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INTER-BOAL PERSONAL INCOME DIFFERENCES AND THE INTERNAL ALLOCATION OF LABOUR IN LARGE YUGOSLAV ENTERPRISES (COALs)

Summary

This paper seeks to explore the factors which cause the incidence of personal income differentials for the same type of work among BOALs operating within the same Composite Organizations of Associated Labour (COALs). Prior research focused mainly on the inter-sectoral wage differentials in Yugoslavia. However, the fact that personal incomes can differ substantially even within the same enterprise has not been emphasized in the literature on Yugoslav firms. The paper develops a simple model of inter BOAL internal allocation of labour (using Ward-Domar-Vanek and Horvat's models of labour-managed firm behaviour) and spells out the possible consequences of net income per worker and profit maximization on internal wage differentials among BOALs. The potential ways of evening out wage differentials for the same type of work (by economic instruments) are then discussed. These include transfer prices, physical reallocation of labour, and income distribution regulation. Empirical research shows that in the majority of COALs, transfer prices are used as a redistributive tool (rather than as an allocative instrument) to even out larger wage differentials, while the physical mobility of workers among BOALs is rather weak. Income distribution regulations (setting limits to maximum allowable wage differentials, regulation of retained earnings ratio, etc.) play an important role in the internal allocation of labour. Using a sample of large firms located in Belgrade, a simple statistical rank correlation analysis was used to determine whether wage differentials vary in any consistent manner with the size, organizational form and type (industrial versus trade companies) of the sampled enterprises. It was found that size and organizational form have a significant impact on personal incomes and profitability differentials among the BOALs in the observed sample.

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THE EFFECT OF CAPITAL INTENSITY ON INCOME IN YUGOSLAV INDUSTRY

Robert STALLAERTS*

I. INTRODUCTION

In an earlier contribution to this journal, J. Vanek and M. Jovičić (1) consider income differences due to capital intensity in Yugoslav industry. The empirical part of the study contained linear regressions of per capita income variables on capital-intensity variables. The authors used a cross-section of branches of industry for 1969 and 1970. A. Vahčić followed the suggestion to decompose the income variable. Thus for the year 1969, he was able to analyze 'how the rent imputable to capital is reduced during the process of secondary distribution of the net product' (2). We extend the analysis by performing a time regression (section 3) and cross-section (section 4). Earlier, some remarks on methodological problems were given (section 2). The additional information made possible certain comments on purified income as an allocative criterion (section 5), personal incomes purified of capital rent (section 6), and the evolution of the marginal product of capital (section 7). These problems are in the centre of scientific (3) and political (4) discussions in Yugoslavia.

In the last section, we explore the issue of whether the new system of social compacts and self-management agreements has significantly influenced differences in personal incomes.

2. PRELIMINARY REMARKS ON METHODOLOGICAL PROBLEMS

In the first part of this article, the scope is limited and greatly confined to the judgment of some of Vanek's proposals. Therefore, we use the same methodology as the authors. Vanek first of all wanted to isolate the effect of capital intensity and used a simple two-variable regression to obtain marginal capital productivity. However, one can ask whether this simple equation is not misspecified by the omission of relevant variables. Though it was not the basic aim to explain income variability to the full, Vanek tried to identify some other determinants by questioning the residuals of this first regression. Variables representing relative price

* State University, Ghent, Belgium.

movements, supply concentration, price control, and newness of fixed assets were not found significant at the 10% level. We tried to include monopoly and price control variables immediately in the 1975 cross-section regression equation, but this only led to high multicollinearity and incorrect signs.

Distortions of coefficients should be greater in the time regressions. First, variables are not adjusted to the use of capacity. Secondly, in the short-run, one could consider capital endowment as more or less fixed, given by technological necessity, and socially frozen by granting it for use to the collectives. It could therefore be easier to consider capital in the equation as an exogeneous variable.

All this merely strengthens the argument developed in section 5 against the use of the criterion.

3. TIME REGRESSION ANALYSIS

We cover the period 1958—1975 with 18 yearly observations. A series for fixed assets at 1972 prices was available. A series of circulating assets (5) was transformed into 1972 prices by the index of producer prices (6). The gross and net income (net product) of industry were given in 1972 prices (7). Income was divided into net wages and surplus value at constant prices by taking the same distribution as at current prices (8). No differentiation of surplus value was possible due to the unavailability of statistics for earlier years. The labour factor was transformed into unskilled labour equivalents (9). The following income variables:

- y_0 : gross income
- y_1 : net income
- y_2 : net personal incomes
- y_3 : surplus value,

all per unskilled labour equivalent, were regressed on two versions of the capital variable:

- x_2 : fixed assets per unskilled labour equivalent
- x_4 : fixed and circulating capital per unskilled labour equivalent.

