PRIKAZI

Savez republičkih i pokrajinskih samoupravnih interesnih zajednica za naučni rad u SFRJ učestvuje u troškovima izdavanja ovog časopisa.

ČLANCI — ARTICLES

ECONOMIC ANALYSIS AND WORKERS' MANAGEMENT, 2, XVI (1982), 141—155

EVALUATION OF THE MACROECONOMIC POLICY OF THE YUGOSLAV 1971—1975 FIVE-YEAR PLAN BY TECHNIQUES OF QUANTITATIVE ECONOMIC POLICY

*Lovrenc PFAJFAR**

I. INTRODUCTION

This paper compares the actual economic policy in the period of the 1971—1975 Yugoslav Five-Year Plan with a policy that would result from the application of certain methods developed in the theory of quantitative economic policy. The comparison focuses on the three main economic targets of the Plan: the growth of real GDP (DPCS), the trade balance (TBCS), and the rate of inflation, measured by index of producer prices (CPI).[1]

The starting point of the analysis is the aggregate annual macroeconomic econometric model of the Yugoslav economy (5). The model is linearized, and computations of the dynamic multipliers are presented. Using a dynamic generalization of Tinbergen's fixed target approach, two solutions for the instruments are given which guarantee the achievement of the specified Plan targets. In the first solution, an equal number of targets and instruments are used, and in the second, the number of instruments exceeds the number of targets.

To apply optimal control, the quadratic objective function of the policymakers is specified. Using its estimated parameters, optimal solutions for economic policy are presented and compared with actual values of targets and instruments.

II. LINEARIZATION OF THE MODEL AND DYNAMIC MULTIPLIERS

The aggregate annual econometric model of the Yugoslav economy (5) describes all the important elements of the national accounts and includes 34 equations with 55 variables. Since it follows the accounting structure, it is, in a way, neutral as far as doctrine is concerned (3).

* Institute of Economic Research, Ljubljana

[1] Variables DPCS and TBCS are in billions of 1972 dinars, CPI is a price deflator 1972 = 100.

The model is nonlinear in variables, and to make it suitable for our purposes it was linearized. The technique used to derive linearizations is the truncation, after the first order terms, of a set of Taylor series expansions. Regarding the nonlinearites in the model, it is a satisfactory approach. A general nonlinear equation of the form $\overline{y = f(x)}$ has, after linearization, the form

$$y = \lambda_0 + \lambda_1 x_1 + \lambda_2 x_2 + \ldots\ldots + \lambda_n x_n \tag{1}$$

where λ_0 represents the sum of all three components of linearization (constant term of the equation, the evaluation at x^o of the nonlinear terms in the equation, and the product of the variables in the nonlinear terms multiplied by their respective derivatives at x^0). While λ_i are defined as

$$\lambda_i = \frac{\delta \overline{y}}{\delta x_i} \Bigg| \quad x = x^o \qquad i = 1, 2, \ldots, n \tag{2}$$

There is no significant time trend of linearized parameters and no significant variability for the five-year period. For that reason we decided to use simple arithmetic averages of their values to formulate the linearized version of the model, which will hold for the whole period. The results of dynamic simulations of both models (nonlinear and linearized) do not differ significantly for the majority of variables. Thus, the information lost through linearization is not serious.

The reduced form of the linearized model is

$$y_t = \pi_1 y_{t-1} + \pi_2 x_t + \pi_3 x_{t-1} \qquad t = 1, 2, \ldots, 5 \tag{3}$$

where y and x are vectors of endogeneous and exogeneous variables of the model, and π are matrices of the reduced form coefficients. Dynamic multipliers for the model in the five-year period are

$$\pi_2, (\pi_1\pi_2 + \pi_3), \pi_1(\pi_1\pi_2 + \pi_3), \pi_1^2(\pi_1\pi_2 + \pi_3), \pi_1^3(\pi_1\pi_2 + \pi_3) \tag{4}$$

The selected targets analyzed in this paper were already specified. Taking into consideration the structure, the philosophy of the model, and the purposes of our paper, we selected the following variables of the model to be used as instruments of economic policy: public spending on goods and services (SPCS), investment in nonproductive activities (INNGCS), exchange rate including export stimulus (exchange rate — exporter, DTECT), exchange rate including all import duties (exchange rate — importer, DTECT), and money supply (DMCT).[2] The role of the selected instruments in the context of the aggregate macroeconomic model is well known. The dynamic multipliers which result from our model describe this in a quantitative manner for the five-year period 1971—1975 and are presented in Table 1.

