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THE INTERINDUSTRY WAGE STRUCTURE OF A LABOUR-MANAGED ECONOMY: THE YUGOSLAV CASE 1976—1981.

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Abstract

In this paper, we first formulate and estimate a wage equation for the Yugoslav economy for the period 1976—1981. We introduce the variation coefficient of wages and study its interrelation with the other variables. We also try to explain its behaviour.

In the second part, we examine the evolution of the interindustry wage structure. Taking into account the income policy of the Yugoslav authorities, differential reactions of branches to the macro-economic situation are studied by means of regression equations.

1. THE WAGE EQUATION AND THE COEFFICIENT OF VARIATION OF WAGES

In this first section we present some estimates of aggregated macro-economic variables. The second section will contain an analysis of the behaviour of industrial branches and groups.

We shall first estimate a clasical wage relationship. Then we shall consider the introduction of the coefficient of variation of wages as a structural parameter in this equation. Thereafter the variation coefficient itself is explained by macro-economic and policy variables.

Classical variables in wage relationships are the unemployment ratio, the productivity index and a price variable. In Yugoslavia the unemployment variable has been under discussion as an applicable concept. At least according to the official ideology, labour cannot be seen as a commodity and the idea of a labour market has been rejected (1). A more serious problem is the lack of adequate statistical data due to the narrow definition of structural unemployment (2). Therefore we discarded it as a candidate in our regression equation. Theoretically the productivity variable — defined as physical production per capita — is most attractive to the wage equation, as it reflects the widely ac-

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cepted principle in Yugoslavia — remuneration according to (the results of) work. Some reserves against this variable, however, have been raised by earlier econometric work (3).

At least one author argued for the introduction in the wage equation of an income variable or a profit measure expressing the ability to pay out a higher wage to the workers (4). An earlier attempt to construct such a measure has broken down on the multicollinearity problem when simultaneously a price variable had to be introduced (5).

The price variable is indispensable in the relation. It performed best in many earlier tests. Its success can partly be ascribed to the fact that inflation has been reckoned within the adoption of the planned personal incomes of the workers. The yearly planning documents of the Republics foresee a rate of inflation which functions as a minimum rate in the planning documents of the collectives (6).

So, the productivity variable has been retained in place of a profit or income variable. It also figures in the yearly plans of the collectives as a legitimate reason for raising incomes. In our macro-economic analysis, we have chosen the same period as in the disaggregated one in the second part of this paper. A new classification of branches started in official statistical publications (e.g. INDEKS) with January 1976, and data were available until September 1981 at the time of writing. We use monthly data in the form $100\ t/t_{-12}$. Yearly changes were preferred as they reflect the practice of yearly official resolutions (inflation target) and annual plans (production and productivity targets).

So our basic equation reads:

$$LD = 56.7 + \underset{(0.39)}{0.06\ PRODt_{-3}} + \underset{(9.82)}{0.48\ PCLEt_{-3}} \qquad R^2C = .66,\ DW = .86,\ F = 52.9$$

With: PROD: index of productivity of industry (physical production per capita)
PCLE: index of cost of living
LD: average wage in the economy. (7).
( ): t-coefficient

Some experimentation with simple lag-structures resulted in a lag of three months for both independent variables; this period reflects the adjustment pattern of personal income payment in Yugoslav accounting practice. Following total income, monthly advancements are rounded up every three months, along with the final account at the end of the year. Both productivity and price variable show the expected sign, though only the price variable is statistically significant. A low DW-value points to autocorrelation. The relative failure of the productivity variable is no surprise in the light of earlier investigations. It has been publicly observed that branches with losses pay out regularly above average wages (8).

The performance of the equation could be improved by using distributed lags. However, we immediately proceed to the investigation of the influence of economic policy and of a structural characteristic

of the wage structure, represented by the coefficient of personal income variation. The introduction of the variation coefficient of wages has been suggested by Wachter (9). A negative sign is expected, as a greater dispersion of wages leaves more room for the poorer branches to catch up without provoking a protection reaction of the higher income branches, and the average wage shifting up at a higher speed. Economic policy is introduced by a dummy variable starting January 1980. It represents the renewed efforts of the government to control personal incomes. In the words of the OEDC:

'Pour la première fois depuis de nombreuses années, des directives fermes en matière de revenus, fixant des normes précises et légalement obligatoires, ont été réintroduties en 1980' (10).

Inserting a time trend, the following equation has been generated:

$$LD = 54.4 - \underset{(0.20)}{0.03\ PROD} + \underset{(8.83)}{77.8\ PCLE} - \underset{(2.71)}{0.22\ VAR} - \underset{(3.95)}{5.82\ DIP} - \underset{(1.91)}{0.11\ T}$$

$$R^2C = 0.79,\ DW = 1.44,\ F = 41.1,\ Period = 77/I - 81/IX.$$

With: VAR = coefficient of variation of 82 groups of the economy.
DIP: Dummy representing income policy since 1980/I.

The variables display the expected sign with the exception of the productivity variable, confirming the unstable relationship referred to above. Along with the price variable, the variation and economic policy variables are significant at the 1% level. Iteration procedures in order to remove some autocorrelation did not fundamentally change the results. Nor yielded autoregressive equations significant results.

