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INFLATION AND THE REAL WAGE IN YUGOSLAVIA

*James H. GAPINSKI**

ABSTRACT

This paper explains Yugoslav wage inflation and price inflation and uses those explanations to derive implications for the real wage. Data that run annually from 1952 to 1987 support the estimations, which proceed by the Beach-MacKinnon method and by three-stage least squares. Among its main findings, the paper shows that labor market conditions become a progressively weaker determinant of wage inflation and that price inflation depends upon a combination of factors including the growth in intended and unintended credit. To improve the real wage, it argues that credit must be severely restricted and that incomes policy merits consideration.

1. INTRODUCTION

For about two decades after the midway mark of the 1950s, the advancing money wage in Yugoslavia tended to stay ahead of the increasing price thereby enabling the real wage to rise without much interruption. During the second half of the 1970s, however, money wage lost ground to price, and the real wage began a descent that continued likewise without much interruption. Figure 1 illustrates the situation. There W denotes money wage measured in dinars per worker. Index P, based at unity in 1972, denotes price, and consequently the real wage RW, being W/P, is denominated in 1972 dinars per worker. Plainly, money wage inflation $\Delta W/W_{-1}$ first traces a cobweb that includes an enormous upward spike for the 1960s reform.

* The author is Professor of Economics at Florida State University, Tallahassee, Florida 32306, USA. He thanks Borislav Škegro of Ekonomski Institut Zagreb, Yugoslavia, for supplying the data and for volunteering comments to help make sense of the results. He also thanks Kathy Hutto for diligently processing the original draft, Carol Felton for promptly keystroking the revisions, and the anonymous referee for providing valuable suggestions to guide those revisions. The present piece is an outgrowth of a project sponsored jointly by EIZ and the Office of the President of FSU. All views and any errors in it are solely those of the author.

Price inflation $\Delta P/P_{-1}$ behaves similarly, but money wage advances fast enough to enable the real wage to increase. Yet after 1977 money wage slows and falls behind price. As a result, the real wage not only fails to advance; it even fails to stay in the same place.

