

$$\frac{p \beta q}{(1 + \Theta q)} = rK. \tag{4}$$

Equations 1-4 can be solved for the equilibrium values of the three choice variables, and substituted back to give the maximum value of earnings in terms of the six parameters:

$$q^* = \frac{\alpha + \beta - 1}{\Theta} \tag{5}$$

$$K^* = p \cdot r^{-1} \cdot \frac{\beta}{\alpha + \beta} \cdot \Theta^{-1} \cdot \alpha + \beta - 1. \tag{6}$$

$$L^* = A^{-1/\alpha} \cdot \cdot p^{-\beta/\alpha} \cdot r^{\beta/\alpha} \cdot \theta^{\frac{\beta - 1}{\alpha}} \cdot \left(\frac{\beta}{\alpha+\beta}\right)^{-\beta/\alpha} \cdot (\alpha+\beta-1)^{\frac{1-\beta}{\alpha}} \cdot \cdot e^{\frac{\alpha+\beta-1}{\alpha}}. \tag{7}$$

$$y^* = A^{1/\alpha} \cdot p^{\frac{\alpha+\beta}{\alpha}} \cdot r^{-\beta/\alpha} \cdot \theta^{\frac{1-\beta-\alpha}{\alpha}} \cdot \left(\frac{\alpha}{\alpha+\beta}\right) \cdot \left(\frac{\beta}{\alpha \beta}\right)^{\beta/\alpha} \cdot (\alpha+\beta-1)^{\frac{\alpha+\beta-1}{\alpha}} \cdot e^{\frac{-(\alpha+\beta-1)}{\alpha}}. \tag{8}$$

The firm therefore chooses the level of output, independent of efficiency and prices, at the point of minimum efficient scale (when $\frac{\alpha + \beta}{1 + \Theta q} = 1$). The capital choice depends on output price (which is implicitly labour cost, via (2)), capital cost and output. Labour input is then chosen as the residual from the production function, and therefore is the only factor whose choice depends on efficiency (A). Earnings depend on efficiency, scale, output price and capital costs.

The comparative statics of the system are described below:

Change in Price: $\frac{\partial q^*}{\partial p} = 0$; $\frac{\partial L^*}{\partial p} < 0$;

$$\frac{\partial K^*}{\partial p} > 0; \quad \frac{\partial y^*}{\partial p} > 0. \tag{9}$$

Change in Interest Rate: $\frac{\partial q^*}{\partial r} = 0$; $\frac{\partial L^*}{\partial r} > 0$;

$$\frac{\partial K^*}{\partial r} < 0; \quad \frac{\partial y^*}{\partial r} < 0. \tag{10}$$

Change in A: $\frac{\partial q^*}{\partial A} = 0$; $\frac{\partial L^*}{\partial A} < 0$;

$$\frac{\partial K^*}{\partial A} = 0; \quad \frac{\partial y^*}{\partial A} > 0. \tag{11}$$

Change in Θ: $\frac{\partial q^*}{\partial \theta} < 0$; $\frac{\partial L^*}{\partial \theta} \gtreqless 0$;

$$\frac{\partial K^*}{\partial \theta} < 0; \quad \frac{\partial y^*}{\partial \theta} < 0 . \tag{12}$$

An increase in output price raises equilibrium earnings, and the firm produces the same equilibrium output with a greater capital intensity. The converse is true if the interest rate increases. θ is a scale parameter, which decreases as minimum efficient scale is associated with greater outputs, and A is a technical efficiency parameter. If minimum efficient scale increases, equilibrium earnings and output rise. However, an increase in technical efficiency leaves equilibrium output and capital unchanged, while raising earnings and lowering labour input. α and β are Cobb-Douglas factor weights, which are assumed constant between firms. Generally the firm uses any parameter shift which raises earnings to simultaneously increase capital intensity with output constant, except for a change in θ which alters output and has an indeterminate effect on capital intensity.

Taking logs and suffixing log variables by L, with subscript i to refer to each firm, (8) can be re-written:

$$LY = \frac{\alpha+\beta}{\alpha} LP_i + \frac{1}{\alpha} LA_i - \frac{\beta}{\alpha} LR_i + \left(\frac{1-\beta-\alpha}{\alpha}\right) L\theta_i + CNST_1 \tag{13}$$

$$\text{Where } CNST_1 = \frac{\beta}{\alpha} \log \left(\frac{\beta}{\alpha+\beta}\right) + \frac{\alpha+\beta-1}{\alpha} \log(\alpha+\beta-1) + \log\left(\frac{\alpha}{\alpha+\beta}\right) - \left(\frac{\alpha+\beta-1}{\alpha}\right)$$

Using D to denote rates of change:

$$LDY_i = \frac{\alpha+\beta}{\alpha} LDP_i + \frac{1}{\alpha} LDA_i - \frac{\beta}{\alpha} LDR_i + \left(\frac{1-\beta-\alpha}{\alpha}\right) LD\theta_i + CNST_1 \tag{14}$$

These are the estimating equations for the competitive case.

In an imperfectly competitive environment, where the firm faces a known demand curve $p = p(q,\Delta)$ (Δ is a shift factor), the general problem becomes, using subscript m for monopoly: —

Choose K_m^*, L_m^*, q_m^*, given r, α, β, θ, A, p(.) to

$$Max\ y_m = \frac{p(q)q - rK}{L} \tag{2}$$

$$\text{subject to } p = p(q,\Delta) \tag{15}$$

$$q\, e^{\theta q} = A L^{\alpha} K^{\beta} \tag{1}$$

$$\text{1st Order Conditions:} \quad (16) \left(p + \frac{q \partial p}{\partial q}\right) \frac{\alpha q}{(1+\theta q)} = pq - rK$$

$$\left(p + \frac{q\partial p}{\partial q}\right) \frac{\beta q}{(1+\theta q)} = rK . \tag{17}$$

$$\text{Define (18) } M = \frac{p + q\partial p/\partial q}{p} = \text{marginal revenue over price}$$

$$\text{Then } \frac{pM\alpha q}{(1+\theta q)} = pq - rK \tag{19}$$

$$\frac{pM\beta q}{1+\theta q} = rK \tag{20}$$

Equations (1), (2), (15), (19), (20), can be solved for equilibrium values of choice variables, in terms of the parameters.