In interpreting the results, one should be extremely careful with the dummy variable. It is, of course, not really proven whether the negative impact is a result of government intervention and not of some autonomous economic forces. Moreover we must point to the fact that the clearly negative sign of the variation coefficient at the aggregate level proved to be unstable using disaggregated data. (See the second part). We now take a look at the evolution of this variable. The monthly variables of the variation coefficient of wages for 82 groups of the Yugoslav economy are given in table 1. They show a fluctuating pattern with regular peaks in the sixth and twelfth month, clearly reflecting the accounting practice to distribute the extra-gains at these moments. The variation coefficient fluctuates around a value of 20% until the beginning of 1980. From the highest value of the whole period (21.87%) at 1979/XII, a clearly declining trend is setting in with an absolute minimum at 1981/VIII. So the periods before and after 1980 look fundamentally different. Since the last period is too short for separate statistical analysis, the dummy variable has been introduced. We are inclined to ascribe the change to government policy, rather than to autonomous economic changes.

We shall now try to explain the behaviour of the variation coefficient itself, treating it as the dependent variable in some simple equations.

First it will be linked with the business cycle in an attempt to explain its fluctuations. A time trend and the economic policy variable are then introduced in order to grasp the observed declining trend. With all variables in their canonical form (100 t/t_{-12}) we get:

$$VAR = 159.2 - 0.56\,IND - 3.78\,DIP - 0.25\,T \qquad R^2C = .53$$
$$(2.14) \qquad (1.57) \qquad (3.72) \qquad DW = 1.32$$
$$F = 21.4$$

with: IND = index of industrial production

The anticyclical movement of the variation coefficient and the declining trend are confirmed, along with the moderating influence of the income policy, as far as it is expressed by the dummy (11).

Some authors see the variation coefficient itself as an expression of the macro-economic situation and try to explain it by price and unemployment variables (12). Replacing the unemployment rate for the reasons earlier cited by the productivity variable, one obtains the following results for the Yugoslav case:

$$VAR = 129.5 - 0.31\,PCLE + 0.06\,PROD \qquad R^2C = .37$$
$$(5.77) \qquad (0.26) \qquad DW = 1.30$$
$$F = 17.1$$

Again the productivity variable is insignificant. The negative coefficient of the price variable is at variance with expectations. Obviously, in the absence of real criteria (e. g. productivity) low wage branches use the inflation device to improve their position, while high wage branches suffer more from wage erosion.

As far as the variation coefficient is explained by these two variables (R^2C reaches only .37), its insertion in the previous wage equation must lead to multicollinearity. We shall now try to qualify these observations on the branch level.

2. THE INTERINDUSTRY WAGE STRUCTURE

2.1. An overview of the average wage growth of the 35 branches of industry over the period 1976/1—1981/IX is given in table 2. The average yearly growth rates (100 t/t_{-12}) lie in a range of 7.7 points, between 119.6 and 127.3, or a maximal difference of approximately 6.5%. A statement made in relation to the American economy seems to be applicable here too — apart from the problem to discern anything resembling a 'key group' in the Yugoslav economy.

'The remarkably low interindustry variance shows the importance of wage spillover from the key group; however at the same time it obscures the direction of these forces. There is no way of telling through an examination of wage changes which industries are the most influential leaders and more important, or why. (13).

Comparing the average wage change rates with the starting level in 1976 (average wages for 1976 are found in column 4 of table 2), some compensation mechanism can be discerned. The lowest average growers — crude petroleum refineries (5), general transformation of electric power (1) and coal processing (3) — occupied the highest starting position in 1976. Leather, at the bottom, (27) displayed the highest growth rate.

Computation of the coefficient of variation of these yearly wage growth rates (column 3 of table 2) did not lead us to a systematic relationship between this measure and the height of the wage change. The contention that higher growers with a stable growth pattern should display a lower variation coefficient — while others with a lower growth rate and dependent on the business cycle, should display a higher variation coefficient — could not be confirmed. We only observe that the variation coefficient apparently is greater for raw materials and basic industry than for processing industries, regardless of the rapidity of growth or the level of personal income. Probably this is so because their wages are more under the control of the government.

Comparing the rank order of average wages for 1976 and 1980 (column 4 of table 2), top and bottom are taken by the same industries. We conclude that there has been some narrowing of the interindustry wage span, but that its structure has remained remarkably stable.

2.2. We now intend to examine the deviations of each branch from the average wage of the economy. This is done by considering the residuals of the regression

$$LD_{it} = a + b\,LD_t$$

where the evolution of one of the 82 wage-groups (LD_{it}) is regressed to the evolution of the average wage of the economy (LD_t).

The constant and the residuals give us measures of the deviation from the average wage evolution and are an indication for autonomy in the wage setting. Alternatively branches can be ranked according to the height of the determination coefficient. (Results are given in table 3). Extremely low (R^2C less than .12) are the values for the following branches: extraction of crude petroleum and gas (4), crude petroleum refineries (5), sea transport (45), internal shipping (46), projection and planning (65), physical education and sports (76). All these are highly remunerated activities.