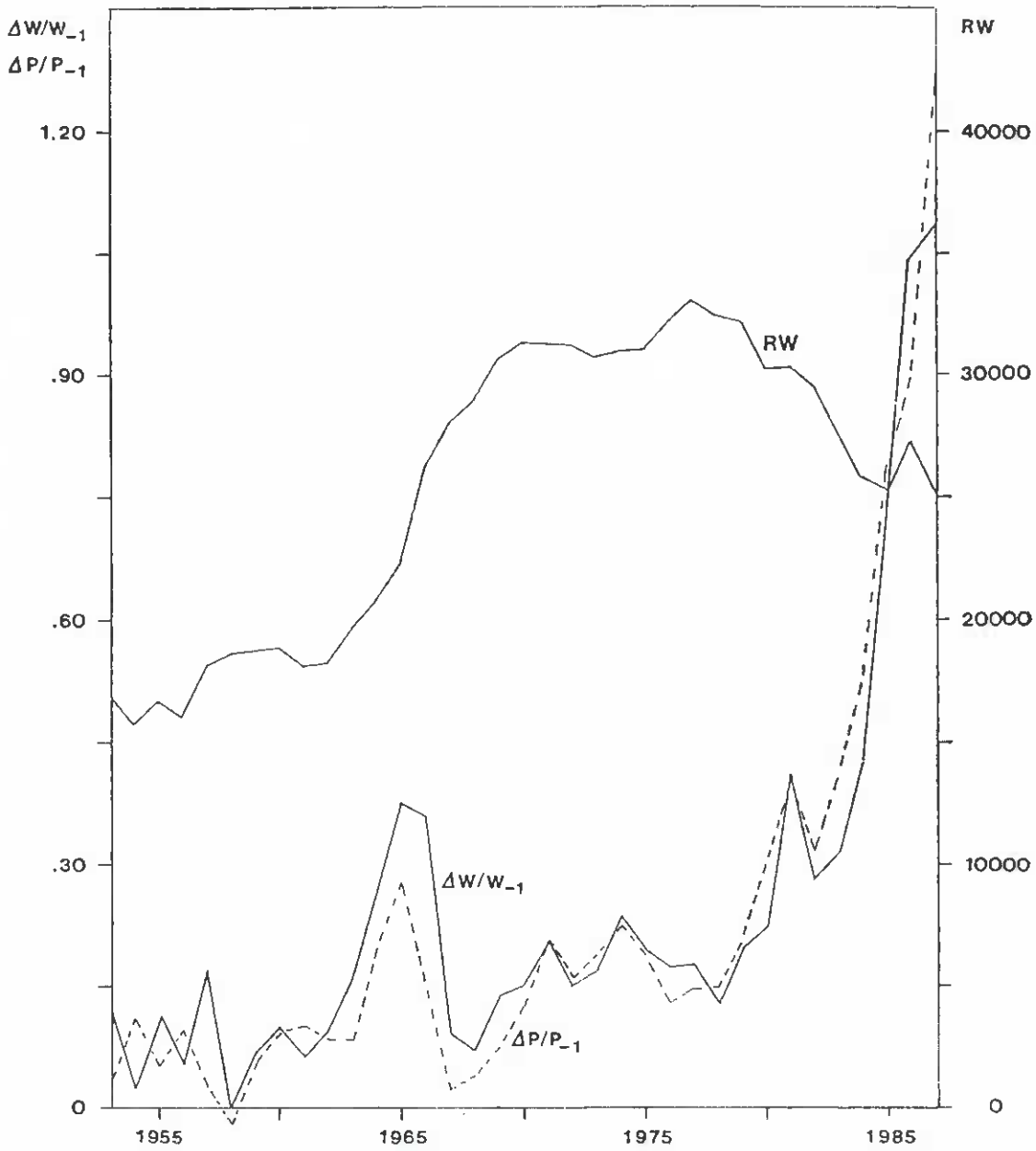

Figure 1 — Wage Inflation, Price Inflation, and the Real Wage from 1953 to 1987

This paper looks at Yugoslav wage inflation and price inflation. More precisely, it studies their determinants, and it explores the implications for the real wage and for policy intended to improve that wage. Section 2 presents the theoretics behind wage inflation in the context of worker self-management. As part of the discussion, it notes the role of labor productivity in the wage determination process. Section 3 examines price inflation. It considers the growth patterns of

cost, credit, and excess commodity demand, and after testing each as a possible determinant of price inflation, it combines them for a comprehensive explanation. Section 4 uses the inflation results to establish the conditions under which the real wage might expand through time and those under which it might remain stationary or decline. That section also indicates the requisite nature of remedial policy. Section 5 offers concluding thoughts about whether policy makers would be inclined to take remedial action.

All data underlying the inquiry have an annual format and cover the period 1952—87. They come from an extension of the file compiled by Škegro (1987, pp. 89—107, 112—33).[1]

2. WAGE INFLATION

Despite their differences, a Western firm and a Yugoslav firm have similarities, and those similarities recommend that the derivation of a Yugoslav wage inflation equation draw on the seminal work by Lipsey (1960, pp. 12—16). In particular, the speed with which the real wage changes is postulated to depend upon excess demand in the labor market making[2]

$$\Delta RW/RW_{-1} = f\,[(LD - LS)/LS]\,. \tag{1}$$

LD and LS stand for labor demand and labor supply respectively while function f satisfies the property that $f \gtreqless 0$ as $(LD - LS)/LS \gtreqless 0$. In addition, $f' > 0$. Although excess labor demand is not observable, it may move positively with some other variable X that is observable. Therefore,

$$(LD - LS)/LS = g\,(X)\,, \tag{2}$$

$g'(X) > 0$, converting equation (1) to

$$\Delta RW/RW_{-1} = h\,(X)\,, \tag{3}$$

for which $h'(X) > 0$.

The rate of change in the real wage equals, as an approximation, the difference between the rate of money wage inflation and the rate of price inflation. Thus from equation (3)

$$\Delta W/W_{-1} = h\,(X) + E\,(\Delta P/P_{-1})\,, \tag{4}$$

which holds to the usual line that what counts for wage decisions is the expected rate of price inflation $E(\Delta P/P_{-1})$ rather than the actual rate. It might also be held that productivity growth counts as well.

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[1] Complete data since 1987 were not available at the time of the investigation.

[2] The notion that market conditions influence Yugoslav wage movements is endorsed by Tyson (1977, p. 120).

Under self-management workers have a voice in how the proceeds of a firm are distributed, and in that circumstance they have an opportunity to seize a principal share of their own productivity gains.[3] So revised, equation (4) becomes

$$\Delta W/W_{-1} = \alpha_h h(X) + \alpha_Q \Delta Q/Q_{-1} + \alpha_{EP} E(\Delta P/P_{-1}). \quad (5)$$

where all coefficients are positive. Labor productivity Q equals 1000 Y/L, with Y signifying total output in millions of 1972 dinars and L signifying total employment in thousands of persons. Q, therefore, is denominated in real dinars per worker.

