GROWTH AND REGIONAL VARIATIONS IN UNEMPLOYMENT IN YUGOSLAVIA: 1965-80

by

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There is scarcely an aspect of Yugoslavia's self-managed economy which has not been studied for its insights into the performance of a labor-managed market economy.[1] Of the many potential indicators, an impressive postwar record of economic growth may be the greatest success and the persistently high levels of unemployment the worst failure of self-management. This paper discusses an empirical study showing that although rapid growth and unusually high unemployment have been intimately related, it has been for reasons largely unconnected to Yugoslavia's labor-managed system.

Controversies over the systemic roots of unemployment in Yugoslavia abound. Early theories of a labor-managed firm (Ward [1958], Furubotn and Pejovich [1970], e.g.) predicted that labor would be allocated suboptimally, and the postwar history of the Yugoslav economy appears to bear this out. A huge exodus of Yugoslavs to West Europe as guest workers dramatized the issue and has been cited as evidence (Sirc [1979], Addison and Burton [1984], e.g.) of an intrinsic inability to achieve and maintain full employment.

Studies of income distribution (Vanek and Jovicic [1975], Rivera-Batiz [1980], Sapir [1980], and Staellerts [1981], e.g.) question such criticisms in suggesting that specific investment and credit policies, mostly inessential to self-management, stimulated an excessively capital-intensive development and thereby limited employment growth. Bartlett [1980] cites even less institutional causes, drawing parallels between Yugoslavia's situation and the transitional difficulties of other developing nations in which industrialization has led to unemployment by overstimulating labor force growth. Though both the capital misallocations and supply-side interpretations diagnose Yugoslav unemployment essentially as a by-product of the rate of economic growth, their respective policy implications, as we later discuss, are quite different.

The paper takes a closer look at the changes in the regional distribution of

unemployment in Yugoslavia from 1965 to 1980, a period over which a curious dichotomy in regional trends became acutely striking. Contrary to the national trend, measured unemployment in the most heavily industrialized areas remained quite low, either stable or even declining. The end result has been a heavily disproportionate concentration of labor surpluses in the less developed areas.

An explanation of the reasons for this should help to clear up disputes about the sources of Yugoslav unemployment. On its face, the regional dichotomy seems to suggest a nonsystemic explanation because comparatively minor regional differences in the practice of self-management could not possibly explain the wide disparities in unemployment. Within Yugoslavia, it is generally believed that the regional differences may be misleading because the external migration of workers to West Europe started in the more industrialized areas, so alleviating unemployment there more than elsewhere.[2] Without necessarily intending so, this viewpoint deemphasizes unemployment as a regional issue and directs attention back to possibly more systemic causes. Much of the literature on the subject (Tyson [1980], Turcic [1978), Schrenk et al. [1979], Vojnic [1982], e.g.) notes that the regional trends in unemployment are consistent with the capital distortions thesis, inasmuch as the more abundant labor resources of the less developed areas should seemingly have favored a more labor intensive growth than has turned out to be the case. But how much can in fact be explained in these terms has not been very carefully researched.

This work is chiefly an attempt to analyze what, if anything, labor supply responses to economic growth, such as those cited by Bartlett, contributed to the contrasting regional unemployment trends. The study singles out the role of labor supply because it offers the least systemic explanation of Yugoslav unemployment. A clearer understanding of its importance ought therefore help to identify the extent to which the labor surplus difficulties are, or are not, related to self-management. Also, if economic growth has

overinflated the supply of labor, unemployment will have increased pari passu with the growth-induced increases in employment, and efforts to reduce unemployment from the demand side may make matters worse. Thus the analysis has a very direct bearing on Yugoslavia's policy choices for dealing with the unemployment issue.

The paper begins with an overview of some of the 1965-80 regional economic trends to be explained which is followed by a discussion of an econometric model of minimum earnings, employment, and unemployment on which the analysis is based. Succeeding sections describe estimates of the model and our findings.

Regional Trends

Regional disparities in living standards in Yugoslavia follow a classical North-South division. Per capita incomes in the northern Republics of Croatia, Slovenia, as well as Serbia Proper, and the Province of Vojvodina remain above the average while in the areas further south-- Bosnia-Hercegovina, Montenegro, Macedonia, and Kosovo-- they fall below. The record of economic growth under self-management has failed to break this pattern. If anything, regional income differentials have widened over the post-World War II years.[3]

Regional differences in unemployment tend to reinforce the North-South division, but they have changed over time in more complicated ways, especially since 1965. In 1965, the ranking of the different areas, according to their respective rates of unemployment (.), looked like this:[4]

Areas Below the Mean Rate of 6.1 Percent:

Slovenia (2.5)

Vojvodina (4.8)

Bosnia-Hercegovina (5.1)

% of total population. 36.4

Areas Above:

Croatia (6.3)

Montenegro (6.3)

Serbia Proper (7.1)

Macedonia (16.6)

Kosovo (21.0)

% of total population. 63.6

It can be seen that the regional distribution exhibited a moderate amount of skewness, but the majority of the population was living in areas with unemployment rates which were rather typical of those for the country as a whole. Rates of unemployment in some areas, especially Slovenia, were not excessively greater than in other economies.

Between 1965 and 1980, unemployment rose everywhere except in Croatia and Slovenia where, apart from comparatively modest fluctuations, the path of unemployment was either flat (as in Croatia) or declining (as in Slovenia). By 1980, these changes had caused the regional distribution to shift as follows:

Areas Below the Mean Rate of 11.9 Percent:

Slovenia (1.5)

Croatia (5.5)

% of total population. 28.9

Areas Above:

Vojvodina (12.8)

Bosnia-Hercegovina (14.4)

Serbia Proper (15.0)

Montenegro (15.2)

Macedonia (22.1)

Kosovo (28.1)

% of total population. 71.1

In those areas where unemployment had risen the increases tended, in progression from the mean, to be inversely proportional to the area rate's proximity to the national average. The net result was a much more uneven distribution of regional unemployment with considerably more skewness.