[2] Variables SPCS and INNGCS are in billions of 1972 dinars, DTECT and DTUCT are in dinars/$, and DMCT is in billions of dinars.

The values of the multipliers are determined by the structure of the model and its parameters, which reflect the fundamental characteristics of the Yugoslav economy. For the period under consideration, there was a significant tendency toward decreasing rate of growth of GDP accompanied by increasing rate of inflation and a significant increase of trade deficit. This is reflected in the dynamic multipliers, and their dynamic characteristics show the presence of two long and one short cycle in the economy.[3]

Table 1

Dynamic multipliers of the linearized model for selected targets and instruments in the period 1971—1975

Targets	Instruments	Year 1	2	3	4	5
	SPCS	2.647	1.465	1.350	1.357	1.401
	INNGCS	2.056	1.552	1.251	1.245	1.282
DPCS	DTECT	1.355	.78	.71	.71	.73
	DTUCT	—10.425	—8.751	—9.136	—10.232	—10.625
	DMCT	—1.425	—2.420	—2.923	—3.607	—4.386
	SPCS	—.505	—.207	—.192	—.202	—.210
	INNGCS	—.616	—.083	—.186	—.185	—.193
TECS	DTECT	.253	—.100	—.101	—.106	—.110
	DTUCT	3.090	1.310	1.408	1.526	.729
	DMCT	.201	.474	.502	.606	.729
	SPCS	—.301	—.150	—.167	—.180	—.193
	INNGCS	—.233	—.163	—.144	—.163	—.175
CPI	DTECT	—.154	—.080	—.087	—.094	—.101
	DTUCT	2.371	1.292	1.385	1.592	1.825
	DMCT	.904	.488	.522	.625	.744

III. ECONOMIC POLICY WITH FIXED TARGETS

The dynamic generalization of Tinbergen's theory of economic policy gives us the values of instrument variables which guarantee the achievement of the specified targets in the context of the linear or linearized economic model. The rearrangement of the variables of the model according to the theory of quantitative economic policy gives the following presentation of the multi-period policy planning problem

[3] The matrix π_1 in equation (3) has three conjugate complex characteristic roots.

$$y = Rx + Sz \tag{5}$$

where y, x and z are stacked vectors of targets, instruments and other variables of the model (in our case, the last vector also includes error terms) for the five-year period. Stacked matrices R and S are constructed according to the selected targets and instruments using the dynamic multipliers of the model (3). Policy actions in our model do not influence events which precede them in time. This leads to the block triangular matrix R.

The concept of perfect output controlability (1) guarantees the solution of the equation (5) if the number of linearly-independent instruments is at least equal to the number of linear independent targets. In the case of equal number of targets and instruments, the solution is

$$\hat{x} = R^{-1}(y^* - Sz) \tag{6}$$

where stacked vector $\hat{x}$ gives the values of instruments which guarantee the achievement of plan targets. The elements of stacked matrix R^{-1} are dynamic instrumental multipliers which indicate the change in each instrument required for a unit change of target variables. The efficiency of instruments is, in this case, influenced only by a set of targets and instruments included in calculation of R^{-1}.

What values of the instruments should be fixed by policy decision-makers to reach the plan targets if they are using the following instruments: investments in nonproductive activities (INNGCS), exchange rate — exporter (DTECT), and money supply (DMCT)? The solution for this case is presented in Chart 1 together with actual and planned values of targets and instruments, and the dynamic instrumental multipliers are given in Table 2.

Table 2

Dynamic instrumental multipliers for selected targets and instruments

Instruments	Targets	Year 1	2	3	4	5
INNGCS	DPCS	.2586	—.1049	—.0318	—.0040	.0079
	TBCS	—.1.0000	—	.0031	.0035	.0015
	CPI	.6305	.7110	.3113	.2543	.2100
DTECT	DPCS	.5066	—.2125	.0050	—.0020	—.0033
	TBCS	1.5168	.2722	—.0255	—.0033	—.0003
	CPI	.4613	—.0843	—.1229	—.0139	—.0172
DMCT	DPCS	.1531	—.0544	—.0139	—.0115	—.0125
	TBCS	—	—	.0066	—.0020	—.0011
	CPI	1.3479	—.4044	—.2347	—.1954	—.1598