$$q_m^{\cdot} = \frac{M(\alpha+\beta)-1}{\theta} \tag{21}$$

$$K_m^{\cdot} = p \cdot r^{-1} \cdot (M(\alpha+\beta)-1) \cdot \theta^{-1} \cdot \frac{\beta}{\alpha+\beta} \tag{22}$$

$$L_m^{\cdot} = A^{-1/\alpha} \cdot p^{-\beta/\alpha} \cdot r^{\beta/\alpha} \cdot (M(\beta+\alpha)-1)^{\frac{1-\beta}{\alpha}} \cdot \theta^{\frac{\beta-1}{\alpha}} \left(\frac{\beta}{\alpha+\beta}\right)^{-\beta/\alpha} e^{\frac{(M(\alpha+\beta-1)}{\alpha}} \tag{23}$$

$$Y_m^{\cdot} = A^{1/\alpha} \cdot p^{\frac{\alpha+\beta}{\alpha}} \cdot r^{-\beta/\alpha} \cdot (M(\beta+\alpha)-1)^{\frac{\alpha+\beta-1}{\alpha}} \cdot \theta^{\frac{1-\alpha-\beta}{\alpha}} \cdot \left(\frac{\alpha}{\alpha+\beta}\right) \left(\frac{\beta}{\alpha+\beta}\right)^{\beta/\alpha} \cdot e^{\frac{-(M(\alpha+\beta)-1)}{\alpha}} \tag{24}$$

In this case, the firm chooses the output where returns to scale equal the ratio of price to marginal revenue. This generalises the competitive case when that ratio equals one, and the remaining equilibrium values are altered similarly.

Comparative statics are as follows:

Change in Δ: parallel upward shift in the demand curve: (25)

$$\frac{\partial q^*_m}{\partial \Delta} > 0; \quad \frac{\partial K^*_m}{\partial \Delta} > 0; \quad \frac{\partial L^*_m}{\partial \Delta} < 0; \quad \frac{\partial y^*_m}{\partial \Delta} > 0.$$

Change in the interest rate: (26)

$$\frac{\partial q^*_m}{\partial r} = 0; \quad \frac{\partial K^*_m}{\partial r} < 0; \quad \frac{\partial L^*_m}{\partial r} > 0; \quad \frac{\partial y^*_m}{\partial r} < 0.$$

Change in A: (27)

$$\frac{\partial q^*_m}{\partial A} = 0; \quad \frac{\partial K^*_m}{\partial A} = 0; \quad \frac{\partial L^*_m}{\partial A} < 0; \quad \frac{\partial y^*_m}{\partial A} > 0.$$

Change in: (28)

$$\frac{\partial q^*_m}{\partial \theta} < 0; \quad \frac{\partial K^*_m}{\partial \theta} < 0; \quad \frac{\partial L^*_m}{\partial \theta} \lesseqgtr 0; \quad \frac{\partial y^*_m}{\partial \theta} < 0.$$

In the competitive case an increase in demand, which the firm would observe as an increase in price, would affect only capital intensity and incomes, leaving output unchanged. In imperfect competition, a parallel upward shift in the demand curve (or the formally identical decrease in M) produces a positive output response as well. The remaining comparative static results are unchanged.

Equation 24 can only be converted to a simple estimating equation by substituting back the equilibrium value of output from equation 21.

$$(LY_m)_i = \frac{\alpha+\beta}{\alpha} LP_i - \frac{\beta}{\alpha} LR_i + \frac{1}{\alpha} LA_i - \frac{\alpha+\beta-1}{\alpha} LQ_i - \frac{\alpha+\beta}{\alpha} M_i + CNST_2 \qquad (29)$$

where $CNST_2 = \frac{\alpha}{\beta} \log\left(\frac{\beta}{\alpha+\beta}\right) + \log\left(\frac{\alpha}{\alpha+\beta}\right) + \left(\frac{1}{\alpha}\right)$

$$(LDY_m)_i = \frac{\alpha+\beta}{\alpha} LDP_i - \frac{\beta}{\alpha} LDR_i + \frac{1}{\alpha} LDA_i - \frac{\alpha+\beta-1}{\alpha} LDQ_i - \frac{\alpha+\beta}{\alpha} - \frac{\alpha+\beta}{\beta} DM_i + CNST_2. \qquad (30)$$

The model therefore specifies the equilibrium relationship between enterprise average earnings and a number of independent variables. The remainder of this section explains how these variables can be associated with the available data, while the next section discusses the procedures and estimations of equations (13, (29), (14) and (30).

Firstly, there is no information about the sectoral rates of marginal revenue to price, denoted M. This can be related to a concentration ratio, by adapting the analysis of Hitiris (8).

In an industry of n + k firms, k operate as a cartel. They set the product price, allow the n firms remaining to sell all they can at that price, and produce to meet the rest of demand.

Let $D = D(p)$ — *market demand curve.*

$S_n = S_n(p)$ — *supply curve for n firms.*

Then $D_k = D(p) - S_n(p)$ — *demand curve of k firms.*

$$\frac{\partial D_k}{\partial p} = \frac{\partial D}{\partial p} - \frac{\partial S_n}{\partial p}$$

$$\frac{\partial D_k}{\partial p} \cdot \frac{p}{D_k} = \frac{\partial D}{\partial p} \cdot \frac{p}{D_k} - \frac{\partial S_n}{\partial p} \cdot \frac{p}{D_k}$$

Define $\Sigma_k = -\frac{\partial D_k}{\partial p} \cdot \frac{p}{D_k}$. *elasticity of demand for k firms.*

$$\Sigma = -\frac{\partial D}{\partial p} \cdot \frac{p}{d}$$

$\Sigma_s = \frac{\partial S_n}{\partial p} \cdot \frac{p}{S_n}$ — *elasticity of supply for n firms.*

Then $-\Sigma_k = \frac{\partial D}{\partial p} \cdot \frac{p}{D_k} - \frac{\partial S_n}{\partial p} \cdot \frac{p}{D_k}$

$$\Sigma_k = \Sigma \frac{D}{D_k} - \Sigma_s \frac{S_n}{D_k}$$

$$\Sigma_k = \Sigma \frac{D}{D_k} - \Sigma_s \left(\frac{D - D_k}{D_k}\right)$$

Define K = concentration ratio $\frac{D_k}{D}$

$$\Sigma_k = \Sigma . \frac{1}{K} - \Sigma_s \left(\frac{1-K}{K}\right)$$

$$\text{Then } M = \left(p + q \frac{\partial p}{\partial q}\right) / p = 1 - \frac{1}{\Sigma_k}$$

$$M = 1 - \frac{K}{\Sigma} + \frac{K}{(K-1)\,\Sigma_s}$$

If the elasticity of supply of n firms is infinite,

$$M = 1 - \frac{K}{\Sigma}$$

$$\text{where } \frac{\partial M}{\partial K} < 0$$

This is a special case of the Cowling and Waterson result (1) where $M - 1 = \frac{K}{\Sigma}(1 + \lambda)$ where H is the Herfindahl index of concentration.