Several functional forms were tried out, and we present here the theoretically suitable version of those needed for comparison with earlier results. The variables were transformed into first differences and yearly relative changes to eliminate the time trend.

The equation with variables expressed in first differences explains about half of the variance. The capital coefficients are significant at the 0.01 level.

$$y_1 = 259.9 + 0.2103 x_2 \quad R^2 C = .60$$

$$(244.2) (0.0421) \quad DW = 1.84$$

$$T = 5.00$$

$$y_1 = 173.9 + 0.1379 x_4 \quad R^2 C = .45$$

$$(288.0) (0.0366) \quad DW = 1.82$$

$$T = 3.77$$

The difference between the two coefficients for capital intensity is considerable, but taking into account standard errors, an intermediate value can be accepted. Due to the broad definition of circulating capital — including inventories and cash — the lower estimate underrates productivity of capital.

We now turn to the effects on wages and surplus value. Let us first consider the wage equations:

$$y_2 = 414.2 + 0.0534 x_2 \quad R^2 C = .05$$

$$(218.7) (0.0377) \quad DW = 1.50$$

$$T = 1.41$$

$$y_2 = 367.2 + 0.0374 x_4 \quad R^2 C = .04$$

$$(222.3) (0.0282) \quad DW = 2.07$$

$$T = 1.32$$

Coefficients lose their significance and the determination coefficient almost falls to zero. Introducing a lag of one year does not improve the results. Thus wage changes do not depend linearly on investment. Now we present the equations for surplus value:

$$y_3 = -118.3 + 0.1570 x_2 \quad R^2 C = .40$$

$$(266.0) (0.0459) \quad DW = 1.25$$

$$T = 3.42$$

$$y_3 = -193.3 + 0.1006 x_4 \quad R^2 C = .32$$

$$(293.8) (0.0373) \quad DW = 1.27$$

$$T = 2.69$$

A major part of the effect is distributed to surplus value. Coefficients are significant at the 2 and 1% level, and the determination coefficient is much higher, though not as high as for the net income concept. This contradicts some of Vanek's observations based on a cross-section analysis for 1969 (10). Equations with variables in the form of yearly relative changes perform somewhat better (11). Using gross income (12) strengthens all coefficients and augments the capital coefficient by approximately 0.03 points. The problem of exogeneity is posed even more sharply as depreciation is included in income (13).

4. CROSS-SECTION REGRESSION ANALYSIS

4.1. Interindustry regression for 1962

Industry is divided into 22 branches, of which the statistics of 19 can be used for regression.

Income is divided into wages and surplus value, taken per unskilled labour equivalent (14). Capital is given at the acquisition value of

fixed assets (X_1) and at depreciated value (X_2). Circulating assets were added to construct variables (X_3) and (X_4), all values taken per unskilled labour equivalent. The best results were obtained with capital at acquisition value, suggesting that depreciation was merely an accounting device. However, the significance of all results was low and never above the 5% level. The determination coefficient (R^2) reached .25 in the most favourable case using X_3 .

The value of the capital coefficient ranged from 16 over 17 and 19 to 24% (X_1 to 4, respectively)

In all cases, 95% of the capital coefficient is split out in favour of surplus value.

We present only the equation for capital at depreciated value, which will be used in a later section since it corresponds to Vanek's choice.

$$y_1 = 0.94344 + 0.16825 x_2 \quad R^2 = .09$$

$$(0.12868) \quad DW = 1.97$$

$$T = 1.37 \text{ not sign. at } 10\%$$

4.2. Interindustry regression for 1975

The net product for 1975 could be divided into wages and surplus value; the latter could be split out further to give the following income variables (15):

- y_1 = net product
- y_2 = wages
- y_3 = surplus value
- y_4 = contributions for development funds
- y_5 = contractual obligations
- y_6 = legal obligations
- y_7 = wage tax
- y_8 = turnover tax

Again, the best results were obtained with capital at acquisition cost. In particular, the significance of regression coefficients for the combined capital variable (x_3) is high. The absolute values of the coefficients are low. The regression coefficient for net income (0.071) is split out over wages (0.006) and surplus value (0.064), so that again more than 90% of the capital effect falls to surplus value. The effect of the capital-intensity variable on the change of income variables is expressed by the elasticity coefficient $(dY/dK)/(Y/K)$ measured at the mean values of the variables. The value of the elasticity coefficient for wages (0.093) gives on that a 10 times higher capital intensity rises personal incomes with 93% (16). Because of the low value of the regression coefficient for surplus value, not too much importance can be given to the further splitting out in its components. The greatest correlation is found with the variable for development funds ($R^2 = .52$, $b = 0.038$). This is reflected in the high elasticity coefficient (0.82). As Vanek observed for 1970, the determination coefficients for wages and

(investment) funds are higher than those for net income, reducing the influence of other factors in favour of capital intensity. Following the regression coefficients, a rent of capital of 7.1% is transferred to a 0.6% rent for wages and 6.5% for surplus value. Increasing assets per unskilled labour equivalent (ULE) by 10,000 dinars leads to 713 dinars higher net product per ULE, and will result in an increase of 64 dinars take-home pay. The firms will dispose of 649 dinars more, of which 382 are destined for their development funds. Only 27 dinars go to contractual obligations, 103 to legal obligations, and 127 to sales tax. The wage tax variable is not significantly affected.