Two questions of specification remain. The first regards h(X). In Yugoslavia businesses operate subject to a budget constraint that is soft. A firm whose revenues fall short of expenses can pay its bills by securing funds from the local bank, which operates under the influence of the firm itself, or by issuing unbacked promissory notes, which circulate throughout the business community.[4] Because firms can generate their own credit, their employment practices are insulated from general economic activity. Accordingly, employment is virtually tenured, and pressures in the labor market may not be captured by the unemployment rate. It may be prudent, then, to express h(X) in terms of something other than the reciprocal of that rate. A promising alternative involves capital usage since labor pressure and capital usage likely go hand-in-hand. By this reasoning h(X) gives way to $\beta_0 + \beta_K \ln K$, where K symbolizes the real capital stock in use. Mathematically, K equals the real capital stock in existence at the beginning of the period multiplied by an "index" of capacity utilization; namely, real imports of intermediate goods in the period.[5] K is denominated in millions of 1972 dinars, and its β_K coefficient is positive.

Question Two regards inflation expectations $E(\Delta P/P_{-1})$. How are they to be represented? Preliminary investigation conducted for the years 1958—84 revealed that they should be modeled by current infla-

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[3] Precedence for productivity's role in Yugoslav wage decisions can be found in Mencinger (1975, pp. 39—43) and Tyson (1977, pp. 124, 129—34).

[4] That the magnitude of such officially unintended credit tends to be large is exemplified by Agrokomerc, a food processing enterprise that recently managed to issue bogus paper amounting to $300 million during a single year. In a wider context, one government source ventured that unintended credit currently accounts for 80 percent of total domestic credit.

[5] Interpreting intermediate imports as an index of capacity utilization has its basis in the intermediate goods shortages that hamper Yugoslav productive activity. More intermediates mean more activity and, with it, greater utilization. The log transformation of K is adopted mainly for scaling.

It may be worth noting that intermediate imports present a somewhat different picture of capacity utilization than does the "standard" measure, which defines utilization as the ratio of actual output to maximum output. Standard measures for industry, social agriculture, private agriculture, and other sectors of the Yugoslav economy can be compared with intermediate imports, but the resulting correlation coefficients for the period 1953—87 uniformly fall below .50. The two index types have different orientations, and hence they give different portrayals of utilization.

tion alone. The investigation started from a version of equation (5) that allowed for the mid-1960s reform by a dummy variable A, which assumed unit values in 1965—66 and zeros otherwise. Postulating expectations by alternative polynominal distributed lags of current and past actual inflations produced inflation coefficients that declined sharply in magnitude and in Student-t value from the current year's. Then restricting the lag structure to the present and immediate past year left only the former coefficient significant leading to the conclusion that $E(\Delta P/P_{-1}) = \Delta P/P_{-1}$.[6]

Applied to equation (5), such considerations produce

$$\Delta W/W_{-1} = \xi_0 + \xi_A A + \xi_K \ln K + \xi_Q \Delta Q/Q_{-1} + \xi_P \Delta P/P_{-1}, \qquad (6)$$

whose coefficients ξ_A through ξ_P should be positive. Estimating this equation by BMac, the Beach-MacKinnon (1978) method of autocorrelation correction, discloses the properties reported in Table 1.[7] There ρ denotes the first-order autocorrelation coefficient.

Table 1. *Estimates of Wage Inflation Equation (6)*

Reference	Column					
	1	2	3	4	5	6
	Coefficient Estimate and [Student-t Value]					
ξ_0	—.38209	—.29278	—.21347	—.07819	—.08638	—.09952
	[—2.145]	[—1.903]	[—1.489]	[—.487]	[—.596]	[—.701]
ξ_A	.15864	.15678	.15340	.14447	.14099	.14110
	[5.915]	[5.947]	[5.904]	[4.199]	[4.256]	[4.258]
ξ_K	.01790	.01381	.00952	.00190	.00221	.00270
	[2.156]	[1.937]	[1.440]	[.272]	[.344]	[.428]
ξ_Q	.68274	.67286	.68750	.87660	.89406	.91982
	[6.588]	[6.909]	[5.412]	[4.308]	[5.411]	[5.894]
ξ_P	.61976	.62230	.77522	.97728	.97798	.97984
	[4.795]	[5.007]	[8.522]	[24.848]	[24.883]	[25.184]
	Supplementary Information					
$\overline{R^2}$	.8919	.8705	.8863	.9652	.9610	.9609
F	41.72	40.63	54.91	220.93	210.22	209.77
ρ	.260	.315	.107	—.075	0	0
DW	1.95	1.90	1.95	1.97	2.05	2.06
Period	1953—74	1953—79	1953—83	1953—87	1953—87	1953—87
Method	BMac	BMac	BMac	BMac	3SLS	3SLS

Notes. Apart from any transformation the dependent variable for each equation is $\Delta W/W_{-1}$. The equation in column 5 is fitted simultaneously with the equation in column 4 of Table 2; similarly, that in column 6 is fitted jointly with the one in column 5 of Table 2.