As a crude check on the the popular explanation that higher rates of external migration from Croatia and Slovenia obscured what might have been increases comparable to elsewhere, Table 1 compares actual unemployment with what it might be supposed to have been in the absence of external migration, assuming that each external migrant left a job vacancy to be filled by one of the remaining unemployed.[5] On this assumption, the initial regional differences between Croatia and Slovenia, i.e. the nonincreasing regions (NIR's), and the rest of the country, i.e. the increasing regions (INR's), would have been largely eliminated and much of the widening of the gap reduced. Yet, from 1965 on, the hypothetical rates continue to increase and the regional dichotomy persists. Rates of unemployment in the INR's about double, compared to the NIR's.

There are probably many reasons why the external migration hypothesis offers an incomplete explanation of the regional trends.[6] In the model we estimate, a more careful effort to evaluate the impact of external migration finds its contribution to the

TABLE 1

Unemployment Rates

	Official Estimates:			Counting External Migrants as Unemployed:		
	Croatia & Slovenia	Other Republics & Provinces		Croatia & Slovenia	Other Republics & Provinces	
	(1)	(2)	(2)/(1)	(3)	(4)	(4)/(3)
1965	5.0	8.0	1.6	11.0	12.2	1.1
1966	4.9	8.2	1.7	13.4	13.3	1.0
1967	5.7	8.8	1.5	14.0	14.3	1.0
1968	5.5	10.2	1.9	16.7	17.0	1.0
1969	4.6	9.8	2.1	18.4	19.9	1.1
1970	3.8	9.0	2.4	18.7	23.6	1.3
1971	3.7	8.5	2.3	21.6	24.0	1.1
1972	3.7	9.5	2.6	22.1	25.7	1.2
1973	3.7	11.3	3.1	22.6	27.7	1.2
1974	3.8	12.9	3.4	20.8	27.6	1.3
1975	4.7	14.5	3.1	19.1	27.2	1.4
1976	5.0	15.7	3.1	17.7	27.1	1.4
1977	4.8	16.3	3.4	16.2	26.8	1.7
1978	4.1	16.4	4.0	14.7	26.3	1.8
1979	3.9	16.5	4.2	13.8	26.1	1.9
1980	4.1	16.2	4.0	13.2	25.4	1.9

dichotomous unemployment trends to have been quite small.

What of the other factors? We examined many other regional characteristics, a selection of which is illustrated in Table 2, for an impression of such differences as might be relevant. For manageability, Table 2 shows only the value of the characteristic for each Republic or Province at the beginning and end of our reference period, with a summary estimate of the time trend in between.[7]

This table reveals many similarities, especially in the time trends between 1965 and 1980. Employment, real wages, consumer credit, per capita Social Product,[8] and physical capital, for example, grew at similar rates in all regions.

There is an inverse relationship between unemployment rates and income levels, but the association of regional income differences or growth rates of income to unemployment trends appears to be much weaker. At first glance, there does not appear to be a strong relationship between the shifts in the regional distribution in unemployment and levels of development as measured by income differences.

However, the relationship is stronger if economic development is more broadly defined. Consider, e.g., the regional differences in the percentages of the population whose principal work activity is in traditional agriculture. In 1961 (such figures are available only for census years), the distribution of these percentages (.) looked as follows:

Areas Below the Mean of 49.6 Percent:

Slovenia (31.1)

Croatia (43 9)

Montenegro (47.0)

TABLE 2
Regional Comparisons: Selected Indicators

		Less-Developed Areas:					More-Developed Areas:		
		Bosnia-Herce-govina	Mont-enegro	Mace-donia	Serbia Proper	Kosovo	Vojvo-dina	Croatia	Slovenia
Unemployment Rate (Percent):	1965	5.1	6.3	16.6	7.1	21.0	4.8	6.3	2.5
	1980	14.4	15.2	22.1	15.0	28.1	12.8	5.5	1.5
	% p.a.	7.83	7.03	2.02	6.57	2.25	6.63	-.21*	-6.27
% Working Age Pop. Empl. in Soc. Sector	1965	24.4	25.5	27.4	26.5	16.1	34.7	35.2	50.6
	1980	30.2	34.0	35.8	39.3	20.8	41.4	46.8	68.1
	% p.a.	2.01	2.43	2.21	2.90	2.12	2.00	2.37	2.57
Real Wage: (1965 dinars)	1965	332	306	284	319	280	318	360	443
	1980	514	469	410	507	431	561	567	596
	% p.a.	2.77	2.66	2.10	2.93	2.61	3.70	2.80	2.15
Women workers as % of Soc Sector Empl.	1965	22.8	27.4	24.1	28.4	20.0	31.4	34.0	39.6
	1980	30.7	30.5	30.0	33.1	20.2	34.8	38.2	43.3
	% p.a.	2.30	1.02	1.82	1.20	.87	.74	.99	.68
External Migrants/1000 Persons of Working Age	1965	15.0	7.7	20.2	14.3	3.9	12.5	28.9	25.6
	1980	60.5	32.7	62.7	48.4	40.6	44.6	62.1	44.9
	% p.a.	8.98	7.63	7.82	9.02	14.46	7.35	3.93	4.01
High School & College Grads/ 1000 Persons of Working Age	1965	7.5	7.9	10.5	11.0	6.4	10.5	12.9	12.5
	1980	21.1	20.9	16.5	19.6	21.6	17.0	18.0	24.5
	%p.a.	6.66	7.45	1.55	2.98	8.27	1.88	1.83	4.18
Farm Product/ Capita of Work Age (000's of 1965 dinars):	1965	1.81	1.89	2.57	2.78	1.75	5.82	2.62	2.66
	1980	1.95	1.98	3.00	3.82	1.76	7.42	3.77	3.59
	% p.a.	.10*	.52*	.60	1.37	-.37*	2.15	2.08	1.58

TABLE 2: Regional Comparisons: Selected Indicators (Continued)

