WAGE AND PRICE EXPECTATIONS — A CASE STUDY OF YUGOSLAVIA

Emile PRIMORAC*, P. A. DELLA VALLE* *and Mate* BABIĆ**

Among the main economic problems of the Yugoslav economy in the last fifteen years or so has been a high rate of inflation accompanied by a high rate of unemployment. The factors causing this behaviour are too numerous to deal with here. It will be agreed, we hope, that the factors which bear on the distribution of incomes are among the most important in explaining the causes of inflation (cost push inflation) and unemployment in every economic system. The Yugoslav workers' self-management system seems to be no exception.

In the workers' self-management system, the workers decide upon the distribution of income. This is the essential characteristic of the system. So the workers themselves decide upon the shares for the factors of production in the distribution of the value added. What lies behind the workers' decision of what is the share of their own labour in the new product, i. e. the question of what are the factors influencing the change of the wage rates in such a system is very important. The answer to that question could also be useful in shaping the guidelines of stabilization policies in the Yugoslav economy.

There are several works in the literature that purport to identify and explain the most important factors influencing the money wage rate and price changes in the Yugoslav economy.[1])

The purpose of this paper is to incorporate a »new measure of excess capacity in the labour market« into a simple, adaptive expectation model of price changes for the Yugoslav economy over the period 1960—1977. The same basic model is then extended to examine changes in money wage rates over that same period.

I

One of the reasons which led to increased literature dealing with the Phillips curve has been the disagreement among economists about the underlying theory which purports to explain the trade-off (or lack

*) Professors of Economics, University of Windsor.
**) Professor of Economics, University of Zagreb.

[1]) See among others: B. Horvat (1969) and (1975), J. Mencinger (1971) E. Primorac and M. Babić (1973).

of trade-off) between the change of money wage rates and the excess supply of labour in the labour market. Lipsey (1961) attempted to explain Phillips' empirical findings on the basis of market relationships alone which, he argued, would eliminate the need for institutional factors in explaining the movements of money wage rates. Kuh (1967) attemted to reconcile Lipsey's findings with the neoclassical theory of the firm, so that Phillips relationship is readily explained through marginal productivity theory.

Later on, Phelps (1968, 1969) and Friedman (1968) — with whom the expectations hypothesis is usually associated — challenged the existence of the stable negative sloped Phillips curve. Instead, they argue that, at least over a period of years, the Phillips curve is vertical at some unemployment rate. This unemployment rate is consistent with any rate of inflation, and they argue that attempts to move the unemployment rate permanently below or above this „natural rate" by the use of stabilization policies will result in an acceleration of the rate of inflation or deflation. This is why these economists have been labelled »accelerationists«. All of this is well-known and several excellent surveys of the theoretical debate are available.[2])

Another reason, which caused an even greater profusion of published articles, was an attempt on the part of the profession to improve the reliability of numerous estimates of the trade-off adding/replacing explanatory variables in order to account for the influence of both institutional and purely economic forces. The results of such efforts appeared to provide us with statistically respectable estimates as to, for example, what level of unemployment would result in stable prices or what rate of inflation would »ensure« full employment in the economy.

In the last decade or so, however, something happened which caused the trade-off between wage (price) changes and unemployment to become unstable. Kaliski (1972) re-estimated the Bodkin equations for the period up to 1969 and discovered that »the original wage change equations no longer seem to fit data very satisfactorily ... and the trade-off seems to have become more unfavourable«[3]). The trade-off appears to have worsened since the mid 1960's and, in fact, seems to be non-existent today. The message we get is quite clear: The Phillips curve, as currently measured, is rather unstable over moderately long time periods.

One possible reason why the Phillips curve has become unstable is the changing structure of unemployment, but Kaliski found »no good reason to suppose that the trade-off has altered because of changes in the structure of unemployment«[4]).

Another possibility is that expectations changed, causing the deterioration in the trade-off between wage (price) changes and unemployment. Studies by Vanderkamp (1972) and Turnovski (1972) give support to this view. What is interesting, however, is that in Vanderkamp's study the parameters of U^{-1}_t are not very significant.

[2]) See for example: Phelps (1970), Rottschild (1971), Laidler and Parkin (1975).
[3]) Kaliski (1972) page 34.
[4]) *Ibid.* p. 61.

Still another possibility is to cast doubt on the validity of the unemployment rate as an appropriate proxy for excess capacity in the labour market. This has already been done before[5]).