This analysis provides formal justification for employing concentration ratios to pick up the effects of M in the model. Since the relationship is negative, the predicted sign of estimated coefficients is reversed. However, the linear association might prove weak if the elasticity of demand varies between sectors. Moreover, even the price leadership model employed above implies non-linearity since, at some level, firms can collude to the joint profit maximising output, causing a large increase in the price-marginal revenue ratio, after which the association between concentration and earnings ceases. The relationship of M and K, and K and Y is therefore discontinuous, and the problems for linear estimation are exacerbated if there is an inter-sectoral dispersion of the factors

determining collusion, so the level of concentration at which the break occurs varies between sectors (see 7). Despite this, the independent variable M is proxied by the four firm concentration ratio (MONI) in the estimations, and enter the log linear equations linearly.

Estimation is made possible by the assumption of a particular production function, so equilibrium earnings depend on four technical parameters — a simple (θ) and log (A) residual, and two Cobb-Douglas factor weights (α and β). Equations (13), (14), (29) and (30) can be estimated log linearly using OLS with the assumption that, though all four are parameters to the enterprise, only A and θ vary between enterprises. This entails further restrictions on the assumed shape of production technology, which can therefore only vary between in two ways. The permitted differences between enterprise production technology relate to efficiency of production (the output produced by a given input combination), and the level of returns to scale at each output.

While this specification might appear unduly restrictive, it captures the essential feature of a self-managed economy — that differences in enterprise efficiency should generate an earnings dispersion. In capitalist firms, the level of A would be inversely related to long run average costs at each value of output, and determine intra-marginal profits in competitive equilibrium where wages for a skill type would be equal in each enterprise. Only in self-management would this surplus dispersion from differences in the height of the average cost curve be reflected in average earnings, so the significance of this variables represents an important test of the model.

Given invariant α and β, θ specifies the relationship between returns to scale and output, and fixes minimum efficient scale. It might appear convenient to assume θ invariant between sectors, since it does not highlight any conventional determinant of capitalist profit which could be carried over to the self-managed economy. In fact θ appears in the equation because co-operatives produce under more restrictive technical conditions than capitalst firms (see 4), since the competitive requirement to pay marginal products and exhaust the surplus cannot be generally fullfilled simultaneosly. The production function employed generates a unique positive equilibrium output, which is unaffected by the remaining independent variables in the system. If θ is assumed invariant, this entails the restriction that output differences are solely determined by variation in the degree of concentration and elasticity of demand, so each firm would choose the same output in a competitive enviroment. Since this implication is untenable, θ is permitted to vary in the estimations.

The issue can be clarified by reference to capitalist enterprises, for whom this production function generates a U-shaped long run average cost curve; A fixes average costs at each level of output; and θ determines the slope. In competition, A and θ then jointly determine both surplus per unit produced and output for the capitalist firm, but the determinants are separated for the self-managed one, for whom θ determines output and A the residual per unit. This factorisation of determinants means that while one can assume θ invariant between capitalst firms, yet still generate differences in output and profit, this is impossible with self-management.

In an imperfectly competitive environment this additional restriction under self-management need not bind, bacause a dispersion in the price-marginal revenue ratio generates an output distribution with θ constant. Since Yugoslavia is imperfectly competitive, evidence that θ does not influence average earnings can be taken to suggest that it does not, in fact, vary between sectors.

In the regression, the scale parameter is proxied by equilibrium output, so equation (5) is substituted into (8) for the competitive case to give: —

$$LY_i = \frac{\alpha + \beta}{\alpha} LP_i + \frac{1}{\alpha} LA_i - \frac{\beta}{\alpha} LR_i + \frac{\alpha + \beta - 1}{\alpha} LQ_i + CNST_3 \qquad (31)$$

where $CNST_3 = \frac{\beta}{\alpha} Log \left(\frac{\alpha}{\alpha+\beta}\right) + log\left(\frac{\alpha}{\alpha+\beta}\right) - \frac{\alpha + \beta - 1}{\alpha}$.

The equation for the imperfectly competitive case has been presented above (29).

Technical efficiency is measured using the Farrell method (6), which comprises the estimation of technical efficiency relative to an »efficient« industry through the calculation of two factor isoquants. The procedure never directly estimates the production function though significant coefficients permit an indirect calculation of its form.

Before proceeding, three general criticisms of this approach should be noted. The model assumes that enterprises have achieved long run equilibrium, and fully adjust to changes in parameters within one year. These are untenable, but since no simple disequilibrium relationship can be derived, the only available flexibility is through a lag structure.

The model represents a reformulation of marginal productivity theory of distribution for self-management, and is static. These equilibrium conditions may not hold for enterprises optimising over time in an uncertain environment (see 10). Regarding both issues, the limitations of the neo-classical approach are well known, and interpreted below as factors increasing unexplained variance, rather than invalidating the entire methodology.

The final issue concerns the Yugoslav environment. Enterprises generate revenue, net of non-labour costs, which can be used for investment, earnings or welfare funds. While the model, and estimation, focuses on earnings, it is possible that certain firms have chosen to consume collectively, rather than individually, and, differences in the availability of external funds, or internal discount rate, may cause a dispersion in the proportion of net revenue devoted to investment. The mean proportion of net revenue devoted to earnings was 40.5% with a coefficient of variation of 23,7% in 1967, changed little between the years and showed a slight positive association with observed earnings. This is another factor wich would increase unexplained variance.

III. ESTIMATION OF THE MODEL

This section discusses results from two estimating procedures of the earnings equations, with sources and Tables contained in the Appendix. Firstly, it is assumed that α and β alter between years, so the model is estimated separately for each of the nine years of the sample period on cross section data. The second part assumes that the Cobb-Douglas weights are invariant, so the data is pooled for cross-section time-series runs over the whole period and three sub-periods.

In each section, the estimation was approached as follows. The basic equation was taken to comprise only the constant, output price, residual efficiency and the interest rate. One then tested whether the scale parameter, and the degree of monopoly, either together or separately, improved the fit. There is only data on the concentration ratio for 1966, so the imperfectly competitive rate of change equation could not be estimated.