		Less Developed Areas:					More Developed Areas		
		Bosnia-Hercegovina	Montenegro	Macedonia	Serbia Proper	Kosovo	Vojvodina	Croatia	Slovenia
Consumer Credit/Capita of Working Age (1965 dinars)	1965	208	262	595	291	163	324	346	400
	1980	243	1,135 [1/]	287	405	89	298	434	731
	% p.a.	5.74	10.84	-2.52*	6.75	4.14*	7.60	6.41	8.98
Soc Product/ Capita of Work Age (000's of 1965 dinars)	1965	4.82	4.90	4.85	6.17	3.04	7.57	7.70	11.77
	1980	7.85	8.97	7.02	10.79	4.34	14.64	14.03	20.57
	% p.a.	3.81	3.45	3.03	3.83	2.89	5.22	4.38	4.59
Soc Sec as % of Soc Prod.	1965	77.8	78.6	71.4	75.4	64.7	72.0	81.9	87.6
	1980	8.90	91.4	87.3	86.6	80.5	81.0	88.8	92.1
	% p.a.	1.08	1.21	1.33	1.05	1.50	.98	.71	.43
Capital/Capita of Working Age (000's of 1972 dinars)	1965	20.3	28.3	16.9	19.4	10.6	23.1	27.7	48.7
	1980	45.3	70.3	43.0	50.0	27.3	63.0	74.1	121.2
	% p.a.	5.50	6.23	6.22	6.56	6.39	6.22	6.62	6.38

1/ Includes relief credits for the earthquakes of 1979.

* All =% p.a. significant at .05 or less, except asterisks.

%of total population. 33.5

Areas Above:

Bosnia-Hercegovina (50.2)

Macedonia (51.3)

Vojvodina (51.8)

Serbia Proper (56.2)

Kosovo (64.2)

%of total population. 66.5

Except for Montenegro, whose mountainous terrain limits farming yet whose proportion of the populace primarily employed in agriculture is nevertheless close to the national average, the split above and below the mean in 1961 is the same as the classification into INR's and NIR's in subsequent years. Though by 1981 the agricultural work force had fallen dramatically everywhere, the key features of the earlier regional distribution remained the same:

Areas Below the Mean of 28.8 Percent:

Slovenia (10.1)

Croatia (22.3)

Montenegro (25.8)

% of total population. 31.5

Areas Above:

Macedonia (29.8)

Bosnia-Hercegovina (30.3)

Vojvodina (31.7)

Serbia Proper (35.1)

Kosovo (43.4)

%of total population. 68.5

The more fully to appreciate these comparisons, note that the proportion of persons employed outside of farming in most of the INR's is either smaller or not appreciably greater than the proportion for Vojvodina, Yugoslavia's leading agricultural producer. Serbia Proper, usually classified as a more highly developed area, in fact has the second largest traditional sector after Kosovo. The proportion of the active population integrated into its modern industrial work force is smaller than in some of the least developed republics.[9]

Other measures suggest a similar relationship. As Table 2 shows, the agricultural productivity of the INR's (except in Vojvodina) lagged behind that of the NIR's, consistent with what one might expect if INR agriculture was less advanced and there was the usual underemployment found in rural areas of developing nations.

In Yugoslavia, the share of output produced in what is called the Social Sector is another indicator of the degree of modernization. The Social Sector is defined to include the production of the larger and more capital intensive self-managed enterprises and to exclude the output of peasants and the handicrafts and trade-oriented private sector. An expansion of the share of output produced in the Social Sector is therefore usually a sign of modernization and industrial transformation.

As Table 2 shows, the share of output produced in the Social Sector was significantly lower in the INR's in 1965. Though much of this gap had been closed by 1980, the comparison bears out the different order of magnitude of the rate of economic

transformation in the INR's over these years. In addition, INR women's labor force participation rates were accelerating at a faster pace, as were the annual numbers of high school and college graduates, the gap between the INR's and NIR's in this respect having been almost entirely closed by 1980.

Overall, the indicators are that the INR's and NIR's were at fundamentally different stages of economic development in 1965. Next, we discuss how this, in and of itself, might have contributed to the disparate trends in regional unemployment rates.

Labor Supply and Economic Development: Basic Ideas

Economic growth, in adding modern industrial activities onto a traditional, largely agricultural base, induces unemployment whenever the reallocations of labor necessary for modernization lure a greater number of jobseekers away from traditional employments than can be absorbed into the expanding industrial sector. Where unemployment takes this form, there is socially inefficient labor transfer and employment and unemployment vary directly, counter to the more usually expected inverse relationship between these two variables.

Wellisz [1968] and Todaro [1969] were the earliest development economists to spell out the conditions for unemployment of this type. A main proviso is that the earnings of workers in the modern industrial sector (I) exceed the earnings of persons of equivalent skill in the traditional sector (A) and continue to do so in the face of an influx of new workers. The discrepancy between earnings in the two sectors draws an excess supply of unemployed workers into I. The downward rigidity of earnings prevents the normal adjustments of labor supply which would restore equilibrium and equalize sectoral earnings.

When this happens, unemployment has three sources. First, there is less employment than if wages had been free to find their market-clearing levels. Second, too

many persons from the families of workers already in I enter the modern sector labor force, substituting jobseeking for household production and other informal employment in response to sector I wage rates. Finally, there are excess migrants from rural areas attracted to I for the same reasons. Whereas the development literature stresses the excess migrants from rural areas, we do not, in this paper, distinguish between the second and third sources of excess labor supply. The historical data on rural to urban migration for Yugoslavia are not very reliable.[10] Also, the distinction is not analytically important for our purposes, as it makes little difference for the resulting unemployment whether the excess jobseekers are attracted to I from current migration or from the households of past urban migrants.

Todaro [1976], Mincer [1976], Blomqvist [1978], and Arellano [1981] show that the likelihood of growth-induced unemployment depends on a number of factors which may vary from one setting to the next. Thus, not all developing countries will experience unemployment of this kind. In our model, potential additions to the unemployed vary directly with the elasticity of the supply of labor, and as this is likely to become less elastic as an economy matures, the possibility of economic development inducing unemployment diminishes as modernization expands.