If the unemployment rate is not an appropriate variable, then the statistical results which purport to support the contention about unstable Phillips curves are questionable, simply because their measure of excess capacity in the labour market is not correct.

In the case of Yugoslavia, this seems to be especially important. According to the ILO's definition of unemployment, which the Central Statistical Office follows, a great deal of potentially employables were not counted, suffice it to mention one million employed abroad in recent years.

We can, therefore, define the concept of »potential employment« as simply the difference between the potential labour force and employment, expressed as the proportion of the potential labour force, i. e.,:

$$P.E. = \frac{P.L.F. - E}{P.L.F.}$$

where P.L.F. = potential labour force
E. = employment
P.E. = excess supply in the labour market

We believe this to be a superior measure of the excess supply in the labour market because it does not suffer from some shortcomings that are associated with the traditional unemployment rate.

Firstly, the use of Potential Employment circumvents the arbitrary nature of the accepted measure of the labour force. Namely, we do not distinguish between those who are willing and able to work from others who are not, because such a distinction cannot be made properly.

Secondly, Potential Employment avoids the problem inherent in identifying structural unemployment and its possible impact on the trade-off relationship.

Thirdly, Potential Employment avoids the problem caused by changes in eligibility requirements which influence the number of people registered as unemployed, and which has nothing to do with changes in the conditions prevailing in the labour market.

Fourthly, this definition of unemployment rate is consistent with the neoclassical definition of the deflationary gap as the difference between potential and actual output, where potential output is determined by the potential labour force *(ceteris paribus)*. In analyzing the potential growth rate, this definition of the Potential Unemployment rate is clearly superior.

We are well aware that the Potential Emmployment variable is not as refined a measure of the excess labour supply as it could be. Certain hardcore unemployables schould be excluded, as well as those individuals over 14 years of age who could not be considered as ever joining the

[5]) See for example, Phelps (1968).

labour market queue. Such refinements are possible although, because of the small proportion of such people in the potential labour force, the final results would not be significantly improved. Our results in the next section tend to indicate that the Potential Employment variable without such refinements appears to perform its duty rather well.

II

In estimating price change movements, we shall utilize an adaptive expectations hypothesis in which current price changes ($\dot{P}$) are dependent on historical price changes, as well as current and historical Potential Employment (PE).

$$\dot{P}_t = m(\dot{P}_{t-1}, \dot{P}_{t-2} \ldots ; PE\,, PE_{t-1} \ldots .) \tag{1}$$

where

$$\frac{\partial \dot{P}_t}{\partial \dot{P}_{t-k}} \geq 0 \text{ and } \frac{\partial \dot{P}_t}{\partial \dot{P}E_{t-k}} \leq 0 \quad (k = 1,2, \ldots)$$

We will designate a simple Koyck-type lag structure in which the weighted impacts of ($\dot{P}$) and (PE) decline geometrically through past time.

We therefore have:

$$\dot{P}_t = a + b(\lambda \dot{P}_{t-1} + \lambda^2 \dot{P}_{t-2} + \ldots) + \\ + c(PE_t + \lambda PE_{t-1} + \lambda^2 PE_{t-2} + \ldots) \tag{2}$$

where $0 < \lambda < 1$.

Writing the corresponding equation for $\dot{P}_{t-1}$ and multiplying by λ we have:

$$\lambda \dot{P}_{t-1} = \lambda a + \lambda b(\lambda \dot{P}_{t-2} + \lambda^2 \dot{P}_{t-3} + \ldots) \\ + \lambda c(PE_{t-1} + \lambda PE_{t-2} + \lambda^2 PE_{t-3} + \ldots) \tag{3}$$

Subtracting (3) from (2) and rearranging we have:

$$\dot{P}_t = a(1 - \lambda) + \lambda (1 + b)\dot{P}_{t-1} + cPE_t \tag{4}$$

Equation (4) will allow us to estimate price changes from lagged price changes and our measure of excess capacity in the labour market (PE).

A model of wage movements follows directly from the above analysis. We assume that the workers' demand for the change of money wages is strongly influenced by the rate of change in the general price level measured by the change in consumer price index.