(a) Cross-section estimates:

Tables 1—4 in the Appendix present the nine annual regressions on each of the four forms of the earnings equation, while Tables 5 and 6 show the competitive rate of change case. It should be noted that there were only nineteen observations of each run.

Table 1 gives the basic equation, where the $\bar{R}^2$ never exceeds 0.45, and a strong F-test suggests that the explanatory variables have no effect on the mean of average earnings in six years of the nine. However, the unsatisfactory overall estimation should not disguise some important results. The fit of the equation, and the coefficient and t-statistic on residural efficiency, broadly follow the pattern suggested by historical pressures, improving between 1966 and 1970. The coefficient on residual efficiency is significant at the 99% level in five years of the nine, and weakly so in a further two. This establishes that differences in the efficiency of production did partly determine the Yugoslav inter-sectoral earnings' dispersion during the central period of market self-management. Finally, though insignificant the remaining estimated coefficients are remarkably stable over time, which supports the later assumption of invariant Cobb-Douglas weights.

The remaining three tables show the consequences of including either or both the scale and degree of monopoly parameters. One must reject the hypothesis that the inclusion of a scale variable improves the fit of the equation since the $\bar{R}^2$ and F-statistic of every regression in Tables 2 and 4 are lower than in Tables 1 and 3, and the estimated coefficient is never even weakly significant.

The inclusion of the degree of monopoly variable in Tables 3 and 4 has less clearcut effects .When added alone, in Table 3, the parameter raises the $\bar{R}^2$ considerably in four of the first six years, and by up to 0.1 in the year to which the data refers (1966). It is hardly surprising that the effect tails off in the later years, given the evidence of major changes in industrial structure towards the end of the sample period (see 3). However, the estimated coefficient is only significant once, and then at the 95% level. While the regressions suggest an independent significant effect of concentration on earnings, it cannot be rigorously established in each year with the available data.

The addition of both independent variables in Table 4 improves the fit over Table 1 in three early years, with the coefficient on the degree of monopoly once significant, but the $\bar{R}^2$ is always lower than in Table 3. Even in the imperfectly competitive case when concentration normally improves the explanation provided by the equation, one cannot isolate an independent effect of scale.

The runs in Tables 1 and 3 therefore represent the best cross-section results. However, even then the fit is very poor with the $\bar{R}^2$ never exceeding 0.45 and generally settling between 0.35 and 0.4 in the middle years of the sample when the regression is generally significant at the 99% level. Moreover, the signs on the two market price series normally contradict theoretical expectations, and the coefficients, though stable from year to year, are rarely significant. In Table 1 the coefficient on output price is always negative, and generally at least weakly significant in the later years. The majority of interest rate coefficients, though never significant, are positive. This pattern is broadly repeated in Table 3, except the signs more frequently conform to the model, and the coefficients are never significant when the degree of monopoly variable is included.

The cross-section estimations therefore refute the hypothesis that the model developed in previous section explains Yugoslav earnings dispersion since the regressions are rarely significant and the market price coefficients have the wrong sign, so the calculated production coefficients always suggest the β (the Cobb-Douglas weight on capital) is negative and α + β rarely exceeds one. The partial correlation coefficients will be used to suggest the reasons for this failure.

The argument is that the Yugoslavs regulated the market during the sample period, in a manner which prevented the two price series from reflecting the signals on which the model is based, and their interference generated multi-collinearity so the estimated significance was reduced. Table 7 below shows the matrix of correlation coefficients for 1968 (which is not reproduced for every year since the general pattern remains constant), and permits the following speculation on the causes for the failure of the model to identify the particular null hypothesis from the three outlined above.

Table 7: Correlation Coefficients 1968

	LY	LP	LA	LR	LQ	MON 1
LY	1					
LP	—.4318	1				
LA	.7134	—.4125	1			
LR	.2541	—.2924	.2222	1		
LQ	—.0895	.4080	—.1128	—.0460	1	
MON 1	.5144	—.6030	.4313	.6498	—.3496	1

Both concentration and efficiency are closely, positively, associated with earnings, so one might expect the full equation to reflect the two indepedent effects. But efficiency and concentration are positively related, so with insufficient degrees of freedom, and perhaps inadequate earnings' dispersion, the two separate effects cannot be identified. Though the two probably jointly determine earnings, multicollinearity prevents independent identification of the weaker determinant. Incidentally, by implication Yugoslav self-managed firms do not suffer from the monopolistic organisational slack.

The price series is negatively associated with earnings, and the binary relationship with the interest rate is positive. Table 7 suggests the following interpretation of these perverse findings. Suppose the Yugoslav earnings' dispersion can be primarily explained by efficiency and market power. If the authorities set prices and the interest rate in response to that distribution, as redistributive and anti-monopoly policies, these idependent variables would determine both earnings and the market price series. Unfortunately, the pressures have been informal, and the policies secret, so quantification and re-specification of the model is impossible.

The problem with the output price series is partly caused by its method of calculation. If the relative prices of the better paid sectors were higher, but subject to stricter price control, the derivation of the series from a recent base year would generate the observed negative association. The results of the above estimations are consistent with the suggestion that the Yugoslav authorities not merely prevented prices from reflecting demand conditions, but, as in most socialist economies, used the regulation for redistribution of income. Similarly, the observed positive binary association would emerge if the interest rate were used as a capital tax against higher paid sectors. More likely in this case is a government attempt to reduce the serious inter-sectoral dispersion in capital-intensity, which is widely believed to underlie the earnings' dispersion. In the theory, one expects a positive association between earnings and capital intensity in equilibrium, which has been supported empirically (see 5). However, the relationship is not causal, but both are determined by the same parameters. The pattern of collinearity in the matrix would therefore emerge if the authorities employed discriminatory interest charges determined by existing capital-intensty, in the erroneous belief that this would equalise the distribution of income.

The final effect of government interference on the independent variables is used to suggest why the Farrell measure of efficiency loses significance in the later years of estimation. It has been observed that sectors with low earnings were relatively unconcentrated, and inefficient with low capital intensity (and therefore labour productivity). However, these were the crucial sectors for both employment and trade, in which their inefficiency led to a disadvantage on world markets. Once the economy became relatively open, and the balance of payments disequilibrium severe, the authorities intervened to raise the efficiency of production in these sectors. This was achieved by prioritising their recapitalisation, financed by the lower interest rates discussed above, as well as direct grants and enforced internal saving. Therefore the proportion of net revenue devoted to earnings declined somewhat in these sectors (on average by around 5%) while the increase in capital and output with the given labour force raised the Farrell measure of efficiency. Therefore the policy caused a decline in the dispersion of the technical efficiency series, which was not associated with a decline in the earnings dispersion.