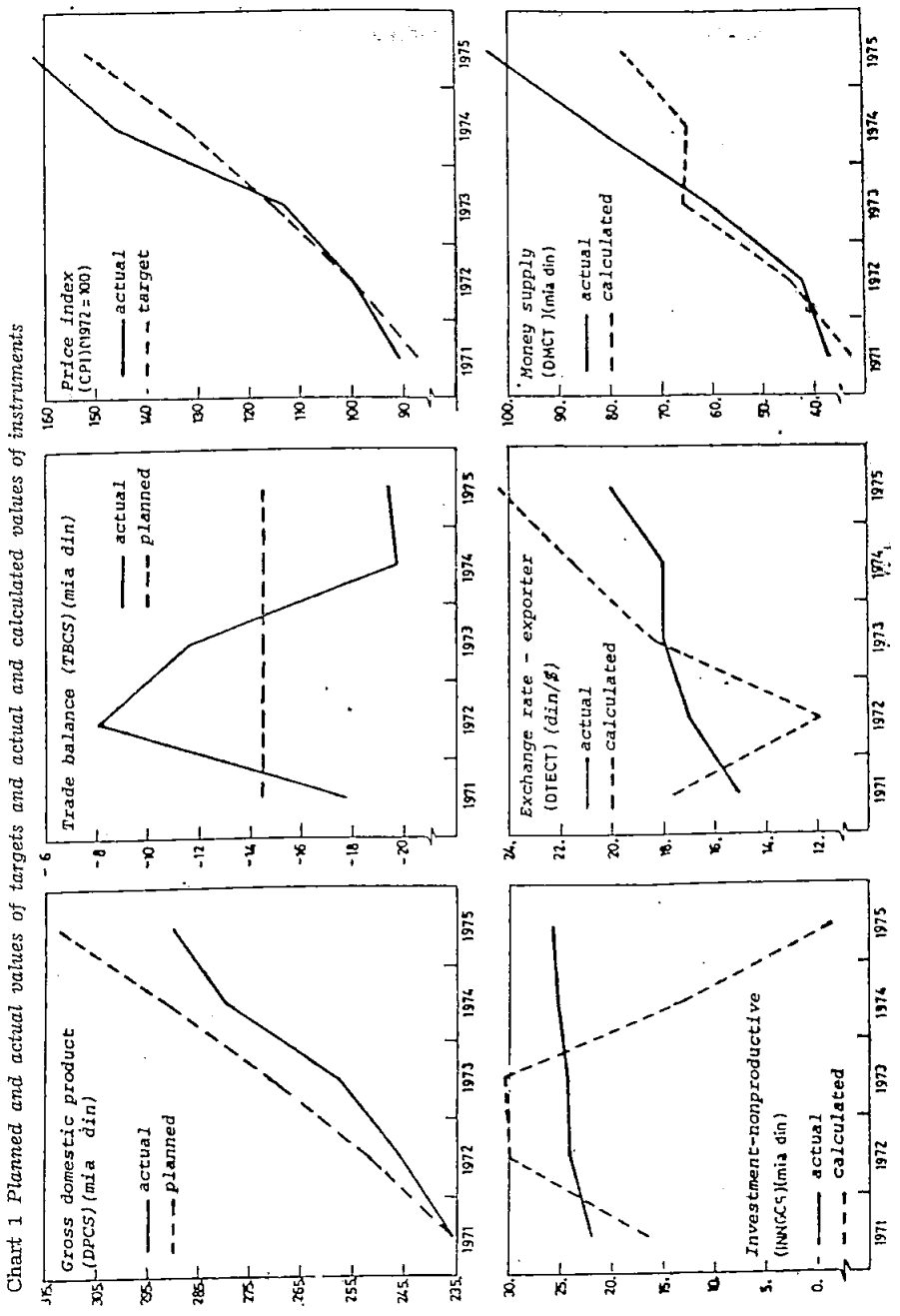

Chart 1 *Planned and actual values of targets and actual and calculated values of instruments*

The selected targets of the 1971—1975 Five-Year Plan were not reached. The planned growth rate of GDP was 7.5% per year, and the actual one for this period was 5.9%. The trade balance deficit should have remained unchanged in real terms, but it actually increased by 7.5% annually. The inflation rate was fixed at 5% per year[4] but actually prices grew by 18% (7). The results, using equation (6), indicate that for the realization of the targets the economic policy should put intensive restrictions on investments in nonproductive activities (INNGCS) to bring it to almost zero in real terms at the end of plan period, and at the same time use that money for export promotion. To keep inflation at modest rates, the money supply should be significantly lower at least in the last two years.