Though the Wellisz-Todaro framework was meant to explain rising levels of unemployment in nations without labor-managed economies, it seems potentially applicable to Yugoslavia as well. The pace of postwar modernization was extremely rapid, recasting an 80 percent agrarian society at the end of World War II into one 70 percent urbanized in the comparatively short span of about 30 years. Yugoslav firms ordinarily stipulate guarantees of minimum earnings which add to the attractiveness of the opportunities opening up in the modern sector. These guarantees act like minimum wages in other countries, putting an effective floor to downward adjustments in labor earnings.

The regional disparities in stages of industrialization in Yugoslavia facilitate a test of the applicability of these ideas. As the theory implies that the degree of development-induced unemployment diminishes with industrialization, the relationships predicted, if present, should prove to be significantly weaker among the NIR's than the INR's. If this is not so, the relevance of an explanation along these lines is doubtful.

Theoretical Model

The theoretical model which we estimate is patterned after the well-known Harris and Todaro [1970] two sector general equilibrium model of economic development. Our adaptation retains their central idea that the labor supplied to I depends on the comparisons of potential workers between the earnings which they expect to receive in the modern vs. traditional sectors. A principal difference is that we relax their assumption of a fixed labor supply. As in their model, the relationships are net of the rate of population increase.

In its simplest form, the model includes a schedule describing the labor demands of the modern sector:

(1') $E_I = E_I(w_I)$

in which w_I designates a wage floor fixed exogenously above its market-clearing level. For traditional workers, there is a corresponding demand schedule:

(2') $E_A = E_A(w_A)$

where w_A is the traditional wage.

Next we assume that potential jobseekers search optimally by comparing expected earnings in I, i.e. P w_I where P is the subjective probability of finding employment in I, with the actual earnings of workers employed in A. This strategy implies individuals enter the labor force to look for work in I whenever:

(3') $P\, w_I \geq w_A$.

In other words, we assume that potential jobseekers take the prevailing w_A which, unlike w_I, is flexible downward, as their reservation wage. Labor supply expands to the point where (3') becomes an equality. The equality determines the intersectoral allocation of the labor supply.

For simplicity, we follow Harris and Todaro in assuming P is determined by:

(4') $P = E_I/L_I$

where L_I is the supply of labor to I. In the econometric model, we relax this and write (4') in a more general form.

It follows from (3') that the aggregate labor supply:

(5') $L_I + E_A = L = L(w_A)$

depends on the reservation wage.

Since economic growth increases the demand for labor in the modern sector and we are interested in the responsiveness of unemployment to economic growth, we look at how unemployment changes with changes in E_I. Defining unemployment:

(6') $U = L_I - E_I$

$\delta U/\delta E_I$ takes the following simple form:

(7') $\delta U/\delta E_I = (L_I/E_I)\theta + (E_A/E_I)\eta_A - 1$

where θ is the elasticity of labor supply and η_A is the elasticity of labor demand in A.

(7') depends on θ, η_A, and the relative size of E_A.[11] In earlier stages of economic development, θ is apt to be larger because of the ease of attracting underemployed persons from A, and there is surely a greater share of employment in A. Given no

offsetting changes in η_A, $\delta U/\delta E_I$ is more likely to be positive than negative in the earlier stages of development. As an economy matures and θ and the share of E_A decline, the more usually expected negative relation between U and E_I should begin to assert itself.

In what follows, we take $\delta U/\delta E_I$ positive to be an indicator of growth-induced unemployment.

Econometric Specification

The econometric specifications of the theoretical relationships are linear. The exogenous variables, introduced as Z's, are those which were the most feasible to measure from existing sources.

Where appropriate, the econometric model has been estimated separately for the INR and NIR regions. Variables are therefore i-subscripted for individual republics or provinces within each of the two groupings. Unsubscripted parameter coefficients are the same within each grouping. Each variable refers to a particular year, but time subscripts have been dropped to simplify the notation.

As already evident, the model incorporates many standard assumptions, such as the responsiveness of labor supply to wage incentives and the familiar law of demand. We leave the empirical work to decide how applicable these may be to Yugoslavia.

The detailed components are as follows:

(1) Employment (labor demand) in I:

$$E_{Ii} = a_0 + a_1 w_{Ii} + a_2 Z_{SSPi} + a_3 Z_{MODi} + a_4 Z^I_{Ki}$$

w_I = minimum wage rate in I

Z_{SSP} = Social Sector Product

Z_{MOD} = degree of modernization (measured by the share of the Social Sector in

Total Product)

Z_K^I = capital stock

hypotheses: $a_1 < 0$, $a_2 > 0$, $a_3 > 0$, $a_4 < 0$

(1) is a conventional labor demand equation, the same as might pertain to a capitalist economy consisting of profit-maximizing firms. Though there are conditions under which the predicted demands of labor-managed (LM) and profit-maximizing (PM) firms may differ, their relevance for Yugoslavia has been a subject for dispute (Horvat [1975]). Moreover, the labor demands of LM and PM firms will have generally similar characteristics if labor has heterogeneous skills.[12] Though our model neglects elsewhere to take account of heterogeneity, its implications are more serious on the demand side. We therefore leave (1) to conform with the neoclassical laws of demand.

Economic growth increases labor demand via exogenous shifts in Z_{SSP} and Z_{MOD}.[13] Z_{MOD} accounts for changes in the composition of final demand. We expect a_3 to be greater in the more advanced NIR's where Social Sector output consists of more labor-intensive services.

a_4 is assumed negative to capture residual substitutions of capital for labor which other variables miss because they are incomplete surrogates for what they are supposed to measure. For example, our data on w_I fail to register interindustry variations in the minimum earnings agreed to in "social compacts."

We treat Z_K as exogenous because interest rates were maintained at artificially low levels for much of the study period and nonmarket criteria were important in allocating investment funds. Experiments with Z_K endogenous gave poor results, as might be expected under these conditions

(2) Employment (labor demand) in A:

$E_{Ai} = b_0 + b_1 w_{Ai} + b_2 Z_{AP}$

w_A = wage rate in A

Z_{AP} = agricultural output

hypotheses: $b_1 < 0$, b_2: see below

(2) is the counterpart in A to (1) for I.