The basic relationship for wage changes ($\dot{W}$) can be given as

$$\dot{W}_t = f(P_t, \dot{P}E_t) \tag{5}$$

Quite simply, wage changes are a function of price changes (determined by equation 4) as well as our excess capacity variable PE. Using the linear form of (5) we have:

$$\dot{W}_t = d + g(\dot{P}_t) + v(PE_t) \tag{5a}$$

We see in (5a) that PE affects $\dot{W}$ directly. In (4) we see that PE affects $\dot{P}$ so that PE affects $\dot{W}$ both directly and indirectly through $\dot{P}$. Substituting (4) in (5) and expanding we have:

$$\dot{W}_t = d + g[a(1 - \lambda) + \lambda(1 + b)\dot{P}_{t-1} + cPE] + vPE_t \tag{6}$$

After rearranging (6) we get the final form of the wage change equation:

$$\dot{W}_t = d + g[a(1 - \lambda) + \lambda(1 + b)]\dot{P}_{t-1} + [gc + v]PE_t \tag{7}$$

Since we are not interested in the separate coefficients contained in the price change equation (4), or the wage change equation (7), our empirical tests can be carried out using the following regressions:

$$\dot{P}_t = A + B\dot{P}_{t-1} + CPE_t \tag{4a}$$

where:

$$A = a(1 - \lambda)$$
$$B = \lambda(1 + b)$$
$$C = c$$

The wage change equation (7) will be transformed in:

$$\dot{W}_t = A' + B'\dot{P}_{t-1} + C'PE_t \tag{7a}$$

where:

$$A' = d$$
$$B' = g[a(1 - \lambda) + \lambda(1 + b)]$$
$$C' = gc + v$$

The results of empirical tests of (4a) and (7a) for the period 1961—1977 are given in Appendices A and B.

The dummy variable D is used for 1965—1966 because of the 1965 Reform.

APPENDIX

SUMMARY OF RESULTS: 1961—1975

Legend

CW = *changes in wages*
CP = *change in price*
U = *unemployment*
PE = *potential employment*
LCP = *lagged change in prices*
T = *time*
D = *dummy*
Est = *value of coefficients*
S. E. = *standard error*
t = *t values*
df = *degrees of freedom*
α = »*two-tailed*«

A.1

SUMMARY OF RESULTS:

A. For CP as the dependent variable:

	a	U^{-1}	*PLS*	*LCP*	*T*	*D*
Est	31.332	—137.049				19.168
S. E.	9.288	66.447				4.603
t	3.374	— 2.063				4.164
α(df = 12)						
	$R^2 = 0.602$		$DW = 0.981$			
Est	31.956	—139.681	— 0.021			19.416
S. E.	12.079	75.750	— 0.246			5.851
t	2.646	— 1.844	— 0.087			3.325
α(df = 11)						
	$R^2 = 0.603$		$DW = 0.961$			
Est	— 8.019	68.590			1.318	18.937
S. E.	18.349	103.342			0.555	3.910
t	— 0.437	0.666			2.375	4.843
α(df = 11)						
	$R^2 = 0.737$		$DW = 1.155$			
Est	— 6.604	65.235	— 0.137		1.405	20.786

S. E.	18.974	106.285		0.211	0.585	4.920
t	— 0.348	0.614		— 0.651	2.400	4.225
α(df = 10)						
	$R^2 = 0.748$		$DW = 0.900$			

A.2

	a	U^{-1}	*PLS*	*LCP*	*T*	*D*
Est	228.495		— 3.080			18.333
S. E.	24.897		0.355			1.917
t	9.178		— 8.680			9.566
α(df = 12)						
	$R^2 = 0.926$		$DW = 2.563$			
Est	252.623		— 3.389	— 0.200		20.744
S. E.	23.898		0.334	0.088		1.960
t	10.571		—10.143			10.586
α(df = 11)						
	$R^2 = 0.950$		$DW = 2.400$			
Est	258.143		— 3.477		—0.213	17.959
S. E.	44.958		0.615		0.267	2.002
t	5.742		— 5.656		—0.797	8.970
α(df = 11)						
	$R^2 = 0.930$		$DW = 2.651$			
Est	265.531		— 3.563	— 0.191	—0.100	20.463
S. E.	39.788		0.543	0.094	0.241	2.149
t	6.674		— 6.555	— 2.040	—0.415	9.521
α(df = 9)						
	$R^2 = 0.951$		$DW = 2.459$			