The findings of A. Vahčić (17) on the distribution of capital (fixed and depreciated) rent between components of income are not very similar, apart from the great preponderance of surplus value over net wages and the preponderance of the part for development funds in surplus value. The high determination coefficient Vahčić obtained for legal obligations - much lower in the 1975 regression - can be explained by the fact that legal obligations included a capital tax, abolished thereafter.

The income equation using the Vanek specification of capital, which shall be used for comparison in the next section, unfortunately performs worst of the four possibilities.

$$y_1 = 0.071429 + 0.05414 x_2 \quad R^2 = .04$$

$$(0.06066) \quad DW = 1.61$$

$$T = 0.89$$

5. PURIFIED INCOME AS AN ALLOCATIVE CRITERION

In the above-quoted paper, Vanek argues that the income levels 'purified' for the capital intensity effect can be used to plan distribution and investment policy in order to attain a distributional and allocational optimum (18). Therefore, he orders branches of industry according to their residual variation in labour income, i.e., observed income less pure labour income and less imputed rent for capital. As he takes it out of his regression, it is by definition not clear what the residuals exactly represent. Apart from 'impurities' in the estimation procedure (measurement errors, specification problems, ...), the residuals should reflect average efficiency or total productivity. Along with positive features (exploiting of scale effects, improving of management and efficiency in the strict sense), negative phenomena - monopoly positions, changes in prices and price control - may also contribute to the residuals. The identification of these factors proved not to be too successful, so one should be cautious when using the measure for policy purposes.

To check Vanek's results for 1970 on their stability, we present similar calculations for 1962 and 1975 (See Tables 1 and 2). When comparing the 1962 order with Vanek's, we see that the same branches remain on the top and bottom positions but intermediary positions change a lot. This can be partly ascribed to the economic reform of 1965 (19). The industry producing building materials es-

pecially upgraded its position; the paper, textiles and electrical industries fell back. The stability of the order is measured by Spearman's coefficient of rank correlation: $r = .54$ (sign. at 1%). The 1975 order corresponds more to the 1970-one: $r = .64$. Oil, tobacco and chemicals score high on both lists. Favourable scores for tobacco have to be corrected since income includes turnover tax. The high income share of the oil industry explains the interest of republics about their part in its development. Ferrous metallurgy changed its position favourably relative to 1970, paper restored, and building materials fell back to the 1962 position. Comparing the 1975 with the 1962 order, the same correlation coefficient ($r = .54$) is found as with 1970 to 1962. Ferrous metallurgy shifted most in the second step, while food processing made its way in two steps. Although there is more stability after the reform period and there ought to be some dynamics in the system, there is still too much mobility to use the estimates as a criterion for allocative purposes. Further, on this level of aggregation the rank-order remains of limited advantage for allocational purposes because of the possibility of greater income differences within branches. Apart from the practical applicability, there are some theoretical considerations — both of technical and ideological nature — pointing to weak parts of the proposed criterion. First, technical interrelations between branches and balance-of-payment constraints are not taken into account. Further, the criterion uses absolute income gains; why not, then, relative income gains? But such a measure is as imperfect as the Vaneks': in the optimization it does not take into account all scarce factors simultaneously. Vanek's measure maximizes income per labour equivalent, but the availability of capital (and price) in the new situation is not taken into account. It stops at the first round in calculating shadow prices, so the criterion is not suited for allocational purposes. It must be recognized that Vanek's neglect of some factors in the maximization formula is common to the traditional Yugoslav approach (20). Only recent research seeks to revert this tendency by introducing two-channel and multi-channel prices (21). Finally, the ideological position on reward of capital services is sometimes confusing and avoids the introduction of simple clear-cut schemes for factor-remuneration (22).

6. PERSONAL INCOMES PURIFIED OF CAPITAL RENT

Using the equations for wages (23), personal incomes net of capital rent are calculated (See Table 3).