Z_{AP} is a surrogate for traditional outputs including those produced in informal activities in urban areas. Little of such incomes appears in the national accounts, but their regional variations are correlated with Z_{AP}.

Z_K^A is omitted for lack of data. Without this, b_2 may take on any sign.

(3) Intersectoral equilibrium

$E(w_{Ii}) = w_{Ai}$

$E(w_{Ii}) = P_i w_{Ii}$, expected earnings in I

P = perceived probability of employment in I

(3) derives from the search behavior of unemployed workers in the theoretical model. Note that because $w_I > w_A$, labor market equilibrium requires $P < 1$.

(4) Expected earnings

$E(w_{Ii}) = d_0 + d_1 E_{Ii} + d_2 w_{Ii}$

hypotheses: $d_1 > 0$, $d_2 > 0$

(4) relaxes (4') and offers a more flexible empirical approximation, while retaining the essential idea that an increase in E_I increases P. [14]

(5) Labor force (labor supply):

$$L_i = c_0 + c_1 W_A + c_2 Z_{CCRi} + c_3 Z_{WEi} + c_4 Z_{XMi} + c_5 Z_{GRDi}$$

Z_{CCR} = consumer indebtedness of persons

Z_{WE} = female employment in I

Z_{XM} = external migration of workers

Z_{GRD} = annual high school and college graduates

Hypotheses: $c_1 > 0$, $c_2 > 0$, $c_3 > 0$, $c_4 < 0$, c_5

As in (5'), labor supply depends on the reservation wage. $c_1 > 0$ assumes the substitution effect of an increase in expected earnings dominates the income effect. Wealth effects enter via changes in consumer credit because of the difficulties of measuring other household assets.

An increase in employment opportunities for women is assumed to increase labor supply, and external migration is assumed to reduce labor supply for obvious reasons. Z_{GRD} picks up additions to the labor force at about the time that school graduates are starting their work careers.

(6) Unemployment

$$U_i = L_i - E_{Ii} - E_{Ai}$$

(7) Industrial wages

$$w_{Ii} = e_0 + e_1 Z_w + e_2 Z_{SSPi} + e_3 U_i$$

Z_w = national average w_I

hypotheses: $e_1 > 0$, $e_2 > 0$, $e_3 < 0$

In principle, there is no wage labor in a labor-managed economy, but so-called "social compacts" embody agreements on minimum earnings[15] which we refer to as the

wage rate. These minima are similar to a uniform minimum wage, except they vary regionally, balancing a national social interest in reducing regional earnings differences with exceptional local labor market conditions, skill differentials, and the like.

In (7), we assume that Z_W sets a standard for equalizing regional incomes. Local influences enter via the variations in Z_{SSP} and U.

e_1 will be less than one to the extent that compacts reduce regional earnings differentials. e_2 positive will show the agreements are constrained by regional productivity differences[1] and $e_3<0$ that the $w_{,l}$ are responsive to local labor market slack.

(1) through (7) can be solved for E_l, E_A, L, U, w_A, w_l, and $E(w_l)$. We do not specify a lag structure or other dynamic properties as our main interest is to explain long term trends by the yearly equilibrium solutions of the model.

Estimating Equations

The model's I employment and wage equations, (1) and (7), can be estimated directly. Because of data limitations however, the relevant parameters of the rest of the model have had to be estimated by indirect means.

To see how this was done, first evaluate E_A and L in (6) by (2) and (5). Then, taking advantage of the equilibrium condition (3), replace w_A with $E(w_l)$ and evaluate the latter with equation (4). Through these manipulations, we obtain a compression of the model:

$$(8)\ U_i = h_0 + h_1 w_{li} + h_2 E_{li} + c_2 Z_{CCR} + c_3 Z_{WE} + c_4 Z_{XM} + c_5 Z_{GRD} - b_2 Z_{AP}$$

or what is sometimes referred to as a quasi-reduced form because it is derived by evaluating a subset of the endogeneous variables with exogenous instrumental variables. (8) is our third and final estimating equation.

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[1] As later explained, Z_{SSP} is measured per capita.

The h coefficients in (8) are related to the parameters of the underlying model as follows:

$$h_0 = c_0 + d_0(c_1 - b_1) - b_0$$

$$h_1 = d_2(c_1 - b_1)$$

$$h_2 = d_1(c_1 - b_1) - 1$$

h_1 is the potential excess supply due purely to the differential between industrial and traditional wages. It is easy to verify that h_1 is positive, given our hypotheses. I.e., an increase in industrial wages increases unemployment.

The test for growth-induced unemployment depends on the sign of h_2, the econometric counterpart to (7') in the preceding section. A unit of growth-induced labor demand reduces the pool of the unemployed by one worker and raises expected earnings in I by d_1. d_1c_1 is the increase in labor supply due to the attraction of new entrants from outside of the I labor force. d_1b_1 is the additional number of existing workers leaving A jobs to look for work in I. If $d_1(c_1 - b_1) > 1$, then $h_2 > 0$ and the labor attracted to I exceeds the total of new jobs available. In this case we have the atypical positive relationship between employment and unemployment predicted if growth gives rise to unemployment. If $d_1(c_1 - b_1) < 1$, then $h_2 < 0$, and the opposite is true. Growth fails to induce unemployment.

The elasticity of labor supply enters h_2 via c_2. For the reasons noted before, h_2 is more apt to be positive in the earlier stages of economic development. We hypothesize therefore that h_2 will be arithmetically smaller in the NIR's. If this is not the case, we reject the hypothesis that unemployment is growth-induced.

To control for size disparities, all variables except w_I and Z_W are normalized relative to the regional population of working age and appear in (1), (7), and (8) as per capita

rates. It is unnecessary to treat w_I and Z_W in this fashion, because they are per capita by definition.