A.3

B. For CW as the dependent variable:

	a	U^{-1}	*PLS*	*LCP*	*T*	*D*
Est	24.813	—54.250				22.167
S. E.	9.921	70.986				4.918

t	2.501	— 0.764			4.508
$\alpha(df = 12)$					
	$R^2 = 0.632$		$DW = 1.339$		
Est	21.844	—41.717	0.101		20.792
S. E.	12.821	80.402	0.261		6.211
t	1.704	— 0.519	0.388		3.348
$\alpha(df = 11)$					
	$R^2 = 0.637$		$DW = 1.276$		
Est	—18.728	173.282		1.458	21.912
S. E.	19.233	108.322		0.581	4.099
t	— 0.974	1.600		2.507	5.346
$\alpha(df = 11)$					
	$R^2 = 0.766$		$DW = 1.251$		
Est	— 18.520	172.789	— 0.020	1.471	22.184
S. E.	20.297	113.697	0.226	0.626	5.263
t	— 0.912	1.520	— 0.089	2.348	4.215
$\alpha(df = 10)$					
	$R^2 = 0.766$		$DW = 1.259$		

A.4

	a	U^{-1}	*PLS*	*LCP*	*T*	*D*
Est	168.081		— 2.149			22.397
S. E.	45.734		0.652			3.521
t	3.675		— 3.297			6.362
$\alpha(df = 12)$						
	$R^2 = 0.797$		$DW = 1.848$			
Est	178.622		— 2.284	— 0.087		23.451
S. E.	52.789		0.738	0.194		4.329
t	3.384		— 3.095	— 0.451		5.417
$\alpha(df = 11)$						
	$R^2 = 0.801$		$DW = 2.002$			
Est	199.140		— 2.565		— 0.223	22.004

S. E.	84.183	1.151		0.499	3.749
t	2.366	— 2.228		— 0.446	5.870
$\alpha(df = 11)$					
	$R^2 = 0.801$		$DW = 1.841$		
Est	201.899	— 2.597	— 0.071	— 0.181	22.939
S. E.	88.140	1.204	0.207	6.535	4.761
t	2.291	— 2.157	— 0.344	— 0.338	4.818
$\alpha(df = 11)$					
	$R^2 = 0.803$		$DW = 1.969$		

REFERENCES

Bodkin, R. G., E. P. Bond, G. L. Reuber and T. R. Robinson, *Price Stability and High Employment: The Options for Canadian Economic Policy, An Econometric Study*, Special Study No. 5, Economic Council of Canada, 1967.

P. A. Della Valle and E. Primorac, »Protential Labour Surplus: A new attempt to relate excess capacity in the labour market to wage and price changes«, *International Labour Review*, Vol. 116, No. 3, November-December, 1977.

Friedman, Milton, »The Role of Monetary Policy«, *The American Economic Review*, Vol. LVIII, No. 1, March 1968.

Horvat, Branko, »Privredni ciklusi u Jugoslaviji«, I. E. N., Belgrade 1969.

Horvat, Branko, »Diferencijalno povećanje produktivnosti privrednih grupacija kao izvor inflacije«, *Ekonomski pregled*, br. 5-6, 1975.

Kaliski, S. F., *The Trade-off Between Inflation and Unemployment: Some Explorations of the Recent Evidence for Canada*, Special Study No. 22, Economic Council of Canada, 1972.

Kuh, E., »A Productivity Theory of Wage Levels — An Alternative to the Phillips Curve«, *The Review of Economic Studies*, October 1967.

Laidler, D. E. W. and J. M. Parkin, »Inflation — A Survey, »*The Economic Journal*, December 1975.

Lipsey, Richard G., »The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1862-1957: A Further Analysis«, *Economica*, February 1960.

Mencinger Joze, »Inflacija potrzujc ili inflacija troskou«, *Ekonomska analiza*, br. 1-2, 1977.

Perry George, L., »Unemployment, Money Wage Rates and Inflation«, Cambridge, Mass., *M. I. T.*, 1970.

Phelps, Edmund, S., »Money Wage Dynamics and Labour-Market Equilibrium«, *Journal of Political Economy*, Vol. 76, No. 4, Pt. III, 1968.

Phelps, Edmund, S., »The New Microeconomics in Inflation and Employment Theory«, *American Economic Review*, May, 1969.

Phelps, Edmund S., *Microeconomic Foundations of Employment and Inflation Theory*, W. W. Norton & Company, Inc., New York 1970.

Primorac, E. and M. Babic, »Kvantificiranje strukturalne nezaposlenosti u Jugoslaviji«, *Ekonomska analiza*, br. 3-4, 1973.

Turnovsky, Stephen, J., »The Expectations Hypothesis and the Aggregate Wage Equation: Some Empirical Evidence for Canada«, *Economica*, February 1972.

Vanderkamp, J., »Wage Adjustement, Productivity and Price Change Expectations«, *The Review of Economic Studies*, Vol. XXXIX (1), No. 117, January 1972.