It can be seen that the effect of capital intensity on personal incomes has greatly diminished compared to that on income: relative share and variability sharply fall. At first sight, except for electrical power, differences in personal incomes due to capital intensity can be neglected. However, the capital rent out of income can be used for accumulation and serves to deepen differences — also in personal incomes — over time (24). Some authors have argued with Vanek that the capital effect should be taxed away. Yugoslav theory is not very clear on this point. While on the one hand labour has to enjoy the fruits of man-

agement of past labour (minuli rad), on the other hand, productivity gains should go to the society as a whole (25). Institutionally, capital tax was abolished (though partially replaced by an obligatory loan to the fund for development of the underdeveloped regions). Thus, capital rent is still included in the enterprise income and partially in personal incomes.

A Serbian firm, for example, has worked out criteria for evaluation of the contribution of workers by their own and past labor (minuli rad). On the one hand, a part of the contribution is seen as a reward for management and depends on the results obtained by the enterprise; on the other hand, part of it depends on work experience. Concretely, for the latter a worker receives a fixed sum (47 dinars) for each year worked, the first is accounted as 6% of personal income before additions. On the question why exactly this rate was applied, no clear answer was obtained (26).

In their economic policy, Yugoslavs have reacted to the consequences — income differences — rather than acting on the causes. A system of social contracts and self-management agreements was introduced with emphasis on distribution of the social product. They could not sufficiently control the conditions of income formation by appropriate factor remuneration, and especially tried to prescribe proportions in the division of income between funds and personal incomes and to influence the differences in personal incomes of workers with different skills. An indication for the limited success of this policy in the last field will be given in the 8th section.

7. THE EVOLUTION OF THE MARGINAL PRODUCT OF CAPITAL

Putting together all the information of the cross-section and time-analysis, no strong conclusions can be made about the evolution of the marginal product of capital.

In the first place, data are not always entirely comparable because of the permanent change of the institutional setting and of the concepts used to compile statistics.

In the second place, for some years now certain capital concepts have given no statistically satisfying results, so that continuity could not be obtained.

Further, the aggregation of data relating to industrial branches can distort and hide real mechanisms, making regressions on this level unreliable (27).

Finally, one can defend that an analysis along the lines of marginal theory does not hold for Yugoslavia. The economy is not in an equilibrium position and the institutional setting is too specific.

8. THE INFLUENCE OF SOCIAL COMPACTS AND SELF-MANAGEMENT AGREEMENTS

To test whether the introduction of the institution of social compacts and self-management agreements had a genuine influence on the

economy and on interindustry personal income equality, we made some regressions with dummy variables for the latter period.

We first used a wage equation with variables in quarterly change form covering the period 1964/I—1976/IV. Not including a labour market variable (this is not suited to the official institutional system), the usual productivity variable was also substituted by income (lagged with two periods) in accordance with the so-called income system and representing the ability of the collectives to pay out personal incomes (28).

The coefficient of variation of personal incomes of industrial branches was added to test whether the level of inequality influences wages. The dummy variable covers the period beginning with 1971/II. The specification of the effect of self-management agreement policy is done in this way because we lack detailed quantitative information. One can always ascribe the significant values for the dummy variable to other causes in the period under consideration. No important arguments are to be found in favour of such an opinion, except a price freeze during the period 72/II—72/IV with the low values of the variation coefficient certainly influencing the behaviour of the equation in the last period (29). Thus we obtained the following equation:

$$y_2 = 59.08 + 0.60 x_1 + 0.21 x_2 - 9.43 x_3 - 156.51 x_4 \quad \begin{array}{l} R^2C = .67 \\ DW = .65 \end{array}$$

(5.21) (1.97) (4.39) (3.10)

With: x_1 = consumer price index lagged with one period

x_2 = income variable, constructed by multiplying productivity data with price indexes

x_3 = dummy for the period 1971/II—1976/IV

x_4 = inequality level represented by the coefficient of variation

Between brackets are T-values indicating that x_1 and x_3 are significant at the 0.1% level, x_4 at 1% and x_2 at 10%. Variables have the expected sign, and the equation performs quite well given the form of the variables.

Replacement of the income variable by a productivity index to avoid collinearity gave similar results.

To react on low DW-measure, an iteration procedure was tried leaving the signs of the coefficients intact.

We now turn to an examination of the variation coefficient (see Table 4). The cyclical evolution of the variable gives no support to the contention that self-management agreements and social compacts significantly reduced the level of inequality.

The influence on an inequality index (coefficient of variation in this case) of the social machinery is suggested by the significant negative value of the dummy variable for the period after March 71.

$$KV = 0.4222 - 0.0022 IND \quad \begin{array}{l} R^2C = .25 \\ DW = .62 \end{array}$$

(0.0081) (0.0005)

T = 4.24

$$KV = 0.4472 - 0.0023 IND - 0.0208 DUM \quad \begin{array}{l} R^2C = .51 \\ DW = 1.05 \end{array}$$

(0.0066) (0.0004) (0.0040)

T = 5.56 5.18

The variable IND (industrial production) was chosen to represent economic fluctuations. It performed better than productivity or income of industry. The introduction of a consumers' price index scarcely influenced the equation (30).