The dynamic instrumental multipliers indicate the problem of instrument instability (2), especially in the case of investments. To avoid this problem, we introduce additional instrumental variables. The multi-instrumentability, which is supported by economic theory, should guarantee the achievement of targets with the smallest possible values of a greater number of instruments. If we suppose that this objective function guided the policy decision-makers, the problem of optimal economic policy is formulated as

$$\min (x' x)$$

$$y = Rx + Sz \tag{7}$$

The stacked vector of instruments which guarantees the achievement of the targets is now

$$\hat{x} = R' (RR')^{-1} (y^* - Sz) \tag{8}$$

The stacked matrix of dynamic instrumental multipliers $(R' (RR')^{-1})$ is no longer block triangular and its elements are additionaly influenced by the length of the planning period.

Using the equation (8), two solutions were prepared. In the first one we added to the instruments already used (in the solution presented in chart 1) the exchange rate corrected for import duties (DTUCT), and in the second one we analyzed all five instruments presented in Table 1. The results are given in Chart 2 together with the actual values of instruments. Dynamic instrumental multipliers are given in Table 3 only for the first solution, to demonstrate the influence of the timespan of targets on instruments.

In general, as we expected, the targets are now realized by more moderate values of instruments. The results show still significantly different values of instruments from the actual ones, and suggest that policymakers were not sufficiently aware of all the difficulties to realize the fixed targets.

[4] In our calculations of optimal economic policy, we assume a target value of 15% per year.