[6] The idea that price inflation affects wage inflation only contemporaneously in Yugoslavia is defended by Wyzan and Utter (1982, pp. 398—401) too.

[7] For convenience no notational distinction is made between deterministic equations and their stochastic counterparts.

As the table manifests, estimation encompasses four periods, the first of which, 1953—74, ends with the constitutional revision and corresponds to the period chosen by Sapir (1980) in searching for the Yugoslav miracle. Those results confirm the theoretical logic. With the $\overline{R}^2$ registering .8919, the explanatory power of the equation is comfortably high given the volatility of wage inflation. Moreover, labor market pressures significantly affect the wage decision, and workers manage to benefit from their own productivity gains. In addition, inflation expectations matter: a 10 percentage-point increase in expected price inflation causes a 6.2 point increase in wage inflation. Repeating the test by using the reciprocal of the unemployment rate to represent labor market conditions shows that variable to perform badly. Taking on the wrong sign, its coefficient is insignificant supporting the belief that unemployment may give false signals of labor market conditions when employment is tenured.[8]

Column 2 of Table 1 broadens the inquiry to cover the period 1953—79. Year 1979 seems to be an appropriate end point since it is the last year before wage inflation permanently rises above 20 percent per annum and before price inflation permanently rises above 30 percnt. Figure 1 confirms these thresholds. Columns 3 and 4 broaden the inquiry still further to include, first, the early 1980s and, second, 1984 and afterward, when wage inflation never drops below 40 percent and price inflation never dips below 50 percent.

Comparing columns 1 to 4 leaves the unmistakable impression that labor market conditions lose importance through time. Formally, the ξ_K coefficient of ln K declines as the time horizon expands, and it declines abruptly when the torrid years 1984—87 are included. Moreover, its significance disappears. Simultaneously, workers capture an increasing share of their productivity gains, and inflationary expectations become the diving force behind wage adjustments. In fact, their coefficient ξ_P climbs from .61976 to .97728, which is not significantly less than one.[9] This finding gives extra weight to Mencinger's (1987, p. 408) claim that inflation expectations assumed a dominant role in inflation movements after 1983.

3. PRICE INFLATION

A popular hypothesis of Yugoslav price inflation is cost push. As Horvat (1971, p. 150) remarked, "if average personal incomes do not increase faster than the productivity of labor, other things being equal, prices in the Yugoslav economy will be perfectly stable." Following Horvat's lead Mencinger (1975, pp. 30—38), Tyson (1977, pp. 139—43),

[8] This failure of the unemployment reciprocal is repeated in the other time periods examined.

[9] Setting the sample to the period 1967—87 and thus continuing the strategy of progressively adding weight to the recent years extends the patterns established in columns 1 to 4 of Table 1. That is, under BMac the ξ_K coefficient continues its descent and becomes negative while ξ_0 and ξ_P continue their ascents and exceed unity albeit neither significantly.

and Sapir (1981, pp. 157, 165) formulated cost-push equations and successfully tested them on data through the early 1970s.

In the present context, cost push may be expressed as

$$\Delta P/P_{-1} = \zeta_O + \zeta_A A + \zeta_{WQ}(\Delta W/W_{-1} - \Delta Q/Q_{-1}) + \zeta_I \Delta I/I_{-1}, \qquad (7)$$

$\zeta_{WQ} > 0$. Representing the dinar value of imports, I is constructed by referencing an index, based at unity in 1972, of the US dollar price of imports to Yugoslavia and multiplying it by the exchange rate of the dinar against the dollar. Consonant with this formulation, dinar depreciation increases the domestic cost of imports and, with $\zeta_I > 0$, increases the rate of inflation.[10] Fitting equation (7) by BMac to the four periods studied in connection with wage inflation always produces impressive results confirming the appropriateness of cost push even well into the 1980s.