Similar equations with the dependent variable in percentage quarterly change form ($100 \times KV/KV_{t-1}$) behaved identically, though less clearly.

As F. Kuzmin did for Slovenia (31), it can be concluded that personal income inequality was reduced in the last period. A final method to test whether branches with low income progressed proportionally more than high income branches relative to the preceding year was applied by using the following regression:

$$\log W_t = \log a + b \log W_{t-1} + \log u.$$

The personal incomes of branches of industry (19) are ordered from low to high and regressed on those of the previous year. Quarterly data were used and the results appear in Table 4 (32). As can be seen, coefficients fluctuate and there is no definite movement to a permanent amelioration of low personal incomes relative to high ones.

Although there are some indications that self-management agreements and social compacts reduced inequality, the evidence is not conclusive. It should be taken into account that until 1975 no uniform system had been built and procedures in the republics differed though aiming at the same goal (33). This reinforces the need to counteract the effects of capital intensity on income in primary distribution.

NOTES

(1) Vanek, J. and M. Jovičić. 'The capital market and income distribution in Yugoslavia'. In: Vanek, J. The labor-managed economy. Cornell University Press, Ithaca, 1977, pp. 92—103. Originally published as 'Uloga kapitalne opremljenosti rada u formiranju i raspodeli dohotka u Jugoslaviji: teorijska i empirijska analiza'. Ekonomska Analiza, 1972, 1—2, pp. 49—60. Quotations relate to this version. The theoretical statement of the problem can be found on pp. 49—50.

(2) Vahčić, A. An econometric analysis of postwar performance of the Yugoslav economy. Cornell University Press, Ithaca, 1976, p. 200.

(3) S. Popov suggested the classification of branches of industry according to their deviation from a 'normal' income (including a normal price for the use of capital). She defines an 'efficiency parameter' similar to Vanek's residual one, and even uses it in equations to explain differences in relative personal income. In: Sistem sticanja i raspodele dohotka. Konzorcijum Ekonomskih Instituta za Međurepubličko Pokrajinski i Jugoslovenski Projekt 'Privredni Sistem SFRJ', Beograd, 1980, p. 90, p. 230.

(4) 'Pripreme za kongres samoupravljača. Izmenama u sistemu do pravednije raspodjele'. Vjesnik, Zagreb, 8/II/80, p. 4.

(5) Fixed assets: SGJ 78, p. 217.

Circulating assets: SZS, SB 1025, p. 38; SGJ different years.

(6) SGJ 78, p. 204; SGJ 73, p. 276.

(7) SGJ 77, p. 136.

(8) SGJ (different years): Osnovni podaci OUR-a.

(9) The method is described in: Popov, S. Uloga ličnih dohodaka u procesu formiranja i kretanja cena proizvođača. I. E. N., Beograd, 1976.

(10) Vanek, J., o.c. pp. 54—55.

(11) Only first differences are presented because we are interested in absolute values of capital coefficients.

(12) Yugoslav accounting distinguishes between 'društveni bruto proizvod', also containing cost of material and services both from outside the firm and 'društveni proizvod'. The latter was used in the text as 'gross income'.

(13) To test for errors in measurement and specification, we performed a.o. regressions in the other direction and compared reciprocals with coefficients obtained by immediate regression; however no profit could be gained from this operation.

(14) SGJ 64, p. 134. Osnovni podaci o privrednim organizacijama društvenog sektora u 1962.

(15) SGJ 77, p. 148.

(16) Vanek, J., (o.c., pp. 55), found in 1969 a rise of 60%.

(17) Vahčić, A., o.c., pp. 200.

(18) Vanek, J., a.c., pp. 50—52. To Vanek this criterion is of outstanding theoretical importance. It is a cornerstone of his theory of the self-managed firm, since he states that the objective function of such a firm is exactly this measure (income per worker). This is not generally accepted; Horvat suggested a total profit maximizing rule. See: Horvat, B. 'Critical notes on the theory of the labour-managed firm and some macroeconomic implications'. *Ekonomika Analiza*, 1972, 3—4, pp. 288—293. The dilemma is further explored by Tyson, L. 'A permanent income hypothesis for the Yugoslav firm', *Mim.*, 1976.

(19) The aim of the reform was to strengthen the position of industries producing raw materials and some intermediary goods. See e.g. Horvat, B. 'Yugoslav economic policy in the postwar period: problems, ideas, institutional developments', I.E.N., Beograd, 1971, p. 96.

(20) D. Milenkovič analyzed Yugoslav thought on price theory and resource allocation, and its defects. In: Milenkovič, D. *Plan and market in Yugoslav economic thought*, Yale University Press, New Haven, 1971, p. 242 a.f.