Table 7 also shows that the scale parameter is almost unrelated to technical efficiency and earnings, but positively associated with concentration. The argument in the model that the size of enterprise output determines average earnings is therefore refuted, but there is confirmation of the important theoretical point that monopolistic sectors in self-management are relatively more restrictive.

Tables 5 and 6 show the rate of change regressions, with the basic equation in Table 5 only providing a significant explanation in one year (1966/67), when the coefficients on price and residual efficiency were both positive, and strongly significant.

Table 6 re-estimates to include the scale parameter, which markedly improves the overall fit. In three years of the eight, a static equilibrium marginal productivity theory provides a good explanation of the dispersion on the rate of change of Yugoslav earnings, with an $\bar{R}^2$ in 1966/67 around 0.8, and all variables strongly significant and displaying the predicted sign. Approximately the same holds for the other two years, except that residual efficiency has a negative coefficient at the end of the period.

The conclusions for the static case are therefore largely reversed since residual efficiency is insignificant or negative after 1967 (because of policy raising efficiency by reducing earnings) while output price and scale become important determinants with predicted signs. This suggests that while price controls discriminated against higher paid sectors from the base year, they were relaxed in particular years to reflect market pressure. The inverse association with earnings must have been established before 1964, after which regulation either did not entirely reflect distributive policies, or followed market signals.

A similar argument can be made for the scale series. It the Yugoslavs inherited some very large inefficient plants from the central planners, it would disguise the predicted positive association with earnings in any one year. However, this distortion would disappear in the rate of change analysis.

The conclusions on these equations are therefore mixed since, though they only provide a significant explanation in half of the years, they then present strong evidence for the forces analysed in the model. This suggests that when market pressures and enterprise choices were permitted to filter through government regulation, the consequences for earnings did follow predictions.

(b) Pooled Cross-Section Time-Series Estimations

The cross-section runs assumed that the α's and β's were invariant between sectors in any year, but differed between years, leaving nineteen observations to estimate an equation with five independent variables. The stability of estimated significant coefficients suggest constancy

in the Cobb-Douglas weights over time, so the equations are re-estimated below in four cross-section time-series pools.

The annual results suggest four poolings. In Period 1, all the data is combined to form a nine year nineteen sector group with 171 observations. Since the central years provide the best fit, overall and with concentration, Period 2 contains the 133 observations from 1965 to 1970 inclusive. Finally the period is divided into two halves, with Period 3 running from 1964—1968 inclusive (95 observations) and Period 4 from 1969—1972 inclusive (76 observations). Table 8 presents the results for the four versions of the equation.

One must reject the hypothesis that the inclusion of either or both scale and concentration to the basic equation significantly improves the fit in any of the four periods. The $\bar{R}^2$ and F-statistic are always lowered (except in Period 2 where the $\bar{R}^2$ is slightly raised by the inclusion of the concentration series), the added variable is never significant, and the coefficients on the other three explanatory variables are approximately unchanged. The conclusions about the scale parameter from annual regressions are therefore confirmed, but those on concentration repudiated, even in the grouping specially constructed to isolate its effect.

The pooling always greatly improves the fit of the estimated equation, compared to annual results and, apart perhaps from Period 2, the explanation conforms to previous discussion. The best fit, in terms of $\bar{R}^2$, is given in Period 3, the first half of the sample period, when the basic equation explains about 58% of the variation in earnings. As would be expected, the explanation deteriorates for the second sub-period (Period 4), though the equation is significant at the 99% level, with a much higher $\bar{R}^2$ than for any of the single years. Period 2 was constructed, and failed to pick up an independent effect of concentration,[2]) and since it contains parts of each of the two sub-periods, provides an explanation intermediate between them. Finally, when the whole period is considered together, the larger sample size generates the largest F-statistic, with an $\bar{R}^2$ around 0.52.

The pools confirm previous results on residual efficiency, and uncover new ones for the price and interest rate series. Residual efficiency is confirmed as an important independent influence on earnings, with a positive significant coefficient in all four periods. The estimator shows an upward trend in the annual regressions, which would explain the higher coefficient in Period 4. However, the coefficient in the whole sample period equation, and the central years, is greater than either sub-period because the changing significance of the price series makes the sum of the period add to more than the two halves.

The annual regressions fail to isolate a significant association between earnings and the rate of interest. However, when the data is poo-

[2]) Pooling fails to isolate any independent effect of concentration since, because the data refers to only one year, the series has no trend. Even though a positive association is found in any one year, the nine annual clusters plot a horizontal line, which is unrelated to the positively sloped earnings clusters. The available data makes it impossible to test for concentration in pooled runs.

led, the variable becomes not merely significant, but a primary explanatory force, though the sub-divisions suggest that most of the effect occurred between 1964 and 1968. Unfortunately, the estimated coefficient has a perverse sign, which directly contradicts theoretical expectations.

The estimated price coefficients represent a further riddle. The estimator is negative and rarely significant in annual regressions; small, positive and insignificant in the first sub-period; and small, negative and insignificant in the second. However, it is large, positive and significant over the whole sample period, and the middle years.

Taken at face value, these results suggest that the increase in information has improved the overall fit, and isolated both a significant price effect, which conforms to theoretical expectations, and an interest rate one which refutes predicted behaviour. Unfortunately, in practice the pooling has increased both information and source of bias, so predicted relationships remain impossible to identify from these runs.

The additional bias derive from a similar trend in the output price, interest rate and earnings series, which must be partially attributed to inflation. The seemingly unrelated clusters of observations in each year therefore act as single points in a positive association over time, causing positive binary correlations between each aggregate annual group. For the interest rate, the clusters are most closely associated with earnings from 1964—1968, but for the output price the relationship is only revealed over the whole period since the trends were similar between, but not within, sub-periods.