Data

Most of the data are taken from the Statistical Yearbook of Yugoslavia for selected years. As indicated in footnote 5, estimates of external migration are based on the Population Censuses of 1971 and 1981 and OECD reports of Yugoslav workers temporarily employed abroad. The series on the capital stock for years prior to 1973 is based on the well-known estimates of Ivo Vinski [1978], and the Federal Office of Statistics provided unpublished estimates for some of the later years. The series on high school and college graduates was derived, in part, from Statistical Bulletins.

Yugoslav accounting practices make it difficult to define a purely traditional sector. Our estimates of employment in the modern sector include a small number of agricultural workers (roughly 4 percent) employed on state farms. Similarly, the output and capital of state farms is counted in the data for the Social Sector (amounting again to roughly 4 percent).

Unemployment in Yugoslavia is measured by the number of persons registered with employment exchanges as opposed to the standard concept requiring persons to have been actively looking for work. This matters little for our purpose as the unemployment measures are applied in an internally consistent fashion. (See Mesa-Lago [1971], e.g.)

Estimates

The study covers 8 republics and autonomous provinces for 16 years each, or 128 sample points in all. We applied the LSDV (least squares with dummy variables) method recommended by Maddala [1977] for pooling time series and cross-section data to ascertain characteristics of the sample. Though LSDV does not control for the intercorrelated disturbances of pooled data, we used it, as Maddala suggests, as an

ordinary least squares check for potentially significant differences in intercept and slope coefficients for the INR vs. NIR groupings.

After these were determined, we reestimated (1), (7), and (8) with three stage least squares for more efficient estimates. At this point, we also made a common estimate of each coefficient for which the regional differences in the LSDV results were smaller than one standard error.

Tables 3 through 5 show the significant regional differences. The first columns display the INR values. The second describes the estimated difference between the INR and NIR values.[16] Absent entries connote no significant difference, intraregional dummy variables correct the intercepts for unobservables peculiar to specific republics or provinces.[17]

We study the differences between the INR and NIR's to concentrate on the regional dichotomy in unemployment. Differences within these groupings or between subsets of each are therefore not identified by this method.

As may be seen, the estimates of the labor demand equation conform, for the most part, to what one might expect in a conventional market economy. Signs of a_1, a_2, and a_3 are as predicted. The value of a_1 shows that employment levels are significantly and inversely related to wage levels. Guarantees of minimum earnings therefore work similarly to minimum wages in a conventional market economy, to reduce employment and create unemployment. This is insufficient, ceteris paribus, to account for the regional differences in unemployment because, as it turns out, labor demand is somewhat less elastic in the INR's.[18]

The sign of a_4 differs from the predicted, but errors of measurement in the capital stock make it advisable to treat the estimates of this coefficient with caution.

TABLE 3

Labor Demand Equation

	INR's	ΔNIR's
Coefficients:		
$a_1(\delta E_I/\delta W_I)$	-.00033 (.00004)	-.00022 (.00007)
$a_2(\delta E_I/\delta Z_{SSP})$	2.06 (.177)	--
$a_3(\delta E_I/\delta Z_{MOD})$	.194 (.063)	.157 (.041)
$a_4(\delta E_I/\delta Z_{KP})$	.0016 (.0003)	--
Intercept	.123 (.004)	--
Intraregional Dummies:		
Bosnia-Hercegovina	-.025 (.005)	--
Montenegro	-.044 (.005)	--
Kosovo	-.031 (.007)	--
Vojvodina	.017 (.006)	--

Standard errors in parens.

TABLE 4

Wage Determination Equation

	INR's	ΔNIR's
Coefficients:		
$e_1(\delta W_I/\delta Z_W)$	.834 (.026)	--
$e_2(\delta W_I/\delta Z_{SSP})$	1173.9 (78.5)	-484.3 (94.8)
$e_3(\delta W_I/\delta U)$	-798.8 (74.3)	--
Intercept	9.2 (10.1)	69.8 (8.6)
Intraregional Dummies:		
Montenegro	-21.3 (5.5)	--

Standard errors in parens.

Estimates for the wage equation in table 4 show that e_1 is less than one and does not differ significantly between INR and NIR's. Minimum standards do, in part, reduce the gap in regional earnings.

As e_2 is significantly lower in the NIR's, economic growth boosts minimum earnings by more in the INR's. This is consistent with the findings of Ostojic [1981] showing that the share of retained earnings increases in the more affluent work units, a disproportionate share of which are located in the NIR's. If employment and unemployment are negatively related, this could help to account for regional differences in unemployment.

The strongly significant and negative e_3 shows restraint in wage agreements when confronted with high unemployment. Excess supplies of labor clearly pressure the bargaining process to keep minimum earnings standards down. As the differences between the INR and NIR's are not significant in this regard, this appears unrelated to the regional unemployment differences.

Most of the coefficients for the unemployment equation in Table 5 are as predicted. The estimate of c_4 is well below unity showing that our earlier assumption that each external migrant freed an opening for one of the remaining unemployed leads to an overstatement of the contribution of external migration. c_5, on the other hand, is close to unity, suggesting that the unemployment rate among new high school and college graduates is close to 100 percent. Because unemployment among school graduates in Yugoslavia is very high, this is not totally implausible. Also, high school and college graduates are frequently unemployed for periods exceeding a year, which tends to increase c_5. There may as well be an "added worker" effect[19] associated with increasing school enrollments which tends to increase the value of this coefficient.

c_2 is the only coefficient whose value differs from the predicted. Z_{CCR} is a poor

TABLE 5

Unemployment Equation

	INR's	ΔNIR's
Coefficients:		
$h_1(\delta U/\delta W_I)$	.000062 (.000020)	--
$h_2(\delta U/\delta E_I)$	.224 (.105)	-.455 (.029)
$c_2(\delta U/\delta Z_{CCR})$	-.0019 (.0035)	--
$c_3(\delta U/\delta Z_{WE})$	.255 (.251)	--
$c_4(\delta U/\delta Z_{XM})$	-.128 (.036)	--
$c_5(\delta U/\delta Z_{GRD})$	1.045 (.206)	--
$b_2(\delta U/\delta Z_{AP})$	-.0039 (.0012)	--
Intercept	-.076 (.014)	.124 (.009)
Intraregional Dummies:		
Macedonia	.045 (.003)	--
Kosovo	.053 (.003)	--
Vojvodina	-.0096 (.0044)	--

Standard errors in parens.

measure of net worth, and an unusually large increase in loans to Montenegro for disaster relief after the earthquakes of 1979 may have added to the difficulties with this variable.