Although requiring a more than average schooling level, these activities could drive up the wage aspiration level in the Yugoslav economy. In any case, they shift up the average wage, a regular reference point in official planning documents.

On the other hand, branches with high determination coefficients and significant t-coefficients for the LD_t variable are supposed to be followers, though one has to be cautious not to interprete it too deterministically.

2.3. Another indication for the autonomy of the wage setting of a branch is seen in its anticyclical character. Theoretically, weak sectors are highly dependent on the business cycle for their income, while strong sectors can grow constantly. As a proxy for the business cycle, we introduce the index of industrial production in the equation:

$$LD_{it} = a + b\,LD_t + c\,IND_t$$

A very low determination coefficient can be interpreted as total independance of the average wage evolution and the business cycle. Branches can then be ranked according to their R^2C-value. The results for industry branches (35) are given in table 4.

Autonomous behaviour is confirmed for the groups: extraction of rcude oil (4), crude petroleum refineries (5) and non-ferrous ore mining (8). A positive, significant (at 1%, t = 2.66) sign for IND_t, suggesting great dependance on the business cycles, is displayed by the groups : manufacture of machinery (14), extraction of stone (20), manufacture of beverages (31) and printing (34). Extraction of coal (2), extraction of non-metallics (11), manufacture of non-metallic mineral products (12), manufacture of yarns and fabrics (25), manufacture of leather footwear (28) and manufacture of animal feeds (32) evolve contrary to conjuncture. In this last group, we find producers of raw materials, most of all low income earners in 1976 whose unfavourable position had not changed at the end of the period. Of course, similar conclusions can be drawn from the value of the partial correlation coefficient for IND_t, as then the influence of the average wage has been eliminated. (See table 4).

2.4. We now turn to differential reactions of the 35 industrial branches and groups on macro-economic measures. In this way we try to gain further insight into the dynamics of the interindustry wage structure. We cannot go so far as to identify with certainty leaders, followers or wage contour structures. In any case, the regression equation shows only correlations, not causal links. However, it can procure hints and a first insight into the wage structure.

It has been stated earlier that the use of common macro-economic variables has been more fruitful than that of branch-specific variables in this kind of investigation of the interindustry wage structure. (14) We now apply our earlier wage equation at the branch level. (See table 5 for the results). The insignificance of the productivity variable as a distinguishing device is deceiving. Some branches even show negative signs : generation of electrical power (1), extraction of coal (2), coal processing (3), extraction of crude petrol and gas (4), iron and steel basic industries (7), non-ferrous ore mining (8), extraction of non-metallic minerals (11), manufacture of leather footwear (28), food products (30), animal feeds (32), miscellaneous (35). The positive sign the other branches show is not very convincing. So the propagation mechanism of inflation described in theory — high productivity branches distribute their gains to wages and pull up low productivity branches spending to wages above their productivity gains (15) — could not be confirmed by this equation. Even when the global productivity variable should be replaced by branch productivity — the more suitable specification to test this theory — the test will certainly be hampered by the overall low significance of the productivity variable (16). The variation coefficient in the equation gives additional information about the behaviour of branches in the wage setting. Some branches display a positive value : extraction of crude petrol (4), crude petrol refineries (5), non-ferrous ore mining (8), extraction of stone and sand (20), printing (34) and miscellaneous (35). High income

groups (4, 5) are continuous growers, not influenced by the income span; low income groups try to catch up when the gap tends to widen too much. A significant negative sign (at 1% level with t more than 2.65) have: extraction of non-metallic minerals (11), manufacture of finished textile products (26), extraction of coal (2), iron and mining (6), manufacture of leather footwear (28), and processing of chemicals (19). All those branches have also the highest determination coefficients for the equation as a whole, which points to the fact that they are more influenced by the market situation. Their failing to reach a stable position has degraded them to low wage earning sectors (with the exception of chemicals).

2.5. Following Bajt (17) we consider the monthly evolution of the interindustry wage structure (35 sectors) via a synthetical measure indicating a move to a more or less equal wage dispersion and thereby specifying whether low or high income branches grow relatively more. Wages of industrial branches are therefore classified each month from low to high and then regressed to those of the previous year (as yearly changes are considered); in logarithmical form:

$$\log LD_t = a + b \log LD_{t-12}$$

The b-coefficients of this logarithmic regression line (one for each month) indicate whether low wage groups (at the left side of the regression line) grew relatively faster than the high wage groups, if b lower than 1, or the reverse (with b higher than 1).

The following picture emerges from this regression (see Table 6): the b-coefficients show a fluctuating pattern close to a value around 1 until 1980 and from then on, a declining tendency appears upto the middle of 1981. So, especially in this last period, low income groups have caught up. We regressed the time series of b-coefficients to a time trend, the industrial production index and the economic policy variable:

$$B_t = 2.04 - \underset{(1.15)}{0.06}\, DIP - \underset{(1.70)}{0.01}\, IND - \underset{(1.52)}{0.002}\, T$$

Both the observed cyclical and declining trend components are captured by the equation. The negative trend contrasts Bajt's finding for the period 1964—1970. (18)

2.6. Our analysis has been restricted to the interindustry wage structure. It should be systematically extended to the whole economy. Political factors should be taken more explicitly into account. (19).