Yet, by themselves, costs might not tell the whole story. For instance, Cagan's (1956, pp. 25—27, 65—66, 91) landmark work indicated that price inflation moved directly with the rate of money growth and established that real balances fell as nominal balances rose. As already noted, annual price inflation in Yugoslavia soared to 50 percent and beyond as of 1984, and correspondingly the combination of intended credit, measured in millions of dinars by the money stock M1, and unintended credit, measured in like terms by a constructed variable L1,[11] began growing at an annual rate of 50 percent or more after having advanced at a yearly pace of about 20 percent. Too, real credit, which had declined continually from 1980 to 1983, declined again in 1985.[12] In other words, the features sketched by Cagan are at least approximated in Yugoslavia of late and say that credit growth might be a relevant consideration.

The model for testing that hypothesis takes the form

$$\Delta P/P_{-1} = \zeta_O + \zeta_A A + \zeta_{ML} \Delta ML1/ML1_{-1}, \qquad (8)$$

where ML1 = M1 + L1 and $\zeta_{ML} > 0$. Almost not surprisingly, the results obtained by BMac for the periods 1953—74, 1953—79, and 1953—83 are less than inspiring as ζ_{ML} is uniformly negative. For 1953—87, however, ζ_{ML} turns positive, and separating out the credit-binge years 1984—87 suggests that money does matter in explaining recent price experience.

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[10] The link between price inflation and import cost inclusive of the exchange rate is supported by Bresser Pereira and Nakano (1987, pp. 84—85, 113—16) although they look at Latin American countries.

[11] Under the supposition that unintended credit is eventually backed by the government, L1 is constructed from its budget constraint. More to the point, L1 equals the difference between tax collections, money stock changes, and foreign borrowing on the one hand and government expenditures on the other.

[12] The exact growth rates for the combination of intended and unintended credit in the four years 1984—87 are, in percent, 53.7, 53.7, 148.4, and 128.8 respectively. Real credit, which stood at 139907 million 1972 dinars in 1984, dropped to 121151 million in the next year.

Further insight into Yugoslav inflation may come from the growth in excess commodity demand, which is quantified as the difference between demand and supply rates: $\Delta D/D_{-1} - \Delta Y/Y_{-1}$. Expressed in millions of 1972 dinars, D entails the sum of real consumption, real investment, real government purchases, and real net exports. Linking excess demand growth to inflation then leaves

$$\Delta P/P_{-1} = \zeta_O + \zeta_A A + \zeta_{DY} (\Delta D/D_{-1} - \Delta Y/Y_{-1}), \tag{9}$$

$\zeta_{DY} > 0$. When BMac-tested over the four long periods, equation (9) gives a weak showing, but when restricted to the period 1980—87, it offers a bit more encouragement. Extra BMac testing narrows that focus to the years 1984—87 as the most promising time for the excess demand argument.[13]

Based on these sequences it seems safe to conclude that cost push provides the main explanation for Yugoslav inflation. However, the 1984—87 period of hyperinflation may involve the additional factors of credit growth and excess demand growth, and consequently a synthesis specification might be apt.[14] It can be written as

$$\begin{aligned}\Delta P/P_{-1} = \zeta_O + \zeta_A A + \zeta_{WQ} (\Delta W/W_{-1} - \Delta Q/Q_{-1}) + \zeta_I \Delta I/I_{-1} \\ + \zeta_{BML} B \cdot \Delta MLI/MLI_{-1} + \zeta_{BDY} B \cdot (\Delta D/D_{-1} - \\ - \Delta Y/Y_{-1}),\end{aligned} \tag{10}$$

where dummy variable B assumes ones in the years 1984—87 and zeros otherwise. Clearly, $\zeta_{BML} > 0$ and $\zeta_{BDY} > 0$.

Table 2 reports the results of fitting equation (10) to the years 1953—87 under different parameter restrictions. Column 1 demonstrates just how well cost push performs on its own. Its $\overline{R}^2$ of .9796 is outstanding in light of the chaotic behavior of price inflation. Further, the growth of unit labor costs has a coefficient that is both positive and significant, and so does the growth of import costs. The perhaps curious negative sign for the reform coefficient means that during those two years price increased more slowly than it would have on the basis of cost push. Evidently, the mid-1960s price controls cited by Drutter and Lacković (1982, p. 108) had their desired effect. Columns 2 and 3

[13] The BMac fits of equations (8) and (9) to the years 1984—87 yield for the former a ζ_{ML} estimate of .49207 with a t value of 9.247. The $\overline{R}^2$ and DW statistics register .9944 and 3.17 respectively. For the latter equation the ζ_{DY} equals 12.68430, its t equals 1.782, the $\overline{R}^2$ equals .3950, and the DW equals 1.60. These results, generated by definition without the reform variable A, are commendable in view of the small sample size.