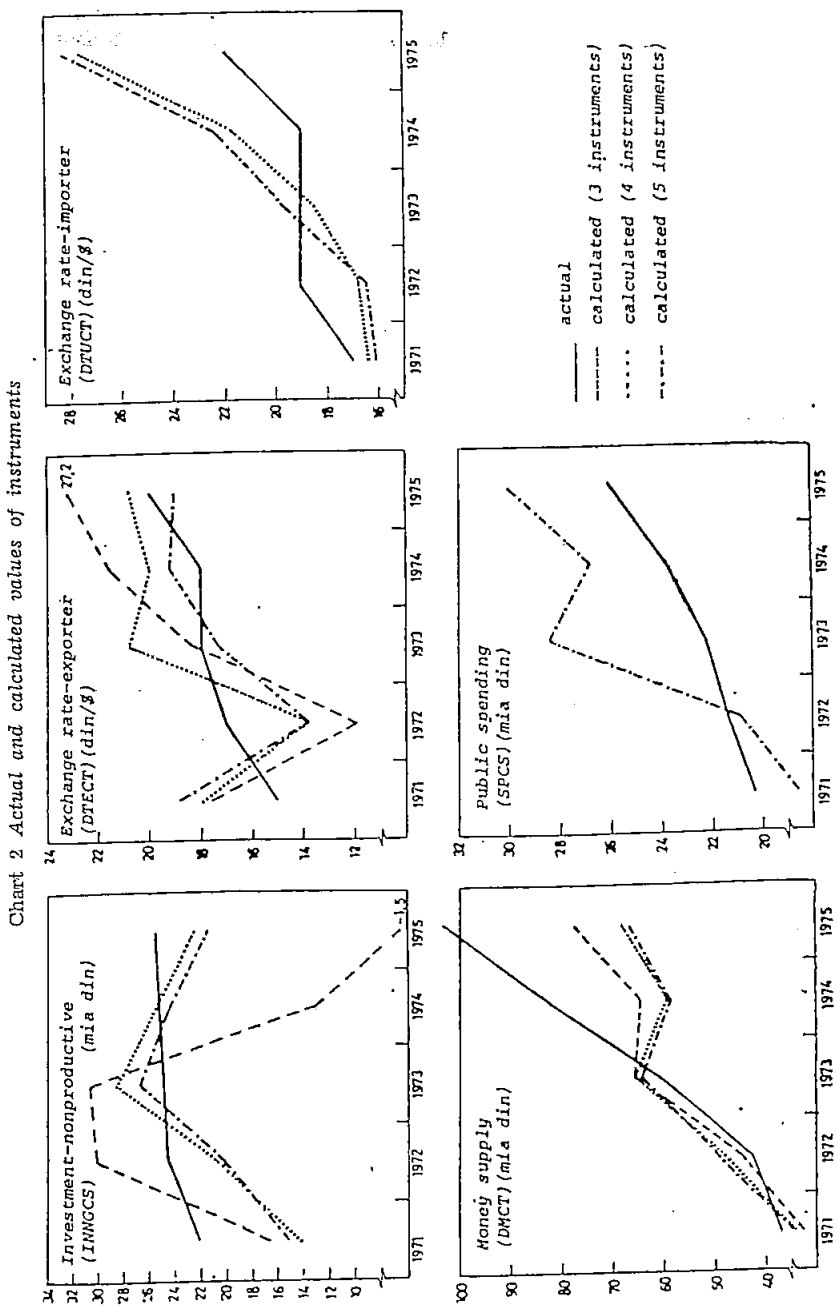

Chart 2 *Actual and calculated values of instruments*

Table 3

Dynamic instrumental multipliers

Instruments	Targets	t = 1			t = 2		
		DPCS	TBCS	CPI	DPCS	TBCS	CPI
t = 1	INNGCS	.112	.006	1.024	.103	.246	.200
	DTECT	.527	1.381	.932	—.014	—.033	— .027
	DTUCT	—.034	.236	— .049	—.024	0.58	.047
	DMCT	.207	—.368	2.715	—.038	—.090	— .073
t = 2	INNGCS	—.057	.004	— .581	.110	.001	1.020
	DTECT	—.186	.042	— .387	.503	1.325	.886
	DTUCT	.011	—.0002	— .317	—.035	.234	— .050
	DMCT	—.070	—.012	—1.619	.206	—.369	2.715
t = 3	INNGCS	—.011	.001	— .198	—.056	.005	— .579
	DTECT	—.014	.012	— .016	—.181	.053	— .378
	DTUCT	.005	.001	.023	.012	.0002	— .316
	DMCT	—.019	—.004	— .510	—.071	—.014	—1.620
t = 4	INNGCS	—.005	.0004	— .067	—.011	.001	— .198
	DTECT	—.006	.004	— .009	—.014	.013	— .015
	DTUCT	—.001	.0002	.007	.005	.001	.023
	DMCT	—.012	—.001	— .171	—.019	—.004	— .510
t = 5	INNGCS	—.003	.000	— .022	—.005	.0001	— .066
	DTECT	—.001	.002	— .005	—.006	.005	— .009
	DTUCT	—.002	.0001	.003	—.0004	.0002	.007
	DMCT	—.009	—.0004	— .057	—.012	—.001	— .171

IV. OPTIMAL ECONOMIC POLICY

In the theory of optimal economic policy, the quadratic objective function is the one most frequently used despite its known weaknesses. Usually used to argument it are the differences between desired and actual values of targets and instruments. This objective function has essential advantages compared with the ones used in the previous section. The only difficulty in using it is how to specify its parameters. In this paper we use the indirect approach to determine their values. The parameters will be estimated on the basis of actual values of targets and instruments and estimated impact multipliers.

The one period problem of optimal economic policy, using the quadratic objective function and the given linearized econometric model, is

$$w(x,y) = 1/2\,[(x - x^*)'A(x - x^*) + (y - y^*)'B(y - y^*)] \qquad (9)$$
$$y = Rx + Sz$$

Optimal values of instruments

$$\hat{x} = x^* + A^{-1}R'By^* - A^{-1}R'By \qquad (10)$$

are functions of their desired values and actual and desired values of

t = 3			t = 4			t = 5		
DPCS	TBCS	CPI	DPCS	TBCS	CPI	DPCS	TBCS	CPI
—.018	—.051	— .026	—.002	—.006	— .001	—.001	—.001	—
.002	.007	.004	.0002	.001	.0002	.0001	.0002	—
—.004	—.012	— .006	—.0004	—.002	— .0003	—.0001	—.0003	—
.006	.019	.009	.001	.002	.001	.0002	.001	—
.104	.247	.201	—.017	—.051	— .026	—.002	—.006	—.001
—.010	—.022	— .021	.003	.008	.004	.001	.001	.0002
.024	.058	.047	—.004	—.012	— .006	—.001	—.001	—.0003
—.038	—.090	— .073	.006	.019	.010	.001	.002	.001
.110	.001	1.020	.103	.247	.201	—.018	—.051	—.026
.502	1.323	.885	—.010	—.022	— .021	.003	.008	.004
—.035	.234	— .050	.024	.058	.047	—.004	—.012	—.006
.206	—.369	2.714	—.038	—.089	— .073	.007	.019	.010
—.057	.005	— .580	.110	.001	1.021	.097	.249	.191
—.181	.052	— .379	.502	1.323	.885	—.009	—.023	—.020
.012	.0002	— .316	—.035	.234	—.050	.023	.058	.045
—.071	—.014	—1.620	.207	—.369	2.714	—.035	—.019	—.069
—.010	.0003	— .195	—.054	.003	— .572	.145	—.009	1.108
—.014	.013	— .016	—.181	.053	— .380	.499	1.324	.875
.005	.001	.024	.012	—.0004	— .314	—.027	.232	—.030
—.020	—.004	— .512	—.072	—.013	—1.623	.194	—.366	2.682