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APPENDIX. Statistical tables

TABLE 1. Variation coefficient of wages of 82 branches of the economy. (1976/1981 — IX)

1976.	1	0.1905	1979.	1	0.1909
	2	0.1919		2	0.2070
	3	0.1888		3	0.1850
	4	0.1974		4	0.1954
	5	0.1833		5	0.1779
	6	0.2002		6	0.1951
	7	0.1838		7	0.1800
	7	0.1801		8	0.1677
	8	0.1697		9	0.1916
	9	0.1844		10	0.2022
	10	0.1982		11	0.2091
	11	0.1949		12	0.2187
	12	0.2011	1980.	1	0.1906
1977.	1	0.1857		2	0.1916
	2	0.2151		3	0.1805
	3	0.1926		4	0.1871
	4	0.1952		5	0.1847
	5	0.1973		6	0.1997
	6	0.2065		7	0.1724
	7	0.1856		8	0.1681
	8	0.1729		9	0.1704
	9	0.1776		10	0.1620
	10	0.1955		11	0.1905
	11	0.1981		12	0.1939
	12	0.2172	1981.	1	0.1780
1978.	1	0.1851		2	0.1784
	2	0.2189		3	0.1605
	3	0.1839		4	0.1653
	4	0.1874		5	0.1593
	5	0.1850		6	0.1672
	6	0.1958		7	0.1539
	7	0.1900		8	0.1495
	8	0.1747		9	0.1590
	9	0.1747			
	10	0.1890			
	11	0.2081			
	12	0.2235			

TABLE 2. Average wage change rate, coefficient of variation of the average wage change rate, level of average wages in 1976 and 1980.

(1) Branch	(2) avarage wage change	(3) var. coef of (2)	(4) avarage wage 1976	1980
1.	121.2	5.1	4683	9240
2.	126.8	8.1	3951	8998
3.	121.4	15.6	4572	7790
4.	124.3	11.3	4977	11531
5.	119.6	9.7	5269	9977
6.	123.7	11.0	3622	6740
7.	124.9	7.8	3746	7980
8.	124.6	9.8	3775	7869
9.	122.2	6.5	3866	7877
10.	124.9	9.8	3576	8265
11.	123.4	9.0	3036	6277
12.	125.2	7.5	3076	6702
13.	123.3	5.8	3433	7251
14.	123.6	5.9	3681	7908
15.	122.5	5.7	3472	7161
16.	123.2	8.4	4211	8627
17.	123.2	6.0	3404	7166
18.	123.9	7.5	3779	7822
19.	122.4	8.0	3742	7423
20.	124.3	4.7	2867	6547
21.	123.3	4.6	3162	6777
22.	124.5	5.5	2856	6284
23.	123.2	4.8	2922	6304
24.	124.4	8.0	3447	7189
25.	125.4	9.7	2778	5799
26.	124.6	6.9	2520	5413
27.	124.6	8.0	3020	7045
28.	125.4	8.4	2762	6021
29.	124.1	8.5	3245	6746
30.	122.2	7.1	3277	6550
31.	121.3	7.9	3439	6586
32.	122.0	11.8	3752	6907
33.	121.2	8.9	3312	6123
34.	122.8	5.8	3522	7535
35.	123.8	8.2	3305	7154