[14] Corroboration of a synthesis explanation for price inflation originates from developing and developed countries alike. For instance, Behrman (1977, pp. 190—91) verifies it in studying the case of Chile whereas Stockton and Struckmeyer (1989, p. 283) imply it in studying the case of the US.

of Table 2 indicate that money counts as a separate influence while column 3 also indicates that excess demand comes into play as well[15]

Table 2. *Estimates of Price Inflation Equation (10)*

Reference	Column				
	1	2	3	4	5
	Coefficient Estimate and [Student-t Value]				
ζ_0	.04071 [4.933]	.05398 [7.918]	.05657 [8.258]	.05497 [5.533]	.05488 [6.025]
ζ_A	—.25384 [—6.539]	—.27070 [—8.778]	—.29124 [—9.114]	—.23540 [—6.580]	—.23012 [—7.355]
ζ_{WQ}	.85935 [23.225]	.59164 [6.876]	.51847 [5.613]	.64209 [4.315]	.66759 [5.188]
ζ_I	.14410 [4.307]	.21813 [5.726]	.25524 [6.116]	.17523 [3.235]	.16362 [3.576]
ζ_{BML}		.17150 [3.409]	.21397 [3.961]	.16614 [1.936]	.15929 [2.057]
ζ_{BDY}			2.21790 [1.901]		1.66114 [1.639]
	Supplementary Information				
$\bar{R}^2$	.9796	.9890	.9895	.9814	.9818
F	527.13	716.20	550.86	449.29	367.75
ρ	—.011	—.291	—.256	0	0
DW	1.76	1.82	1.96	2.30	2.15
Period	1953—87	1953—87	1953—87	1953—87	1953—87
Method	BMac	BMac	BMac	3SLS	3SLS

Notes. Apart from any transformation the dependent variable is always $\Delta P/P_{-1}$, and the equations in columns 4 and 5 are estimated together with those respectively in columns 5 and 6 of Table 1. For all equations here, a nonparametric test involving the pattern of signed residuals substantiates the absence of autocorrelation. Numerically, the test statistic, a normal deviate that corresponds to a null hypothesis of no autocorrelation, never exceeds 1.082 in absolute value.

[15] Restricting the analysis to the post-reform years 1967—87 and re-running the full version of equation (10) by BMac produce results that are quite similar to those reported in column 3 of Table 2. Evidently, Yugoslavia's pre-reform experience is not a discordant influence in the process of inflation.

In terms of their contribution to the inflation rate, the individual factors may be ranked by inserting their values into the estimate of equation (10). For the final year in the data set, 1987, the column 3 results rank the growth in unit labor cost first at 48.1 percent; that is, the growth in unit labor cost accounts for 48.1 percent of the price inflation rate for 1987. Next in line is credit growth, which accounts for 23.1 percent. It is followed by import cost advances at 22.4 percent. Fourth place goes to "everything else" — the constant — at 4.8 percent, and finishing last is excess demand at 1.5 percent. Being inapplicable to 1987, reform variable A receives no ranking.

Price inflation depends upon wage inflation. But as the analysis in Section 2 shows, wage inflation depends upon price inflation. Simultaneity exists between the two types of inflation, and consequently the single-equation findings might be improved by using a simultaneous-equation method of estimation. Column 4 of Table 2 gives three-stage least squares (3SLS) results obtained by estimating the equation described in column 2 along with the wage inflation equation described in column 5 of Table 1. That estimation covers the full period 1953—87 and basically duplicates the single-equation properties for price inflation although ζ_{WQ} is now a bit higher than before whereas ζ_I and ζ_{BML} are now each a bit lower. For the matching 3SLS wage inflation equation, Table 1 manifests that its ξ all lie within hailing distance of their BMac counterparts.[16]

Applying 3SLS to the price inflation equation in column 3 of Table 2 reduces the already small role of excess demand and advises that further treatment of price inflation be confined to the cost and credit components. Column 5 of Table 2 presents the evidence; its wage inflation companion is column 6 of Table 1.

