INTERINDUSTRY WAGE DIFFERENTIALS IN YUGOSLAVIA: A COMMENT*

In a recent article (1), Howard Wachtel uses an econometric model based on neoclassical wage theory to show that the difference in average productivity of labor is the main determinant of increasing interindustry wage differentials over time in Yugoslavia. The author relates differences in average productivity of labor to interindustry differences in the share of investment in enterprise net income (discretionary fund = total sales — nonlabor costs), which in this way becomes the main cause of the increase in interindustry wage differentials.

This comment has two purposes: first, to present some results of another econometric model which takes into account the long run factors of the interindustry personal income structure, and which allots a significantly smaller role to labor productivity, stressing the importance of certain other structural characteristics (2); and second, to question some of Wachtel's conclusions with regard to differential reinvestment rates and to reconsider the correlation between these and the interindustry personal income structure.

I. Determinants of the Interindustry Personal Income Structure

The model comprises 19 industries (same of which were used by Wachtel) and covers the period from 1960 to 1969 (2). The dependent variable is defined as the level of personal income per »unskilled worker-equivalent«, averaged for the period 1960—1969 ($\bar{d}$).[1] The independent variables in the model are: (i) capital intensity measured by the rate of utilization of fixed and working capital per employee for the period 1960—1969 (k); (ii) industrial concentration, measured by the percentage of sales originating in the four largest enterprises in an industry, averaged for the years 1964 and 1969 (μ); (iii) the rate of growth of labor productivity for the period, defined as the rise of production per employee (π)[2]; and (iv) price control measured by the percentage of production that was subject to social control of prices (λ). The assumption is that these four factors are the most im-

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[1]) Conversion of average personal incomes in the particular industry to the personal incomes per unskilled worker-equivalent was carried out according to the following formula:

$$\bar{d} = \frac{N_d}{\frac{d_i\, N_i}{d_{nkv}}}$$

where $\bar{d}$ denotes personal income per unskilled worker-equivalent; N = the total number of workers employed in a given sector; d = the average personal income in the sector; d_i = the level of personal incomes of workers of the i-th skill category relative to the personal incomes of unskilled workers (national average); N_i = the number of employed workers of the i-th category in the sector; d_{nkv} = personal incomes of unskilled workers (national average); and i ranges from 1 to 8, i. e., the 8 qualification categories reported by the Federal Bureau of Statistics have been taken into account (2). Through this conversion intersectoral differences in the vocational composition of the employed have been eliminated.

portant in determining net income, from which personal incomes are derived. That is to say, the model assumes that net income per employee will be higher in the industries that use more capital, are more concentrated, have a higher rate of growth of productivity of labor, and are to a lesser extent subject to social price control.

The cross-sectional log-regression results for the interindustry personal income structure (the numbers in parentheses represent t-values) are:

$$(1)\quad \log \bar{d}_j = \underset{}{4.16} + \underset{(2.99)}{0.083}\ \log \mu_j + \underset{(3.65)}{0.140}\ \log k_j - \underset{(0.38)}{0.050}\ \log \pi_j - \underset{(1.89)}{0.071}\ \log \lambda_j$$

$R^2 = 0.724$; no significance at the 90.0% level

$$(2)\quad \log d_j = \underset{}{3.94} + \underset{(3.14)}{0.080}\ \log \mu_j + \underset{(3.81)}{0.034}\ \log k_j - \underset{(1.94)}{0.071}\ \log \lambda_j$$

$R^2 = 0.721$, significant at the 90.0% level

$$(3)\quad \log \bar{d}_j = \underset{}{4.00} + \underset{(2.93)}{0.081}\ \log \mu_j + \underset{(3.13)}{0.098}\ \log k_j$$

$R^2 = 0.651$, significant at the 95.0% level

$$(4)\quad \log \bar{d}_j = \underset{}{4.14} + \underset{(3.83)}{0.134}\ \log k_j$$

$R^2 = 0.464$, significant at the 99.9% level.

The results show that the interindustry personal income structure in Yugoslav in the ten year period studied is primarily determined by the variables of interindustry differentials in capital intensity and industrial concentration. Capital intensive industries were able to pay higher personal incomes, for they had higher enterprise net income per employee, from which personal incomes are directly derived. Concentrated industries were able to gain monopolistic profits, which are used primarily for increasing personal incomes. It appears that price control was not sufficiently effective in preventing the appropriation of monopolistic profits, but this was not its sole objective. The correlation matrix does not indicate a statistically significant relationship between the variables λ and μ, and hence it was possible to include them both in a regression equation.