TABLE 3: Coefficients of the equation: $LD_{it} = a + b\ LD_t$

Form of variables: $(t/t_{-1}) - 1$

Branches	a	b	t (b)	R^2C	DW	F
1.	—0.01	1.40	11.6	0.66	2.61	134.1
2.	0.02	0.71	4.3	0.21	3.04	18.5
3.	—0.01	1.31	4.7	0.24	2.75	21.7
4.	0.01	0.64	1.6	0.02	2.78	2.6
5.	0.01	0.82	2.5	0.07	2.94	6.3
6.	0.00	0.75	5.0	0.26	2.81	25.1
7.	0.00	0.93	6.0	0.34	3.07	36.1
8.	—0.01	1.60	5.7	0.32	2.84	33.0
9.	0.00	0.74	4.9	0.26	3.02	24.2
10.	0.01	0.84	3.6	0.15	2.70	12.9
11.	0.00	1.00	4.9	0.26	2.92	24.1
12.	—0.00	1.09	9.3	0.56	2.97	87.1
13.	0.00	0.99	16.8	0.81	2.52	281.7
14.	0.00	1.04	13.5	0.73	2.60	182.5
15.	0.00	0.89	8.7	0.84	2.56	78.5
16.	0.01	0.70	4.3	0.21	2.73	18.9
17.	0.00	0.99	10.5	0.62	2.93	109.2
18.	0.00	1.08	10.6	0.63	2.84	111.8
19.	—0.01	1.37	12.6	0.70	2.77	159.7
20.	—0.00	1.17	9.7	0.58	2.12	94.3
21.	—0.00	1.30	12.6	0.70	2.51	158.5
22.	—0.00	1.09	12.4	0.70	2.40	154.4
23.	0.00	0.75	9.8	0.59	2.95	96.9
24.	—0.00	1.30	11.4	0.66	3.11	130.5
25.	0.00	0.89	10.5	0.62	2.57	110.7
26.	0.00	0.80	9.6	0.58	2.62	92.4
27.	0.01	0.83	7.1	0.43	2.58	50.9
28.	0.00	1.05	11.2	0.65	2.59	126.2
29.	0.01	0.73	4.7	0.24	3.11	22.4
30.	—0.00	1.09	14.1	0.75	2.81	200.0
31.	—0.00	1.08	8.8	0.53	2.75	76.9
32.	—0.01	1.64	10.9	0.63	2.37	118.8
33.	0.00	1.17	7.6	0.47	2.56	57.8
34.	—0.01	1.44	12.2	0.69	2.43	150.2
35.	0.00	1.35	8.7	0.53	2.75	75.8
36.	—0.01	1.51	8.9	0.54	2.54	79.7
37.	—0.01	1.59	9.1	0.54	2.58	82.7
38.	—0.00	1.84	4.9	0.26	2.07	24.4
39.	—0.00	1.43	9.0	0.55	2.43	81.6
40.	—0.01	2.03	6.1	0.35	2.50	36.7
41.	0.00	1.04	6.7	0.39	1.50	44.4
42.	—0.00	1.30	7.5	0.45	2.17	56.3
43.	0.00	1.40	11.7	0.67	1.54	137.3
44	0.01	0.55	4.7	0.24	2.66	21.8
45.	0.03	—0.10	0.2	0.00	3.15	0.1
46.	0.02	0.31	0.8	0.00	3.14	0.69
47.	0.02	0.56	1.4	0.02	3.05	2.1
48.	0.00	0.91	9.9	0.59	2.28	98.8
49.	0.01	[illegible]	3.0	0.11	3.16	8.9
50.	0.00	1.04	7.5	0.45	2.90	[illegible]
51.	0.00	0.88	7.3	0.44	2.45	53.8
52.	—0.00	1.10	14.7	0.76	2.79	214.7
53.	0.00	1.08	9.9	0.59	2.40	99.3
54.	0.00	1.46	4.7	0.24	1.44	22.2
55.	0.00	1.00	9.4	0.57	3.06	87.6
56.	0.00	1.01	8.1	0.49	2.11	65.1
57.	0.00	0.86	13.9	0.74	2.72	192.8
58.	0.00	1.29	12.0	0.68	2.28	144.2
59.	0.00	1.31	5.1	0.27	2.86	25.7
60.	0.00	1.18	6.8	0.40	2.77	45.6
61.	—0.00	1.17	9.9	0.59	2.89	97.1
62.	0.00	0.90	4.9	0.26	2.53	24.0
63.	—0.00	1.03	6.8	0.40	2.90	46.5
64.	—0.01	1.50	8.1	0.49	2.72	66.5
65.	0.13	—1.59	0.6	0.00	2.22	0.3
66.	0.00	0.94	6.2	0.36	2.56	39.0
67.	0.00	0.84	6.3	0.36	2.70	39.2
68.	—0.01	1.34	9.2	0.55	2.84	84.4
69.	0.01	0.81	3.2	0.12	2.65	10.5
70.	0.01	0.77	3.2	0.12	2.84	10.2
71.	—0.00	1.33	5.3	0.30	3.00	29.1
72.	0.00	0.93	3.9	0.18	2.74	15.5
73.	0.01	0.76	3.3	0.13	2.93	10.8
74.	—0.00	0.09	8.4	0.51	2.82	71.0
75.	0.00	0.96	6.0	0.35	3.02	36.6
76.	0.00	0.82	3.0	0.11	3.12	9.2
77.	0.01	0.39	6.6	0.38	2.50	42.9
78.	0.00	0.95	6.9	0.41	3.01	47.3
79.	0.00	0.80	4.1	0.19	2.78	17.2
80.	0.00	0.69	4.7	0.25	3.08	22.3
81.	0.00	0.75	3.8	0.16	2.64	14.1
82.	0.01	0.68	4.1	0.19	2.51	16.6