4. REAL WAGE IMPLICATIONS

From equations (6) and (10) with ζ_{BDY} set to zero, the reduced forms for wage inflation and price inflation are respectively

$$\Delta W/W_{-1} = \gamma_0 + \gamma_A A + \gamma_K \ln K + \gamma_Q \Delta Q/Q_{-1} + \gamma_I \Delta I/I_{-1} + \gamma_{BML} B \cdot \Delta ML1/ML1_{-1}, \quad (11)$$

$$\Delta P/P_{-1} = (\zeta_0 + \zeta_{WQ}\gamma_0) + (\zeta_A + \zeta_{WQ}\gamma_A) A + \zeta_{WQ}\gamma_K \ln K$$

[16] 3SLS estimation of the wage inflation equation was also carried out on each of the other three long periods, the companion equation being the pure cost-push formulation of price inflation since the credit and excess demand mechanisms did not operate before 1984. Those regressions confirmed the conclusion that through time labor-market conditions decreased in importance as a determinant of wage behavior while productivity and price expectations increased in importance. Actually, the results by 3SLS proved to be more striking than their BMac equivalents.

In each exercise involving 3SLS, the initial parameter guesses were the corresponding BMac estimates, and the instruments were all the exogenous variables in the corresponding two-equation system.

$$+ \zeta_{WQ}(\gamma_Q - 1)\,\Delta Q/Q_{-1} + (\zeta_I + \zeta_{WQ}\gamma_I)\,\Delta I/I_{-1}$$

$$+ (\zeta_{BML} + \zeta_{WQ}\gamma_{BML})\,B \cdot \Delta ML1/ML1_{-1}. \tag{12}$$

For this arithmetic pair the γ coefficients represent composites satisfying the relationships $\gamma_O = \varphi(\xi_O + \xi_P\zeta_O)$, $\gamma_A = \varphi(\xi_A + \xi_P\zeta_A)$, $\gamma_K = \varphi\,\xi_K$, $\gamma_Q = \varphi\,(\xi_Q - \xi_P\zeta_{WQ})$, $\gamma_I = \varphi\,\xi_P\zeta_I$, and $\gamma_{BML} = \varphi\,\xi_P\zeta_{BML}$. Moreover, $\varphi = (1 - \xi_P\zeta_{WQ})^{-1}$.

Subtracting formula (12) from expression (11) gives the reduced form for real wage inflation; namely,

$$\Delta RW/RW_{-1} = \theta_O + \theta_A A + \theta_K \ln K + \theta_Q\,\Delta Q/Q_{-1} + \theta_I\,\Delta I/I_{-1} + \theta_{BML}\,B \cdot \Delta ML1/ML1_{-1}. \tag{13}$$

Its θ coefficients can be written along with their anticipated signs as $\theta_O = (1 - \zeta_{WQ})\,\gamma_O - \gamma_O$, $\theta_A = (1 - \zeta_{WQ})\,\gamma_A - \zeta_A > 0$, $\theta_K = (1 - \zeta_{WQ})\,\gamma_K > 0$, $\theta_Q = (1 - \zeta_{WQ})\,\gamma_Q + \zeta_{WQ} > 0$, $\theta_I = (1 - \zeta_{WQ})\,\gamma_I - \zeta_I < 0$, and $\theta_{BML} = (1 - \zeta_{WQ})\,\gamma_{BML} - \zeta_{BML} < 0$.

From equation (13) the circumstances under which the real wage grows, remains constant, or decays can be determined by setting $\Delta RW/RW_{-1} \gtreqless 0$ and solving for any variable of concern. In light of both the recent credit explosion in Yugoslavia and the widespread talk of soft budgets there, a variable of definite concern is $\Delta ML1/ML1_{-1}$. Solving the real wage inequality accordingly and in the process stipulating that $B = 1$ establish the theorem that $\Delta RW/RW_{-1} \gtreqless 0$ as

$$\Delta ML1/ML1_{-1} \gtreqless \eta\,(\theta_O + \theta_A A + \theta_K \ln K + \theta_Q\,\Delta Q/Q_{-1} + \theta_I\,\Delta I/I_{-1})$$
$$\text{for } \eta = -1/\theta_{BML} > 0. \tag{14}$$

To put theorem (14) into practice, its coefficients might be evaluated using, first, the BMac estimates that appear in column 4 of Table 1 and column 2 of Table 2. Additionally, ln K and $\Delta I/I_{-1}$ might be assigned their 1987 values thereby collapsing the inequality into a relationship between credit expansion and productivity. In particular,

$$\Delta ML1/ML1_{-1} \gtreqless -4.92222 + 95.29546\,\Delta Q/Q_{-1}. \tag{15}$$