(21) Franković, V. 'Modeli namjenske raspodjele i rezultati istraživanja.' *Ekonomist* (Zagreb), 1978, I, p. 43—69.

(22) Petrović, P. 'Relativne cene i privredni rast', *Economic Analysis and Workers' Management*, 1978, 1—2, p. 110—121.

(23) Though these equations are not the best performers, for comparison the same capital concept was used as Vanek:

$$y_1 = 0.23939 + 0.00879 x_2 \\ (0.00792) \\ T = 1.10$$

$$R^2 = .06 \quad (1962)$$

$$y_1 = 0.02591 + 0.00641 x_2 \\ (0.00444) \\ T = 1.44$$

$$R^2 = .11 \quad (1975)$$

(24) See: Miovič, P. *Determination of income differentials in Yugoslav self-managed enterprises*. Cornell University, Ithaca, 1976, p. 177.

(25) Čosić, B. i Lešaja, A. *Dohodak i minuli rad*. Rad, Beograd, 1976, p. 24.

(26) 'Informacija o raspodeli sredstava za lične dohotke'. *OOOR X*, Beograd, 1979, p. 4. The situation in 1978 is described. On this problem, see also: Dasić, D. i Bošković B. *Minuli rad*. Radnička Štampa, Beograd, 1975, p. 151.

(27) Franković, V. *Raziskava gibanj osebnih dohodkov*. Institut za Ekonomska Raziskovanja, Ljubljana, 1975, p. 22. He worked with enterprise data. The exact reference period could not be identified.

(28) For the specification of a wage equation for Yugoslavia, see a.o. Tyson, L. 'The Yugoslav inflation: some competing hypotheses', *Journal of Comparative Economics*, 1977, 2, p. 113.

(29) For a periodization of income policy, see Vahčić, A. *Principi i politika dohotka*. Radnička Štampa, Beograd, 1976, p. 190—198.

A dummy variable for the period 69—71/I, when the new income system was put into practice without a regulative income policy, generated a positive value.

(30) M. Wachter discusses the theory of the interindustry wage structure and builds up an equation incorporating price and unemployment variables. This last variable does not fit the Yugoslav situation. See: Wachter, M. 'Cyclical variation in the interindustry wage structure', *American Economic Review*, March 1970, p. 75—84.

(31) Kuzmin, F. *Three aspects of wage distribution*, Institute of Social Studies, The Hague, s.d., *mim.*, p. 13.

(32) Bajt, A. *Mehanizem jugoslovanskega gospodarstva*. Inflacija osebnih dohodkov. *Ekonomski Institut Pravne Fakultete*, Ljubljana, 1971, p. 55. Bajt used monthly observations for the period '64—'70 and essentially wants to show the dependence of wage inequality on business cycles.

(33) *Društveni dogovori o sticanju i raspodeli dohotka i ličnih dohodaka*. Službeni list, Beograd, 1976, p. 12.

Table 1. Income and imputed rent of capital (1962—millions of old dinars)

Branch of industry (1962)	Estimated Pure Labour Income	Imputed rent of capital	Observed Income	Rank order of (6)	Residual variation in labour income
(1)	(2)	(3)	(4)	(5)	(6)
Electrical power	0.943437	1.604	1.019	19	-1.528
Coal	"	0.240	0.518	18	-0.665
Oil	"	0.840	5.548	1	+3.765
Ferrous metallurgy	"	0.521	0.938	16	-0.526
Nonferrous metallurgy	"	0.463	0.979	13	-0.427
Nonmetals	"	0.176	0.736	11	-0.383
Metals	"	0.135	0.844	8	-0.235
Shipbuilding	"	0.182	0.839	9	-0.267
Electrical	"	0.121	0.975	5	-0.090
Chemicals	"	0.349	1.144	6	-0.149
Building materials	"	0.148	0.482	17	-0.609
Wood products	"	0.091	0.536	15	-0.499
Paper	"	0.541	1.463	4	-0.022
Textiles	"	0.124	0.748	10	-0.319
Leather and footwear	"	0.085	0.628	12	-0.401
Rubber	"	0.119	1.827	3	+0.765
Food Processing	"	0.198	0.701	14	-0.440
Printing	"	0.065	0.761	7	-0.247
Tobacco	"	0.158	3.378	2	+2.277

Table 2. Income and imputed rent of capital (1975 — thousands of new dinars)

Branch of industry	Pure labour income	Rent of Capital	Observed income	Rank order of (6)	Residual	(3)/(4) x 100
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Electrical power	71.43	41.09	88.10	7	-24.42	46.64
Coal	"	3.99	59.13	13	-16.29	6.75
Oil	"	9.65	195.44	1	114.36	4.94
Ferrous Metallurgy	"	7.60	73.12	6	- 5.91	10.39
Nonferrous Metallurgy	"	9.06	71.23	9	-9.26	12.79
Nonmetals	"	4.00	52.07	16	-23.36	7.68
Metals	"	3.14	60.70	11	-13.68	5.17
Shipbuilding	"	2.84	66.37	8	- 7.90	4.28