TABLE 4: Coefficients of the regression $LD_{it} = a + b\ LD_t + c\ IND_t$

Branch	a	b	t (b)	c	t (c)	R²C	Part. Cor Co IND
1.	71.27	0.73	6.01	—0.37	1.68	0.43	0.22
2.	165.37	1.09	6.71	—1.62	5.43	0.63	0.59
3.	0.08	2.19	6.51	—1.38	2.25	0.48	0.29
4.	—15.58	0.24	0.70	1.04	1.70	0.01	0.22
5.	97.72	0.65	2.33	—0.54	1.06	0.10	0.14
6.	—44.09	1.76	7.49	—0.45	1.05	0.52	0.14
7.	31.41	1.39	10.10	—0.72	2.86	0.69	0.36
8.	86.67	1.11	4.20	—0.92	1.90	0.30	0.25
9.	68.78	0.90	6.10	—0.53	1.98	0.45	0.26
10.	13.10	1.49	7.22	—0.66	1.76	0.52	0.22
11.	47.63	1.55	12.16	—1.06	4.57	0.77	0.52
12.	52.50	1.36	12.05	—0.87	4.24	0.77	0.50
13.	—42.97	1.24	27.5	0.14	1.65	0.93	0.21
14.	—72.65	1.19	16.1	0.48	3.53	0.83	0.43
15.	—51.35	1.13	14.2	0.33	2.27	0.78	0.29
16.	19.89	1.33	8.3	—0.55	1.90	0.59	0.25
17.	—20.43	1.18	14.0	—0.00	0.03	0.78	0.00
18.	—34.34	1.55	18.5	—0.30	1.95	0.87	0.25
19.	—29.42	1.55	16.3	—0.36	2.05	0.85	0.27
20.	—45.85	0.61	8.3	0.89	4.63	0.44	0.53
21.	—6.91	0.93	13.9	0.16	1.29	0.78	0.17
22.	10.09	1.04	9.7	—0.13	0.65	0.64	0.09
23.	—9.19	0,92	12.8	0.19	1.45	0.74	0.19
24.	—30.9	1.59	15.7	—0.37	1.99	0.83	0.26
25.	25.4	1.85	18.0	—1.19	6.31	0.88	0.65
26.	—29.0	1.45	25.5	—0.23	2.19	0.92	0.29
27.	—55.9	1.51	11.2	—0.001	0.04	0.70	0.00
28.	—9.6	1.61	13.4	—0.58	2.64	0.79	0.33
29.	—86.2	1.59	11.6	0.14	0.55	0.70	0.07
30.	—25.04	1.41	21.5	—0.23	1.96	0.90	0.26
31.	124.9	1.55	15.8	0.52	2.91	0.82	0.36
32.	—21.3	2.13	14.1	—1.10	3.96	0.81	0.47
33.	141.3	1.79	15.5	0.40	1.88	0.81	0.25
34.	—72.7	0.97	9.1	0.71	3.65	0.60	0.44
35.	—48.51	1.12	5.79	0.33	0.93	0.35	0.13

TABLE 5: Coefficients of the regression
$LD_{it} = a + b\ PROD_{t-1} + c\ PCLE_{t-1} + d\ VAR$

Branch	a	b	t (b)	c	t c)	d	t (d)	R²C
1.	106.54	—0.22	0.81	0.31	2.85	—0.01	0.04	.24
2.	98.68	—0.23	1.00	0.73	7.78	—0.34	2.75	.80
3.	106.34	—0.38	0.49	0.85	2.68	—0.51	1.06	.31
4.	30.67	—1.13	1.80	0.54	2.10	1.48	3.82	.20
5.	—22.99	0.61	1.15	0.61	9.85	0.05	015	.17
6.	80.68	0.19	0.40	0.72	3.84	—0.66	2.31	.54
7.	63.22	—0.22	0.84	0.78	7.20	—0.11	0.66	.70
8.	147.80	—1.04	0.17	0.67	3.45	0.02	0.08	.39
9.	66.56	0.21	0.78	0.49	4.38	—0.27	1.59	.12
10.	80.27	0.16	0.32	0.58	2.89	—0.43	1.42	.35
11.	104.07	—0.01	0.05	0.67	6.11	—0.63	3.76	.76
12.	63.45	0.06	0.28	0.70	7.42	—0.31	2.18	.75
13.	88.66	0.13	0.57	0.43	4.70	—0.32	2.29	.60
14.	60.96	0.20	0.70	0.43	3.63	—0.12	2.29	.35
15.	104.82	0.03	0.11	0.31	2.64	—0.24	1.35	.32
16.	25.33	0.38	1.27	0.75	6.22	—0.34	1.85	.66
17.	81.63	0.07	0.29	0.48	5.00	—0.25	1.70	.59
18.	60.91	0.03	0.13	0.68	6.22	—0.24	1.46	.66
19.	54.65	0.18	0.76	0.72	7.54	—0.39	2.70	.77
20.	66.33	0.36	1.24	0.16	1.40	0.01	0.05	.07
21.	49.07	0.29	1.39	0.41	4.85	—0.05	0.41	.46
22.	150.79	0.17	0.79	0.29	3.94	—0.45	3.44	.61
23.	77.92	0.08	0.43	0.42	5.42	—0.14	1.23	.59
24.	20.00	0.33	1.43	0.80	8.60	—0.29	2.03	.78
25.	58.14	0.02	0.11	0.93	10.9	—0.50	3.89	.88
26.	62.14	0.15	0.70	0.64	7.42	—0.32	2.42	.76
27.	—14.34	0.55	6.78	0.82	6.50	—0.16	0.82	.63
28.	89.60	—0.11	0.45	0.73	7.18	—0.43	2.78	.77
29.	—43.64	0.78	2.42	0.84	6.35	—0.17	0.84	.61
30.	86.44	—0.16	0.63	0.60	5.94	—0.22	1.44	.66
31.	25.20	0.54	1.53	0.58	4.07	—0.31	1.43	.46
32.	105.68	—0.48	1.11	0.91	5.21	—0.47	1.76	.64
33.	48.77	0.21	0.52	0.65	4.03	—0.29	1.19	.45
34.	44.65	0.35	1.07	0.34	2.56	0.00	0.02	.14
35.	89.75	—0.46	0.97	0.49	2.57	0.22	0.74	.14