The value of b_2 indicates that increases in farm productivity help to reduce unemployment, illustrating the interdependence between the labor demands of the urban and rural sectors. As farm productivity increased more rapidly in the NIR's over the study years, the sign of c_2 is consistent with the regional dichotomy.

We are the most interested in the value of h_2. Its estimates are positive in the INR's, but negative in the NIR's, which is fully consistent with what one would expect if unemployment is growth-induced. Of the coefficients in (8), only h_2 differs significantly between regions. This is a striking result.

Simulations

Simulations, summarized in Table 6, carry the analysis a step further to see what each regional difference contributes to the regional trends in unemployment over the study period.

Row one lists the intercept (intial value) and slope (annual change) of a linear historical trend line, $U_{it} = m_{0i} + m_{1i}t$, fitted to per capita unemployment rates simulated with the model for 1965 to 1980. The remaining rows show how the historical trend line shifts when the simulations are repeated, controlling for the regional differences. We do so for each of the indicated row factors by setting it equal to its value in the opposite regional grouping. The shifts measure the sensitivity of the historical trends to alternative influences.[20] The greater the deviation (i.e. the signed cell entries) of the reestimated trend from the historical (row one) benchmark, the greater the contribution of the indicated regional difference.

Point estimates of shifts in the m coefficients are not overly reliable. By their very

TABLE 6

SUMMARY OF MODEL SIMULATIONS

Regional Differences in Per Capita Unemployment:

	INR's:		NIR's:	
	Initial Values	Annual Change	Initial Values	Annual Change
Trend Coefficients	2.85	+.31	1.94	-.04
Contributions of Coefficient Differences:				
Supply Side:				
$h_2(\delta U/\delta E_I)$	+5.11	+.26	-6.44	-.59
Demand side:				
$a_1(\delta E_I/\delta W_I)$	-1.80	-.06	+1.95	+.06
$a_3(\delta E_I/\delta Z_{MOD})$	+2.32	+.03	-2.62	-.02
$e_2(\delta W_I/\delta Z_{SSP})$	+.17	+.02	-.54	-.05
Contributions of Differences in Exogenous Variables:				
Supply side:				
Z_{CCR}	+.007*	+.004	-.007*	-.004
Z_{WE}	-2.07	+.01	+1.78	-.01
Z_{XM}	+.30	-.01	-.27	+.01
Z_{GRD}	-.43	+.01	+.37	-.01
$Z_{XM} = 0$	-.27	-.03	-.52	-.02
Demand side:				
Z_{SSP}	+1.07	+.09	-1.13	-.09
Z_{MOD}	+.49	-.02	-.85	+.03
Z_K	+.42	+.07	-.41	-.06
Z_{AP}	-.06	+.01	+.06	-.01

* All except items asterisked are significant at .05 or less.

nature, the simulations force the model outside the range for which it was estimated. Nonetheless, qualitative comparisons of the rank order relationships can help to sort out the major actors at work.

The contribution of growth-induced unemployment derives from h_2. As Table 6 shows, a negative h_2 is the principal reason NIR unemployment is nonincreasing. The shakiness of the simulations notwithstanding, the h_2 contribution is great enough to suggest that unemployment might have increased as rapidly in the NIR's as in the INR's, except for the sign of h_2. The contribution of other factors to INR unemployment does not approach that of the regional difference in h_2. The trend in unemployment in Yugoslavia appears therefore to have been due primarily to a growth-induced overflow of the labor supply.

To elaborate on the implications of this, we need to examine the interactions of supply and demand side factors more closely. Table 6 enumerates the demand side factors of the model. These include regional differences in the coefficients of the labor demand equation, their associated exogenous variables, and b_2 and Z_{AP} from the agricultural labor demand relation (2).

To abstract from growth-induced unemployment, shifts due to the demand side factors are estimated by setting the INR h_2 equal to its NIR value. It can be shown that the demand side factors were, as a whole, more favorable to employment in the NIR's. Therefore, abstracting from h_2, unemployment would have been even higher in the INR's, purely because of the weaker labor demand.

Now, because h_2 is actually positive, these employment-dampening differences translate into lower unemployment. The full process, in other words, consists of a direct effect (operating purely through regional differences in h_2) and an indirect effect (regional differences in h_2 interacting with differences in labor demand). In the INR's, the indirect

contribution offset the higher unemployment expected from the demand side.

The full process illustrates that policies to increase the demand for labor in the INR's might conceivably have worsened unemployment.

Other supply factors, such as regional differences in external migration, contribute negligibly to the trend differences. As a check on our earlier calculation, we simulated the model to see what it predicts in the absence of external migration (the $Z_{XM} = 0$ row in table 6). The implied differences are small by comparison with other factors.

The fairly small differences in the point estimates make it difficult to pinpoint the factors responsible for the initial differences between unemployment levels at the outset of the period. We skip over these because of our concern with the unemployment trends. Still, it appears from the estimates of the contributions to initial values in Table 6 as if the regional differences in h_2 may have been a major explanation of the initial gap in unemployment in 1965, as well as to the dichotomous trends.

Conclusions

The principal finding of the study is that rising levels of unemployment in Yugoslavia between 1965 and 1980 stemmed primarily from familiar labor supply responses to economic growth. The strongest evidence for this is the unusual positive relationship between changes in employment and unemployment in the less developed areas, as compared with the more conventional negative relationship in the more industrialized areas. No other explanation accounts for the regional divergence in unemployment trends as well.