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Electrical	"	2.59	58.87	12	-15.15	4.40
Chemicals	"	6.12	84.64	3	7.09	7.23
Building materials	"	4.96	58.58	14	-17.81	8.47
Wood products	"	2.85	49.30	18	-24.98	5.78
Paper	"	7.41	72.88	7	- 5.96	10.17
Textiles	"	2.47	47.45	19	-26.45	5.21
Leather and footwear	"	1.65	51.14	15	-21.94	3.23
Rubber	"	3.72	64.82	10	-10.33	5.74
Food Processing	"	5.82	76.94	4	- 0.30	7.56
Printing	"	2.40	69.76	5	- 4.07	3.44
Tobacco	"	5.67	183.64	2	106.55	3.09

Table 3. Personal incomes and imputed rent of capital 1962 and 1975 (in millions of old (1962) or new dinars (1975))

Branch of industry	Imputed rent of capital		(2)/(4) x 100		Observed Personal income	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1962	1975	1962	1975	1962	1975
Electrical power	83.78	4.866	32.7	16.8	256	28.91
Coal	12.52	0.472	5.44	1.68	230	28.15
Oil	43.86	1.143	9.68	3.10	453	36.88
Ferrous metallurgy	27.21	3.47	10.19	3.26	267	27.62
Nonferrous metallurgy	24.17	1.073	9.23	4.02	262	26.68
Nonmetals	9.19	0.474	4.44	2.00	207	23.70
Metals	7.08	0.379	1.66	1.37	427	27.08
Shipbuilding	8.47	0.336	3.27	1.27	259	26.42
Electrical	6.33	0.307	2.69	1.18	235	25.93
Chemicals	18.24	0.724	8.41	2.47	217	29.30
Building materials	7.73	0.587	4.86	2.42	159	24.26
Wood products	4.77	0.338	2.03	1.38	205	24.51
Paper	28.27	0.878	11.04	3.34	256	26.25
Textiles	6.48	0.294	3.34	1.35	194	21.74
Leather and footwear	4.45	0.195	2.21	0.81	201	23.96
Rubber	6.21	0.441	1.88	1.71	331	25.82
Food Processing	10.33	0.689	4.90	2.56	211	26.93
Printing	3.39	0.284	1.21	1.03	280	27.46
Tobacco	8.24	0.671	3.76	2.60	219	25.81

Table 4. Coefficients of equation 13 (1964—1976) and coefficient of variation (v)

	LOG a	T	b	T	R ² C	d	v x 100
1964/1	0.09	3.17	1.07	21.03	.97	1.74	17.6
1964/2	0.19	4.19	0.96	12.98	.91	1.41	16.4
1964/3	0.16	4.35	0.99	16.64	.95	0.94	17.0
1964/4	0.34	10.90	0.92	17.76	.95	2.33	16.1
1965/1	0.29	7.40	0.94	14.46	.93	2.49	17.4
1965/2	0.04	6.16	1.03	8.90	.83	1.46	19.8
1965/3	-0.08	1.65	1.09	13.64	.92	2.16	19.6
1965/4	0.21	3.61	0.98	10.80	.88	2.11	17.1
1966/1	0.10	2.31	1.02	14.63	.93	1.57	18.5
1966/2	0.38	6.36	0.92	9.98	.86	1.76	19.0
1966/3	0.46	7.47	0.88	9.42	.85	2.78	18.6
1966/4	-0.28	3.67	1.13	10.18	.87	1.81	21.6
1967/1	-0.11	1.73	1.07	11.14	.89	2.28	21.6
1967/2	-0.12	1.94	1.06	11.59	.89	1.05	22.9
1967/3	-0.44	8.45	1.17	15.50	.94	2.11	23.4
1967/4	0.01	0.20	1.00	11.47	.89	2.83	23.6
1968/1	0.22	4.42	0.93	13.22	.92	1.83	21.8
1968/2	0.24	6.76	0.93	18.04	.95	2.31	21.7
1968/3	0.53	16.15	0.83	18.07	.95	1.28	19.4
1968/4	0.56	15.23	0.83	15.87	.94	1.34	19.4
1969/1	0.41	9.83	0.88	14.89	.93	2.21	19.1
1969/2	0.51	12.86	0.85	15.18	.93	2.04	18.2
1969/3	0.29	7.40	0.92	16.88	.95	1.60	18.5
1969/4	0.27	7.51	0.94	19.00	.96	2.41	18.2
1970/1	0.29	7.79	0.92	18.03	.95	2.37	17.8
1970/2	0.01	0.20	1.02	17.04	.95	1.83	19.5
1970/3	-0.01	0.12	1.02	11.51	.89	1.51	19.9
1970/4	0.10	2.58	1.00	19.20	.96	2.21	18.7
1971/1	0.16	3.07	.97	13.43	.92	2.52	18.1
1971/2	0.31	7.88	.93	17.41	.95	2.19	18.8
1971/3	0.35	7.69	.91	14.86	.93	1.73	19.6
1971/4	0.29	4.84	.94	12.03	.90	1.92	19.1
1972/1	0.72	19.47	.80	16.11	.94	1.66	15.0
1972/2	0.71	21.01	.80	22.39	.97	3.14	15.1
1972/3	0.77	23.33	.78	17.99	.95	1.57	15.2
1972/4	0.71	19.52	.79	19.47	.96	1.58	15.2
1973/1	0.04	1.08	1.01	22.18	.97	1.36	15.6
1973/2	-0.03	0.59	1.03	16.31	.94	1.40	15.9
1973/3	-0.21	3.73	1.09	15.18	.93	1.67	17.3
1973/4	-0.30	3.73	1.12	10.86	.88	1.88	18.3
1974/1	-0.17	3.28	1.09	16.10	.94	2.69	17.3
1974/2	-0.36	6.59	1.15	16.51	.94	2.03	18.6
1974/3	0.28	4.42	.95	11.80	.90	1.28	16.3
1974/4	0.10	1.77	1.00	14.08	.92	1.00	18.2
1975/1	0.10	1.76	1.00	14.71	.93	1.05	17.3