TABLE 6: b — coefficients of the regression $\log LD_t = a + b \log LD_{t-n}$

1977.	1	0.9150	1980.	0.9817
	2	1.0027		0.8995
	3	0.9231		0.9475
	4	0.8785		0.9231
	5	0.9425		0.9990
	6	0.9466		0.9982
	7	1.1229		0.9293
	8	0.9327		0.9443
	9	0.9150		0.8532
	10	0.9563		0.2756
	11	0.9519		0.8531
	12	1.0046		0.8543
1978.	1	0.9838	1981.	0.9155
	2	0.9453		0.8546
	3	0.9280		0.8491
	4	0.9414		0.8037
	5	0.9196		0.8400
	6	0.9412		0.8003
	7	0.9948		0.8386
	8.	0.9751		0.8505
	9	1.0165		0.9043
	10	1.0009		
	11	0.9891		
	12	1.0026		
1979.	1	1.0048		
	2	0.9208		
	3	0.9529		
	4	1.0066		
	5	0.9348		
	6	0.9624		
	7	0.9110		
	8	0.9128		
	9	0.9900		
	10	0.6027		
	11	0.9636		
	12	0.9573		

TABLE 7. Nomenclature of branches and groups of industry (economy) used in the regression equations

1. Generation, transportation and distribution of electricity
2. Extraction of coal
3. Coal processing
4. Extraction of crude petroleum and gas
5. Crude petroleum refineries
6. Iron ore mining
7. Iron and steel basic industries
8. Non-ferrous ore mining
9. Non-ferrous metal basic industries
10. Smelting, alloying and refining of non-ferrous metals
11. Extract of non-metallic minerals
12. Manuf, of non-metal. miner. prod.
13. Manuf. of fabricated metal produc.
14. Manufacture of machinery
15. " of transport equipment
16. Shipbuilding
17. Manufacture of electrical machinery and apparatus
18. Manufacture of chemicals
19. Processing of chemicals
20. Extraction of stone and sand
21. Manuf. of construction material
22. Sawmills and manuf. of wood boards
23. Manuf. of furniture and other wood products
24. Manufacture of paper
25. Manuf. of yarns and fabrics
26. Manuf. of finished textile products
27. Manufacture of leather and fur
28. Manufacture of leather footwear and leather fancy goods
29. Manufacture of rubber
30. Manufacture of food products
31. Manufacture of beverages
32. Manufacture of animal feeds
33. Tobacco manufacturers
34. Printing, publishing and allied industries
35. Manufacture of miscellaneous products.

For the further groups and branches, no English authororized translation was found. The order of INDEKS was followed (with the elimination of summarizing titles and cevovodni transport).

NOTES

(1) These views are particularly popular with the 'income school', of which M. Korać is an important representative. A theoretical consideration of the employment problem and its effects on the behaviour of the collective is given in POPOV, S. 'Uloga ličnih dohodaka u procesu formiranja i kretanja cena proizvođača' Institut Ekonomskih Nauka, Beograd, 1976, p. 126—133.
Mencinger dispensed with the problem of the unemployment variable in the following way: "... While these variables were considered refinements of the basic relationship between the changes in wages and an excess supply of labour in a capitalist market economy, the reverse seems to be true in Yugoslavia. The relation between the excess supply of labour and changes in wage rates becomes the refinement". MENCINGER, J. 'An econometric testing of some theoretical propositions regarding labour-managed economy". Economic analysis and workers' management, Vol 11, 1977, 1—2, p. 11.

(2) It has however, been constantly used in equation, e. g. MENCINGER, J., o. c.
TYSON, L. The Yugoslav Inflation: some competing hypothesis Journal of Comparative Economics, 1977, 2, p. 113—146.
PRIMORAC, E., DELLA VALLE, P. and BABIĆ, M. Wage and price expectations: A case study of Yugoslavia. Economic analysis and workers' management, Vol. 13, 1979, 1—2, p. 201—211.

(3) F. e. POPOV, S. i JOVIČIĆ, M. 'Uticaj ličnih dohodaka na kretanje cena.' Beograd, Institut Ekonomskih Nauka, 1971, p. 80—85. Mencinger, o. c., p. 11.

(4) BAJT, A. 'Mehanizem jugoslovenskega gospodarstva. Inflacija osebnih dohodkov. Deskriptivna medsektorska analiza.' Ekonomski Inštitut Pravne Fakultete, Ljubljana, 1972, p. 50.

(5) STALLAERTS, R. Aspekten van de inkomensverdeling in Joegoslavië. Gent, 1982 (unpublished doctoral dissertation), p. 191.

(6) The introduction of these official planned inflation rates in the wage equation has never been tried to the knowledge of the author. They could perhaps function as a wage contour element.