These similar trends must comprise some combination of market forces and inflation, but one cannot establish their relative importance. The rate of change equations suggest that the government imposed inverse relationship between the prediced independent and dependent variables severely muted, but did not eliminate, the effects of market signals. Thus, the estimated coefficient of β was seriously downward biased, and this is true for the pooled runs ($\beta \approx -1.5$.). The trend in the interest rate reflects both inflation, and the consequences of changing capital scarcity in the increasingly liberalised capital market, while that of prices comprises both relative and absolute shifts. The improved fit therefore disguises similar distortions, confirms refutation of the model (since the estimated capital parameter is negative), and suggests that the correct null hypothesis relates to interference in the market mechanism.

CONCLUSIONS

This paper has outlined a general approach for studying empirically the particular resource misallocation of a self-managed economy, based on explaining the dispersion of enterprise average earnings. The preliminary tests of the model were imperfect, but isolated a consistent effect for residual efficiency; a significant impact of market concentration for the years when data is available; and suggest some positive association may exist with output price and scale. According to economic theory, such relationships should only be observed in a self-managed environment.

However, such conclusions cannot disguise the failure to estimate the model as a whole. The coefficients on the independent market variables generate unrealistic approximations to the parameters of the assumed production technology. The previous section employed binary associations and empirical evidence to suggest that the correct null hypothesis concerns government interference in the market mechanism, rather than inadequacies in the model per se, or mis-specification of production technology. Specifically, while efficiency and concentration proved significant determinants, policies reversed the causality between the hypothesised dependent and independent market variables. A fuller test requires disaggregated data, and re-specification to include government interference.

Even so, these preliminary conclusions have implications for Yugoslav economic policy. The existence of an earnings' dispersion is evidence for labour market misallocation, as well as socially unacceptable income inequality. This approach would base the solution on changes in enterprise numbers, and effective anti-trust legislation. Rather than concentrating on prices and income policies, which merely worsen resource misallocation while acting on symptoms rather than causes, the authorities should undertake an entrepreneurial role in high-earning, efficient and concentrated industries.

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APPENDIX
DATA SOURCES AND TABLES

The following data series were employed in the regressions. There are nineteen Yugoslav sectors, which approximate U. S. three digit industries, defined in the official source — Statistički Godišnjak Jugoslavije — on which the cross section work is based.

(a) Earnings (Y)

The model assumes homogeneous labour, and a unified product market, so one should ideally use an earnings series adjusted to remove the effects of differences in skill and regional composition. Data inconsistency, and insufficiency, prevented this so a considerable proportion of earnings variation should remain unexplained by the model. The series used was average monthly earnings per person employed, derived from Statistički Godišnjak Jugoslavije (SGJ). While the failure to adjust is worrying, it has been shown (5) that unadjusted inter-industry earnings dispersion is similar, though greater, than that observed for each skill type and region taken sparately.

(b) Prices (P)

The price series is the value of nominal output in each sector, over the value of real output, based back to the earliest available date of 1960. There are serious problems of interpretation, due to both aggregation and policy, since prices in the model reflect demand for a product in a market which must be obscured in an average price index for industries in aggregate, and the state controlled the prices of approximately 70% of products.

(c) The Rate of Interest (R)

The series calculated is cost of capital as a percentage of borrowed capital at historic cost, derived from SGJ. Thus, while the model considers marginal capital cost, the data refers to the average. It is not clear, whether one can reasonably assume a constant average cost in the Yugoslav case. One can imagine a firm, with a given average cost of capital facing either a rising or falling curve, depending on its prioritisation over the period. Low average cost probably reflects and overstates marginal cost, while high average cost reflects and understates it. Thus, the variation in average probably understates the true variation in marginal cost. There is the same problem of aggregation referred to for the price series above.

(d) Scale (Q)

This is the level of real sectoral output, derived from SGJ for the relevant years.

(e) Residual Efficiency (A)

One can estimate measures of technical efficiency with the Farrell method (6). Using the result that competitive firms in equilibrium produce at constant returns, and data on capital, labour and output from SGJ, isoquants were constructed and technical efficiency relative to a calculated »efficient« industry derived. The measure ought to be independent of the remaining parameters of the system, except scale. Though, in principle, the Farrel efficiency series is identical to the residual efficiency in the model, it is a slightly imperfect proxy in practice because of problems of aggregation to the industry level, and the fact that it is relative.

TABLE 1

LY on LP LA LR

Year	CNST	LP	LA	LR	$\bar{R}^2$	F
1964	6.820	−0.166	0.361	0.0301	.2583	3.089
	(8.03)	(0.96)	(2.56)	(0.45)		
1965	6.916	−0.118	0.333	0.039	.1503	2.06
	(8.35)	(0.67)	(1.90)	(0.52)		
1966	6.816	−0.0345	0.416	0.0501	.2631	3.14
	(11.23)	(0.32)	(2.48)	(0.44)		
1967	7.005	−0.0438	0.503	0.0602	.3711	4.54
	(11.70)	(0.39)	(3.00)	(0.58)		
1968	7.237	−0.072	0.444	0.0393	.4433	5.78
	(12.81)	(0.75)	(3.27)	(0.37)		
1969	8.340	−0.185	0.321	−0.158	.3623	4.408
	(12.90)	(2.02)	(2.23)	(1.08)		
1970	8.185	−0.153	0.239	−0.102	.2767	3.296
	(15.17)	(1.78)	(1.61)	(0.92)		
1971	8.420	−0.166	0.149	−0.0982	.1147	1.778
	(13.60)	(1.70)	(0.91)	(0.79)		
1972	8.213	−0.119	0.249	−0.0241	.2448	2.9945
	(15.12)	(1.45)	(1.82)	(0.26)		

TABLE 2

LY on LP LA LR LQ

Year	CNST	LP	LA	LR	LQ	$\bar{R}^2$	F
1964	6.832	−0.156	0.357	0.028	−0.0079	.2071	2.175
	(7.76)	(0.84)	(2.43)	(0.40)	(0.18)		
1965	6.926	−0.0942	0.332	0.0328	−0.0167	.0143	1.467
	(8.09)	(0.47)	(1.84)	(0.41)	(0.27)		
1966	6.839	−0.0227	0.416	0.0532	−0.0121	.2128	2.216
	(10.72)	(0.17)	(2.40)	(0.45)	(0.20)		
1967	7.04	−0.0249	0.502	0.0701	−0.0206	.3308	3.224
	(11.22)	(0.19)	(2.89)	(0.63)	(0.31)		
1968	7.191	−0.0838	0.441	0.0369	0.0152	.4068	4.086
	(11.88)	(0.78)	(3.15)	(0.34)	(0.28)		
1969	8.269	−0.204	0.310	−0.169	0.0253	.3276	3.192
	(12.15)	(2.00)	(2.08)	(1.11)	(0.48)		
1970	8.102	−0.173	0.219	−0.122	0.0309	.2426	2.442
	(14.18)	(1.83)	(1.40)	(1.03)	(0.57)		
1971	8.285	−0.179	0.135	−0.102	0.0272	.0665	1.32
	(11.91)	(7.72)	(0.79)	(0.79)	(0.47)		
1972	8.164	−0.123	0.245	−0.0255	0.0098	.1935	2.080
	(13.51)	(1.42)	(1.72)	(0.26)	(0.22)		