	LOG a	T	b	T	R ² C	d	v x 100
1975/2	0.18	3.62	.97	15.88	.94	1.23	19.0
1975/3	0.24	3.25	.96	10.77	.88	2.37	16.8
1975/4	-0.03	0.51	1.03	16.09	.94	1.23	19.8
1976/1	-0.06	1.46	1.04	20.61	.96	2.70	18.1
1976/2	0.11	3.55	.98	25.62	.98	1.95	18.3
1976/3	-0.05	1.65	1.03	30.04	.98	2.87	17.6
1976/4	0.34	10.72	.92	25.01	.98	1.72	17.8

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UTICAJ KAPITALNE INTENZIVNOSTI NA DOHODAK U JUGOSLOVENSKOJ INDUSTRIJI

Robert STALLAERTS

U članku se polazi od ponovnog razmatranja izvesnih propozicija Jaroslava Vaneka i Milene Jovičić (Tržište kapitala i raspodela dohotka u Jugoslaviji: teorijska i empirijska analiza). Njihovo glavno gledište sastojalo se u tome da dohodak koji nastaje usled različite kapitalne intenzivnosti u jugoslovenskoj industriji — treba meriti i oporezivati. Dohodak korigovan za kapitalnu intenzivnost bio je predložen kao kriterijum za izbor razvojne strategije koja ima za cilj distribucijski i alokacijski optimum. Njihov je predlog bio potkrepljen cross-section-analizom industrijskih grana za 1969. godinu. Takođe su bila predložena i neka poboljšanja, kao što su: upotreba drugih funkcionalnih oblika, analiza vremenskih serija i obrada podataka koji su u većoj meri dez-agregirani.

Mi smo ponovili Vanekovu cross-section-analizu za neke druge godine i ispitili smo neka predložena poboljšanja. Takođe smo nešto podrobnije istražili mogućnost podele dohotka na »čist dohodak od rada« i »rentu od kapitala« u nekoćini dohodovnih koncepata.

Nismo mogli da dobijemo konzistentne ocene cross-section-analizom industrijskih grana za različite godine. Stoga je zaključeno da predložena tehnika nije pogodna. Značajnija su, međutim, neka teorijska razmatranja koja osporavaju Vanekov »čist dohodak od rada« kao kriterijum za raspodelu i alokaciju. Optimizacija je jedino moguća kada se svi raspoloživi faktori (ma kakva njihova precizna definicija u jugoslovenskom kontekstu bila) vrednuju jedni prema drugima, stvarajući na taj način skup relativnih »cena u senci«.

Drugo važno pitanje u našem članku odnosi se na uticaj društvenih dogovora i samoupravnih sporazuma na lični dohodak u jugoslovenskoj industriji. Radi ispitivanja tog uticaja, izvedene su neke regresije i zaključeno je da društveni dogovori i samoupravni sporazumi imaju, u stvari, umereno dejstvo. Ovaj zaključak, međutim, dobijen je pri visokom nivou agregacije podataka i upotrebom nedovoljno rafiniranog metoda analize. Na ovom polju podosta istraživanja tek treba obaviti.