From this condition it is evident that if technology stays absolutely fixed, then ceteris paribus credit must fall by 492.2 percent per year if the real wage is not to decrease. If the real wage is to increase, then credit must fall even faster! By contrast, a productivity advance of 5.2 percent per year, $\Delta Q/Q_{-1} = .05165$, means that the real wage remains constant if credit remains constant and that it rises if credit falls. Credit expansion, however, signals real wage decay. Indeed, credit expansion always foretells real wage decay as long as annual productivity growth fails to exceed 5.2 percent. Along the same line, if productivity were to advance at 5.5 percent annually, credit could expand by about 30 percent annually without cutting into the real wage, and if it were to advance at 5.75 percent, the "tolerable" rate of credit expansion would climb to about 55 percent. Nevertheless, the fact that sustaining annual

productivity growth above 5 percent is no easy trick for most countries,[17] the fact that annual productivity growth in Yugoslavia has been hovering below 1 percent lately, and the fact that annual credit expansion in the country has been registering more than 100 percent lately stress how hard the credit reins must be pulled if real wage erosion is to be stopped and reversed.

A similar lesson comes from the 3SLS estimates in column 5 of Table 1 and column 4 of Table 2. For 1987 the intercept of inequality (15) becomes —4.53883 while the technology coefficient becomes 91.36216. Consonantly, stagnant productivity requires credit to contract by 453.9 percent yearly if the real wage is to be preserved. Productivity growing at 5 percent yearly eases the tolerable rate of credit expansion to the zero mark whereas growth at 5.2 percent eases it to 18 percent. Compared to the BMac findings, these new numbers are less onerous, but owing to the recent lackluster performance of Yugoslav productivity, they still lead to the conclusion that credit growth must be severely restricted.[18]

5. CLOSING THOUGHTS

Restricting credit in Yugoslavia constitutes an enormous challenge. Acting in their vested interests, firms, as Gedeon (1985—86, pp. 215—18) intimates, may try to circumvent policy by loosening unintended credit should the National Bank attempt to tighten its money belt. Furthermore, government officials, who are not indifferent to the plight of firms, may not wish to jeopardize their political future by advocating the draconian steps that must be involved in hardening the budget constraint. The fallout in terms of business bankruptcies, forfeited tenure, and general unemployment may be too unpleasant for them to risk.

Equations (11) through (13) reveal that the sensitivity of price inflation to wage inflation is a crucial link in the chain connecting credit growth to price inflation to wage inflation and ultimately to real wage inflation. Lowering ζ_{WQ} causes γ_{BML} and θ_{BML} to move toward zero, and consequently all three types of inflation become less sensitive to credit explosion. To pursue this thought further, inequality (14) might be reworked under the supposition that policy action halves ζ_{WQ}. As an illustration, the BMac estimate .59164 shrinks to .29582. Now the annual productivity growth of 5.2 percent that under the old BMac

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[17] Maddison (1987, p. 650) and Grilliches (1988, p. 10) have the details.

[18] The BMac and 3SLS calculations grounded in 1987 data give some indication about the robustness of the conclusion that credit growth must be greatly reduced. Other indications come from the means for 1984—87. Combining them with the BMac and 3SLS estimates shows that productivity advance of 5.2 percent makes the tolerable rate of credit expansion 42 percent and 52 percent respectively. These numbers are obviously far less harsh than those reported in the text, but, with credit expanding on average at an annual rate of nearly 100 percent for the years 1984—87, even they call for greatly reduced credit growth. The numbers change, but the conclusion does not.

values put the tolerable rate of credit increase at zero percent puts it at 96.3 percent: Credit can expand by roughly as much as 100 percent per year without sacrificing the real wage, and for credit expansions below that rate, the real wage actually advances. Plainly, the sensitivity of inflation to inflation is critical.

For a Post Keynesian the thrust of this logic lies in the direction of incomes policy. Tests by Gapinski (1986, pp. 594—603) for the US and by Škegro, Gapinski, and Anušić (1989, pp. 104—06) for Yugoslavia show that incomes policy can improve economic performance. In the latter effort, for example, money wage and price are permitted to creep upward during a two-year control program whose design guards against real-wage erosion during its administration. Joined inter alia by tight monetary and fiscal policies, the wage-price controls reduce the annual price inflation rate by 17.7 percentage points, raise yearly output growth by 2.5 points, and trim unemployment by 3.5 points. Moreover, they push the real wage upward overall. These outcomes speak well of incomes policy; yet the country's past failure with an in-name-only attempt at controls probably speaks less well of the government's resolve about remedial measures.

Industrial strikes and civil protests beset Yugoslavia. Those disturbances, which are not unrelated to the declining standard of living, sound the alarm that something substantial must be done soon to change economic trends. Credit tightening, budget hardening, and incomes policy represent mechanisms of such change. In other words, the ways are there; the issue is whether the will is.

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