Most of the trend in unemployment in Yugoslavia appears therefore to be rooted in transitional difficulties similar to those of other developing nations, without labor-managed economies. It may well be that labor-managed economies are more unemployment prone, but our results caution against taking the rate of unemployment in

Yugoslavia, heavily weighted as it is by the experiences of the developing areas, as any indicator of the degree to which this may be true.

The findings imply that a labor-managed economy offers developing nations little or no immunity from growth-induced unemployment. Purely macroeconomic policies are, moreover, likely only further to increase unemployment, and Yugoslav leaders appear to have acted wisely, as Singleton and Carter [1982, p.189] note, in having typically avoided rhetorical commitments to full-employment. The paper stresses that economic development produces unemployment in conjunction with downwardly rigid wage rates. If there is a sense in which self-management has aggravated matters, it may be because guarantees of minimum earnings increased the attractiveness of modern sector employment to an even greater degree than the minimum wage conventions of non-labor-managed economies.

The evidence does not imply that alternative viewpoints, such as the capital misallocations hypothesis, fail to identify serious inefficiencies under self-management. Our conclusion is simply that other explanations do not get to the heart of the unemployment problem nearly so well as the links with economic growth reviewed here.

[1]The author is indebted to the University of Pittsburgh Russian and East European Studies Program of the University Center for International Studies, and the Institute of International Politics and Economics in Belgrade for financial support. Neither organization nor the persons in Yugoslavia, too numerous to mention individually, who gave so generously of their time and assistance, share any responsibility for the analysis or the conclusions herein. Helpful comments on earlier versions of the paper from Janet Chapman, Gene Gruver, Wim Vijverberg, Jerry Wells, Kenneth Zapp, Lester Zeager, and the referees are gratefully acknowledged.

[2]This was usually the first explanation offered by the economists and other social scientists whom I interviewed.

[3]See Schrenk et al. [1979], Clark [1982], and Woodward [1982], for more on regional income trends.

[4]See Data section below for definition of unemployment rate.

[5]There are no data on regional rates of external migration for most years. Our estimates take the reports in OECD economic surveys of Yugoslav workers temporarily employed abroad and infer the regional breakdown from the Baucic [1977] study for 1971 and prior years. Estimates for the later years are then obtained by linearly interpolating changes in regional shares of external migration between the 1971 and 1981 Population Censuses.

[6]The assumption of a one-for-one replacement of each migrant by a remaining unemployed is completely arbitrary. It is not clear that external migration reduces unemployment at all. As a rule, migrants tended to be more highly skilled than the average of the workers left behind. The loss of skilled workers may lower productivity, raise labor costs, and cause more, rather than less, unemployment. In addition, regional differences in migration rates were significantly smaller in the years after 1965. Though

the labor exodus from Croatia and Slovenia was initially greater because of their closer proximity to West European labor markets, as time passed, the flow of workers from other areas increased (see Table 2). This, added to the return of migrants in the late 70's, greatly reduced the contribution of external migration to an explanation of the differences in regional trends.

[7]The time trend in Table 2 is an ordinary least squares estimate of p_1 in $X_t = p_0 e^{p_1 t}$ where X_t is the regional characteristic in study year t.

[8]Social Product is roughly equivalent to Gross National Poduct in Western national accounts.

[9]I am indebted to Tripo Mulina and Milos Macura for stressing this to me, a point which they also make in their work with Rasevic (1978).

[10]A change in the definition of internal migration between the 1971 and 1981 censuses makes it unreliable to interpolate a series for this variable for the intercensal years as we did in the case of external migration.

[11]See Wellisz [1968] for a similar conclusion.

[12]I.e., assuming that the LM firm maximizes income instead of profits, as the minimum wage increases the LM firm, like its PM counterpart, will seek to substitute the higher quality labor of skilled for unskilled workers, and the total membership will decline assuming that fewer skilled workers are necessary to achieve the same efficiency units of labor as the unskilled. (See Ireland and Law [1982] for a proof.)

[13]Demand is related to Social Sector Product because Social Product includes agricultural output.

[14]Though one might add unemployment to (4), we do not in order to keep the exposition simpler. Adding U make no difference for our analytic conclusions or the

estimating procedure.

[15]I.e. the Prosecno net licna primanja po uslovno nekvalifikovanum radniku, or average net monthly income for an unskilled worker described in Statisticki Godisnjak Jugoslavie.

[16]The final estimating equations were of the form:

$$Y = a_0 + \Sigma\, a_{0k}(ID)_k + \Sigma\,(\, a_i X_i + \Delta a_i D_i X_i\,)$$

where D_i=0 if the observations of X_i are pooled to obtain a common estimate of a_i, and D_i=1 whenever a regional difference is estimated between the a_i. The upper portion of the first column of tables 3-5 show the estimates of the a_i's, and the second column lists the estimates of the Δa_i's. $(ID)_k$=1 if the intercept estimate is adjusted for an intraregional effect for Republic or Autonomous Province k and $(ID)_k$=0 if not. The lower portion of the table contains the estimates of the a_{0k}.

[17]The LSDV and three stage least squares estimates differ only slightly in most details. The regional difference in the critical h_2 coefficient is virtually the same in both estimates.

[18]The elasticity of INR labor demand is .52 and NIR .63, at the sample means.

[19]See e.g. Ehrenberg and Smith [1982] for an explanation of the added worker effect.

[20]Let $U^j_{it} = m^j_{0i} + m^j_{1i}t$ represent the trend for the INR's say, after controlling for the regional differences in factor j. Each row of table 6 below the first is then derived by estimating:

$$U_{it} - U^j_{it} = (m_{0i} - m^j_{0i}) + (m_{1i} - m^j_{1i})\, t.$$

Columns 1 and 3 list estimates of $(m_{0i} - m^j_{0i})$ and 2 and 4 estimates of $(m_{1i} - m^j_{1i})$ for INR's and NIR's, respectively.

The m_0 initial values of per capita unemployment are smaller than the 1965 unemployment rates in table 1 because the former are normalized relative to the population of working age and the latter relative to L.

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