The poor result shown for the labor productivity variable could be partly explained by the possible interrelationship of this variable with the capital intensity. But the correlation matrix does not show a sufficiently high linear relationship to have an effect on the estimates. Furthermore, the partial r^2 between the level of personal incomes and the rate of growth

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[2]) Theoretically it would be more correct to use the rise in productivity of labor per unskilled worker-equivalent, but that would and significantly affect the results of the analysis.

of labor productivity is not significantly different from zero. This does not, of course, mean the absence of any impact of differences in the rate of growth of labor productivity on the different rates of growth of personal incomes, particularly in the shorter run. But in any event, such an impact is likely to become increasingly less important in determining personal income differentials over the ten year period. Salter has demonstrated that the effect of interindustry differences in labor productivity on differential rates of increase in personall income become weaker over time in a market economy as a consequence of the long run tendency toward negative correlation between interindustry movements in relative prices and labor productivity (3).

II. Some Observations on Differentials in the Rate of Investment

The central point in Wachtel's explanation of interindustry wage differentials in Yugoslavia is that the differences in enterprise investment rates resulting from the decision of worker management lead to increasing interindustry differentials in productivity of labor, and since wages are related to the value of the marginal product, this leads to increased interindustry wage differentials over time. But the author takes no account of differences in capital intensity among industries that are determined by technology.

According to neoclassical theory, factor prices are determined by the factor ratio. However, it is not possible to explain variations among industries in factor prices by use of this theory, because variations in factor ratios are mainly the result of differences in technology. It would be possible, and Wachtel's analysis would be quite correct, only in the case of use of the same technology.

These differences in technology appear to be one of the main causes of interindustry differences in personal incomes in Yugoslavia. Since capital intensive industries have larger enterprise net incomes per worker and a relatively high relationship of the investment fund to the personal incomes fund, in these sectors there are greater possibilities of using part of the investment funds for payment of personal incomes. This possibility is underscored by the fact that internally generated funds are even today of lesser importance than external sources as a source of investment, and this was even more so before 1965 (4, 5). The small proportion of internally generated finance has been particularly marked in the capital-intensive industries, which demand a high level of investment. This would seem to argue against Wachtel's theory, which correlates high wages via the medium of high productivity of labor with high internally financed investment.[3])

In a discussion of the interindustry relationship between the enterprise's rate of investment and the increase in productivity of labor, the definition of the rate of investment is important. The ratio of the enterprise's investment fund to the amount of capital used seems to be a better

[3]) It may be of some importance to note that although striving for higher personal incomes can lessen investment in the capital-intensive industries, it is not of paramount importance for the total amount of investment in these industries and particularly for the total amount of productive investment in the country (4).

measure in this context than the ratio of investment to the enterprise's net income, which Wachtel uses. The rates of investment so defined are substantially lower than Wachtel's in capital intensive industries and higher in labor-intensive industries. The positive correlation betwen rates of investment and personal incomes by industry, which Wachtel stresses in his argumentation, would probably disappear in this case. Branko Horvat has shown that rates of profit in Yugoslav industries are substantially lower in capital intensive than in labor intensive industries (6).

Institute of Economic Studies,
Belgrade

Sofija POPOV

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(3) W. E. G. Salter, *Productivity and Technical Change,* (Cambridge, 1964).

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(5) Christopher Prout, »The Yugoslav Dinar«, *International Currency Review* (March—April, 1971).

(6) Branko Horvat, *»Cijene proizvodnje u Jugoslaviji«,* (Prices of Production in Yugoslavia), *Ekonomska analiza* (Beograd), No. 1—2, (1970).

INTERINDUSTRY WAGE DIFFERENTIALS IN YUGOSLAVIA: A FURTHER COMMENT

Having stepped on comparatively unknown ground when I initially did my research on wages in Yugoslavia, I did not expect my empirical analysis of the determination of wages and wage differentials to go unchallenged. Sofija Popov's addition to the literature on this subject is most welcomed for this reason.

Let me try to summarize Mrs. Popov's major points and at the same time offer a response.

1. Her analysis combines cross-section and time series, covering the period 1960—1969, while my analysis was limited to cross sectional analysis. As I indicate in my book which contains the full content of my research on wages and workers' management in Yugoslavia,[1]) the cross sectional mo-

[1]) Howard M. Wachtel, *Workers' Management and Workers' Wages in Yugoslavia: The Theory and Practice of Participatory Socialism,* Ithaca: Cornell, University Press 1973. p. 170.