TABLE 3

LY on LP LA LR MON1

Year	CNST	LP	LA	LR	MON1	$\bar{R}^2$	F
1964	6.005	−0.024	0.275	0.0091	0.0021	.2558	2.547
	(5.04)	(0.11)	(1.65)	(0.13)	(0.97)		
1965	5.986	0.031	0.237	0.0158	0.0032	.2231	2.29
	(6.02)	(0.15)	(1.33)	(0.21)	(1.55)		

1966	6.447	0.041	0.342	—0.095	0.0041	.3663	2.60
	(10.80)	(0.38)	(2.12)	(0.72)	(1.86)		
1967	6.631	0.0275	0.469	—0.0119	0.00268	.3815	3.776
	(9.73)	(0.22)	(2.77)	(0.098)	(1.12)		
1968	7.001	—0.018	0.412	—0.0412	0.00229	.4418	4.561
	(11.38)	(0.16)	(2.96)	(0.31)	(0.98)		
1969	7.887	—0.09	0.300	—0.244	0.003	.4026	4.033
	(11.23)	(0.81)	(2.14)	(1.59)	(1.41)		
1970	7.842	—0.088	0.221	—0.151	0.0022	.2734	2.69
	(12.11	(0.81)	(1.47)	(1.23)	(0.96)		
1971	8.000	—0.091	0.134	—0.15	0.00228	.0987	1.49
	(10.08)	(0.69)	(0.80)	(1.07	(0.86)		
1972	8.131	—0.105	0.246	—0.032	0.00043	.1931	2.108
	(11.71)	(0.97)	(1.73)	(.31)	(0.20)		

TABLE 4

LY on LP LA LR LQ MON1

Year	CNST	LP	LA	LR	LQ	MON1	$\bar{R}^2$	F
1964	6.02	—0.020	0.274	0.0083	—0.0041	0.0021	.1990	1.89
	(4.82)	(0.08)	(1.58)	(0.11)	(0.09)	(0.43)		
1965	5.984	0.0297	0.236	0.016	0.00083	0.0032	.1634	1.70
	(5.73)	(0.14)	(1.28)	(0.20)	(0.13)	(1.47)		
1966	6.337	0.0193	0.331	0.122	0.0328	0.0046	.3327	2.79
	(9.81)	(0.16)	(1.99)	(0.85)	(0.54)	(1.87)		
1967	6.586	0.022	0.468	—0.022	0.0114	0.0029	.3352	2.815
	(8.66)	(0.16)	(2.66)	(0.16)	(0.16)	(1.05)		
1968	6.87	—0.035	0.403	—0.059	0.0309	0.0027	.4127	3.53
	(10.19)	(0.30)	(2.80)	(0.42)	(0.55)	(1.07)		
1969	7.726	—0.110	0.280	—0.271	0.0402	0.0033	.3852	3.26
	(10.42)	(0.95)	(1.94)	(1.69)	(0.78)	(1.52)		
1970	7.580	—0.102	0.179	—0.204	0.0535	0.0029	.2581	2.32
	(10.73)	(0.42)	(1.14)	(1.51)	(0.94)	(1.21)		
1971	7.711	—0.096	0.111	—0.166	0.041	0.0028	.0642	1.25
	(8.48)	(0.71)	(0.64)	(1.15)	(0.70)	(0.98)		
1972	8.04	—0.106	0.240	—0.036	0.013	0.00057	.1537	1.57
	(10.09)	(0.94)	—1.61	(0.33)	(0.26)	(0.25)		

TABLE 5

LDY on LDP LDA LDR

Year	CNST	LDP	LDA	LDR	$\bar{R}^2$	F
1965/4	0.326	0.175	0.265	0.0340	.0483	1.304
	(17.17)	(1.91)	(0.82)	(0.83)		
1966/5	0.307	0.021	0.392	0.025	.0036	1.022
	(14.88)	(0.24)	(1.37)	(0.92)		
1967/6	0.147	0.503	0.447	0.0077	.4468	5.845
	(6.71)	(3.97)	(2.56)	(0.11)		
1968/7	0.0848	0.284	0.156	—0.122	—.0281	0.8359
	(6.08)	(1.22)	(0.83)	(1.55)		
1969/8	0.123	0.137	0.0011	0.075	.3534	4.279
	(6.99)	(0.93)	(0.03)	(1.97)		
1970/9	0.138	0.111	0.150	0.0534	.0298	1.184
	(10.23)	(1.18)	(1.56)	(1.01)		
1971/0	0.144	0.150	0.285	—0.122	—0.1025	0.442
	(2.18)	(0.65)	(1.00)	(0.88)		
1972/1	0.140	—0.0073	—0.107	—0.0329	—0.0329	0.7696
	(8.78)	(0.08)	(1.14)	(0.60)		

TABLE 6

LDY on LDP LDA LDR LDQ

Year	CNST	LDP	LDA	LDR	LDQ	$\bar{R}^2$	F.
1965/64	0.329	0.164	0.218	—0.070	0.135	.4313	4.41
	(22.39)	(2.32)	(0.87)	(2.10)	(3.33)		
1966/65	0.299	0.035	0.353	0.0189	0.184	—.0298	.8697
	(12.55)	(0.40)	(1.19)	(0.64)	(0.721)		
1967/66	0.134	0.478	0.304	—0.0298	0.545	.7901	17.94
	(9.58)	(6.10)	(2.74)	(0.68)	(5.05)		
1968/67	0.074	0.332	0.033	—0.118	0.169	—.0541	.769
	(3.71)	(1.37)	(0.14)	(1.47)	(0.79)		
1969/68	0.121	0.156	0.00118	0.0719	0.0287	—.3103	3.025
	(5.78)	(0.92)	(0.30)	(1.78)	(0.25)		
1970/69	0.112	0.189	0.0075	0.0271	0.241	.0494	1.233
	(4.29)	(1.64)	(0.51)	(0.471)	(1.14)		
1971/70	0.0976	0.215	0.255	—0.158	0.262	—.0922	.62
	(1.24)	(0.90)	(0.90)	(1.10)	(1.07)		
1972/71	0.0835	0.181	—0.185	—0.083	0.517	.5202	5.88
	(4.92)	(2.29)	(2.80)	(2.14)	(4.30)		

TABLE 8

Cross Sector Time Series

Period 1: 1964—72 Inclusive: 171 obs.