(7) All statistical data were taken out of the official statistical publication INDEKS (Beograd, Savezni zavod za statistiku).

(8) F. e. Vjesnik, 3. 6. 82. Službeno od SDK. Gubitaši i zarade (p. 5). Ekonomska Politika, 7. 12. 81, p. 18. Periodični obračun, efekti mera stabilizacije.
Ekonomska Politika, 17. 8. 81.; p. 19. Raslojavanja u primarnoj raspodeli. (Korošić, M.)
Delegatski Vjesnik, 29. 7. 82, p. 15—16. Informacija o ostvarivanju raspodjele sredstava za osobne dohotke u 1981. i prvom tromjesečju 1982. godine i o aktualnim pitanjima životnog standarda. Povećanje osobnih dohodaka bez rasta proizvodnje i produktivnosti rada.

(9) WACHTER, M. Cyclical variation in the interindustry wage structure. American Economic Review, March 1970, p. 83.

(10) OCDE. 'Yougoslavie'. Paris, 1981, p. 16—17.
The statement is based upon the yearly resolution and it is perhaps too optimistic about its realization.

(11) A similar equation (without time trend) was estimated for an earlier period and for Slovenia by F. KUZMIN. The economic policy variable was interpeted as the influence of the social contracts and self-management agreements. FRANKOVIČ, V. i KUZMIN, F. Raziskava gibanj osebnih dohodkov. Institut za Ekonomska Razaskovanja, Ljubljana, 1975, p. 84—89.

(12) e. g. WACHTER, o. c.

(13) RIPLEY, F. 'An analysis of the Eckstein-Wilson wage determination model'. Quarterly Journal of Economics, February 1966, p. 125.

(14) ECKSTEIN, O. and WILSON, T. 'The determination of money wages in American industry. Quarterly Journal of Economics, Vol. 76, 1962, p. 379—414. Abridged in INFLATION, Ball, R. and Doyle, P. (eds.), Harmondsworth, Penguin, 1972. Citation on p. 365.

(15) See HORVAT, B. Ekonomska politika stabilizacije. Zagreb, Naprijed, 1976, p. 85—96.
MILANOVIĆ, B. Diferencijalno povećanje produktivnosti kao uzrok troškovne inflacije. Ekonomska Misao, 1981, 1, p. 7—27.

(16) Popov used the branch-specific productivity variable in an aggregated level equation. She obtained a different sign for different periods. The variable was not very significant throughout all cases. POPOV, S. i JOVIČIĆ, M., o. c., p. 80—85.

(17) BAJT, o. c., p. 55—61. Here the period 1964—1970 has been analyzed.

(18) BAJT, A. Spill-over mechanism in a liberal labor-managed economy. Mim., p. 47.

(19) Lack of adequate statistical data may render this aim hard to attain.
A recent contribution (ESTERIN, S. Income dispersion in a self-managed Economy, Economica, May 1981, p. 181—194) considers intrasectoral dispersion, but is limited to the period 1965—1972.

BIBLIOGRAPHY

BAJT, A. 1972. Mehanizem jugoslovenskega gospodarstva. Inflacija osebnih dohodkov. Deskriptivna medsektorska analiza. Ljubljana, Ekonomski Inštitut Pravne Fakultete.

BAJT, A. Spill-over mechanism in a liberal labor-managed economy. Mim.

ECKSTEIN, O. and WILSON, T. 1962. The determination of money wages in American industry. Quarterly Journal of Economics, p. 379—414.

ESTRIN, S. 1981. Income dispersion in a self-managed economy. Economica, May.

FRANKOVIČ, V. i KUZMIN, F. 1975. Raziskava gibanj osebnih dohodkov. Ljubljana, Inštitut za Ekonomska Raziskovanja

HORVAT, B. 1976. Ekonomska politika stabilizacije. Zagreb, Naprijed.

MENCINGER, J. 1977. An econometric testing of some theoretical propositions regarding labour-managed economy. Economic Analysis and Workers' management, 1—2.

MILANOVIĆ, B. 1981. Diferencijalno povećanje produktivnosti kao uzrok troškovne inflacije. Ekonomska Misao, 1.

OCDE. 1981. Yougoslavie. Paris, OCDE.

POPOV, S. 1976. Uloga ličnih dohodaka u procesu formiranja i kretanja cena proizvođača. Beograd, Institut Ekonomskih Nauka.

POPOV, S. i JOVIČIĆ, M. 1971. Uticaj ličnnih dohodaka na kretanje cena. Beograd, Institut Ekonomskih Nauka.

PRIMORAC, E., DELLA VALLE, P. and BABIĆ, M. 1979. Wage and price expectations. A case study of Yugoslavia. Economic Analysis and Workers' Management, 1—2.

RIPLEY, F. 1966. An analysis of the Eckstein-Wilson wage determination model. Quarterly Journal of Economics, February.

TYSON, L. 1977. The Yugoslav inflation: some competing hypothesis. Journal of Comparative Economics, 2.

WACHTER, M. 1970. Cyclical variation in the interindustry wage structure. American Economic Review, March.