OČEKIVANE PROMENE ZARADA I CENA: PRIMER JUGOSLAVIJE

Mate BABIĆ, Emil PRIMORAC i P. A. Della VALLE

S a ž e t a k

Među najvećim ekonomskim problemima jugoslavenske privrede u poslednjih petnaestak godina bili su visoka stopa inflacije i visoka stopa nezaposlenosti. Istodobno povećanje stope inflacije i stope nezaposlenosti nije u skladu sa zaključcima ekonomske teorije danim u obliku Phillipsove krivulje. Zbog toga je objašnjenje ove ekonomske pojave trebalo tražiti u analizi utjecaja drugih faktora na inflaciju i nezaposlenost u Jugoslaviji.

U svakom ekonomskom sistemu, pa tako i u jugoslavenskom uzročnike inflacije treba tražiti prije svega u sferi razdiobe dohotka, jer promjene u sferi distribucije utječu na stvaranje pritisaka kako inflacije troškova, tako i inflacije potražnje.

Jedna od bitnih karakteristika samoupravnog sistema jest činjenica da radnici sami odlučuju o razdiobi dohotka. Radnici dakle odlučuju i o udjelu pojedinih proizvodnih faktora u raspodjeli dohotka. Zbog toga je vrlo važno pitanje, posebno za politiku stabilizacije, kako radnici određuju udio proizvodnog faktora rada u raspodjeli dohotka.

Objašnjenje pomoću Phillipsove krivulje nije u praksi davalo dobre rezultate. Zbog toga su »akceleraconisti« čak tvrdili da Phillipsova krivulja nema negativni nagib prema apscisi, nego da je, barem u kratkom roku, okomita na određenoj stopi nezaposlenosti koju su nazvali »prirodnom«.

Razlozi nestabilnosti tradicionalne Phillipsove krivulje mnogostruki su. Među njima su najvažniji, i u praksi najviše testirani promjena strukture nezaposlenosti (Kaliski), promjene očekivanja koje uvjetuju pogoršanje trade-off-a između promjene cijena i nezaposlenosti (Vanderkamp i Turnovsky) itd.

Mi smo u ovom radu pretpostavili da osnovni uzrok nestabilnosti Phillipsove krivulje potječe od neadekvatne definicije stope nezaposlenosti kao varijable kojom se izražava višak ponude nad potražnjom na tržištu rada.

Stopa nezaposlenosti kao endogena varijabla u Phillipsovoj krivulji definirana je od strane ILO i temelji se na broju onih koji aktivno traže posao. Tu definiciju prihvaća i Savezni zavod za statistiku. Međutim, u slučaju Jugoslavije tako definirana nezaposlenost ne izražava višak ponude nad potražnjom na tržištu rada, jer u nju ne ulaze neke kategorije nezaposlenih, prije svega oni na privremenom radu u inozemstvu.

Zbog toga smo definirali potencijalni višak ponude nad potražnjom:

$$PE = \frac{PLF - E^{-}}{PLF}$$

i to uzeli za endogenu varijablu u objašnjenju međuzavisnosti kretanja inflacije i nezaposlenosti.

Naveli smo i objasnili prednosti ovako definirane varijable nezaposlenosti. Također smo naveli i njezine nedostatke, jer obuhvaća i one kategorije koje ne bi trebala, na pr. invalide. U tako definiranu potencijalnu nezaposlenost ubrojene su i neke kategorije za koje ne postoji jednoznačan odgovor predstavljaju li potencijalnu radnu snagu ili ne, jer postoje valjani argumenti za i protiv. To su đaci stariji od 14 godina, studenti i vojnici. Te kategorije uz višak poljoprivrednog stanovništva čine najveći dio razlike između standardne definicije nezaposlenosti i definicije nezaposlenosti koju smo mi usvojili.

U empirijskoj analizi promjene cijena primijenili smo pretpostavku očekivanja u obliku funkcije razdijeljenog jaza Koyckova tipa kojim se promjene cijena u tekućem razdoblju objašnjavaju promjenama cijena iz proteklih razdoblja i potencijalnom nezaposlenošću iz tekućeg i prethodnih razdoblja.

Rezultati empirijske analize dani u prilozima uglavnom potvrđuju ispravnost naše hipoteze. Relativno nezadovoljavajuće statističke osobine nekih regresija upućuju na potrebu daljnje razrade i preciziranja pojma potencijalne zaposlenosti u smislu primjedbi koje smo gore naveli.