Run.	CNST.	LP.	LA.	LR.	LQ.	MON.	R^2	F.
1.	4.470	0.270	0.458	0.528			.5213	62.70
	(14.01)	(4.18)	(4.29)	(11.39)				
2.	4.423	0.262	0.456	0.526	0.013		.5187	46.80
	(12.68)	(3.74)	(4.24)	(11.30)	(0.34)			
3.	4.200	0.312	0.430	0.509		0.0014	.5210	47.23
	(9.35)	(3.99)	(3.88)	(10.10)		(0.90)		
4.	4.080	0.303	0.422	0.504	0.022	0.0016	.5190	37.69
	(8.57)	(3.78)	(3.76)	(9.83)	(0.57)	(1.05)		

Period 2: 1965—70 Inclusive: 133 obs.

Run.	CNST.	LP.	LA.	LR.	LQ.	MON.	R^2	F.
1.	4.716	0.276	0.548	0.450			.4595	33.02
	(12.50)	(3.67)	(4.22)	(7.34)				
2.	4.680	0.269	0.545	0.448	0.0096		.4548	24.56
	(11.29)	(3.30)	(4.16)	(7.23)	(0.21)			
3.	4.302	0.340	0.506	0.417		0.0023	.4623	25.29
	(8.60)	(3.74)	(3.79)	(6.25)		(1.25)		
4.	4.162	0.330	0.495	0.409	0.025	0.0025	.4588	20.16
	(7.37)	(3.55)	(3.65)	(5.98)	(0.54)	(1.34)		

Period 3: 1964—68 Inclusive: 95 obs.

Run.	CNST.	LP.	LA.	LR.	LQ.	MON.	R^2	F.
1.	5.348	0.063	0.313	0.526			.5799	44.25
	(12.19)	(0.69)	(2.38)	(10.90)				
2.	5.240	0.041	0.310	0.524	0.030		.5774	33.10
	(11.18)	(0.42)	(2.35)	(10.81)	(0.67)			
3.	5.416	0.052	0.320	0.529		—0.0003	.5754	32.84
	(9.02)	(0.47)	(2.33)	(10.29)		(0.17)		
4.	5.250	0.039	0.311	0.525	0.030	—0.00004	.5726	26.18
	(8.02)	(0.35)	(2.25)	(10.08)	(0.65)	(0.02)		

Period 4: 1969—72 Inclusive: 76 obs.

Run.	CNST.	LP.	LA.	LR.	LQ.	MON.	R^2	F.
1.	6.733	—0.042	0.422	0.178			.3919	17.11
	(21.04)	(0.75)	(4.85)	(3.11)				
2.	6.725	—0.046	0.421	0.177	0.003		.3835	12.66
	(20.29)	(0.71)	(4.80)	(3.02)	(0.09)			
3.	6.578	—0.014	0.408	0.152		0.0010	.3892	12.94
	(17.70)	(0.21)	(4.61)	(2.33)		(0.82)		
4.	6.528	—0.021	0.405	0.144	0.012	0.0012	.3816	10.26
	(16.32)	(0.30)	(4.52)	(2.09)	(0.36)	(0.89)		

RAZLIKE U ZARADAMA U JUGOSLOVENSKOJ SAMOUPRAVNOJ PRIVREDI

Saul ESTRIN

Rezime

Članak ima za cilj da predloži način testiranja hipoteza o samoupravnoj firmi i da prezentira neke preliminarne rezultate dobijene na bazi modela primenjenog na jugoslovenske podatke. Osnovni cilj je da se težište posmatranja stavi na varijable za koje ekonomska teorija ocenjuje da se u okruženju samouprvne privrede različito ponašaju.

Literatura o samoupravnom preduzeću pretežno je usmerena na poređenje ravnoteže samoupravnog i kapitalističkog preduzeća i njihovu komparativnu statiku, a retko uzima u obzir posledice različitih stanja na prosečne zarade. Kako je cena rada maksimizirajuća funkcija za samoupravno, a parametarska za kapitalističko preduzeće, sve razlike u tačkama ravnoteže samoupravnih preduzeća moraju se odraziti kroz disperziju prosečnih zarada do koje ne bi došlo u kapitalizmu. Štaviše, te, razlike su Pareto neefikasne i prouzrokuju nepovoljnu alokaciju resursa na tržištu rada, što se može i izmeriti.

Ovaj model, opisuje zarade u okviru preduzeća ostvarene u njegovom stanju ravnoteže, koristeći 5 parametara — ponudu, snagu monopola, efikasnost, obim proizvodnje i marginalnu cenu koštanja kapitala.

Svaki od ovih parametara ukazuje na propuste u teoriji, tako da disperzija determinanti između preduzeća treba da dâ objašnjenje raspodele dohotka.

Procena postaje moguća pod pretpostavkom promenljivih prinosa na obimu, Cobb-Douglasove proizvodne funkcije $q^{\delta\theta\rho}=AL^{\alpha}K^{\beta}$, *primenjena je na 19 jugoslovenskih sektora u periodu od 1964—72.*

Kako se izračunati koeficijenti za proizvodnu tehnologiju pokazuju kao nerealni, model postaje neupotrebljiv. Međutim, on posmatra značajnu vezu koja postoji između zarada i parametara efikasnosti i koncentracije. Koeficijenti cena, proizvodnje i kamatne stope su signifikantni, iako ovaj poslednji konzistentno pokazuje negativan znak.

Nadležni postavljaju cene i kamatnu stopu tako da smanje disperziju u zaradama koja je prouzrokovana efikasnošću i snagom monopola, tako da su neke teorijski nezavisne promenljive u jugoslovenskom okruženju zavisne od prosečnih zarada.

Ovo implicira stav da se ne može tvrditi da model ne uspeva da objasni ponašanje preduzeća, niti da je opis tehnologije netačan, već da nadležni organi ne dozvoljavaju da se preduzeća ponašaju onako kao što teorija predviđa.