targets. For the planning period all these values are given including the matrix R. What we have to define are matrices A and B. For each instrument we can write a regression equation[5]

$$x_j = \delta_{oj} + \sum_{i=1}^{n} \delta_{ij}\, y_i + e_i \qquad (11)$$

where δ_{ij} are regression coefficients. Let us suppose diagonality for A and B. Under this assumption, the values of δ_{ij} are

$$\delta_{ij} = -\frac{r_{ij}\, b_{ii}}{a_{jj}} \qquad (12)$$

Using calculated impact multipliers, the parameters of the specified objective function can be estimated.

For the period 1965—1975, we estimate regression equations (11) using all the targets or only some of them. The most satisfactory results were obtained for investment in nonproductive activities (INNGCS), exchange rate including export stimulus (DTECT) and money supply

[5] A slightly modified approach as the one used by Pissarides (6).

(DMCT). On the basis of these results and the impact multipliers given in Table 1, we specified the following quadratic objective function of policymakers, treating as a standard[6] variable the GDP

$$W = \sum_{t=1}^{5} \{(DPCS_t - DPCS_t^*)^2 + 1.395\,(TBCS_t - TBCS_t^*)^2 + \quad (13)$$
$$+ 2.020\,(CPI_t - CPI_t^*)^2 + 1.968\,(INNGCS_t - INNGCS_t^*)^2 +$$
$$+ 4.904\,(DTECT_t - DTECT_t^*)^2 + 5.054\,(DMCT_t - DMCT_t^*)^2\}.$$

Assuming the value of the objective function to be 0 *(optimum optimorum)*, then the change of GDP for 1 billion dinars causes the increase of it to 1. The same increase is caused by the change of trade deficit by .84 billion dinars or by the change of the price index by .7 points. Thus, in the neighbourhood of zero value of the objective function, the policy decision-makers are indifferent between specified changes of targets. For the instruments, they are indifferent between change of investment in nonproductive activities by .71 billion dinars or money supply by .44 billion dinars or exchange rate — exporter .45 dinars. Also taking into account the absolute values, the most sensible instrument of the economic policy of that period was the exchange rate.

Given the linearized econometric model and specified quadratic objective function, we use the algorithm of Norman and Jung (4) to reach the solutions for optimal economic policy. As desired values for instruments we use their actual values, and to avoid the problem of permanent trade deficit we take 0 (balanced balance) as its desired value. The sensitivity of the results is demonstrated by preparing an alternative solution where by we suppose the weight of trade deficit (TBCS) to be twice as much as the weight of the exchange rate (DTECT).

The results are presented in Chart 3, where optimal values of targets and instruments are compared with their actual values. Assuming that the policy decision-makers actually behave according to specified objective functions to achieve the planned targets, the economic policy of that period was rather efficient. It was quite successful in controling inflation (average optimal value 17% yearly, actual 18%) and trade deficit, too (total actual deficit for the whole period ammounted to 76.6 billion dinars, optimal solution gives 78 billion dinars). However, the economic policy was less successful in coping with growth of GDP (actual growth rate is 5.9% yearly, optimal solution gives 7.1%). On the side of instruments, rather significant discrepancies appear in the exchange rate (actual increase in the whole period is 54%, by optimal solution 68%). The change of the weight in objective function (alternative solution) results in halving the actual trade deficit, but on the account of the growth of GDP. Described changes are the result of significant differences between actual and optimal values of investment in nonproductive activities and corrected exchange rate (DTECT).

[6] From the form of the objective function, it follows that parameters can be estimated only up to a factor of proportionality.

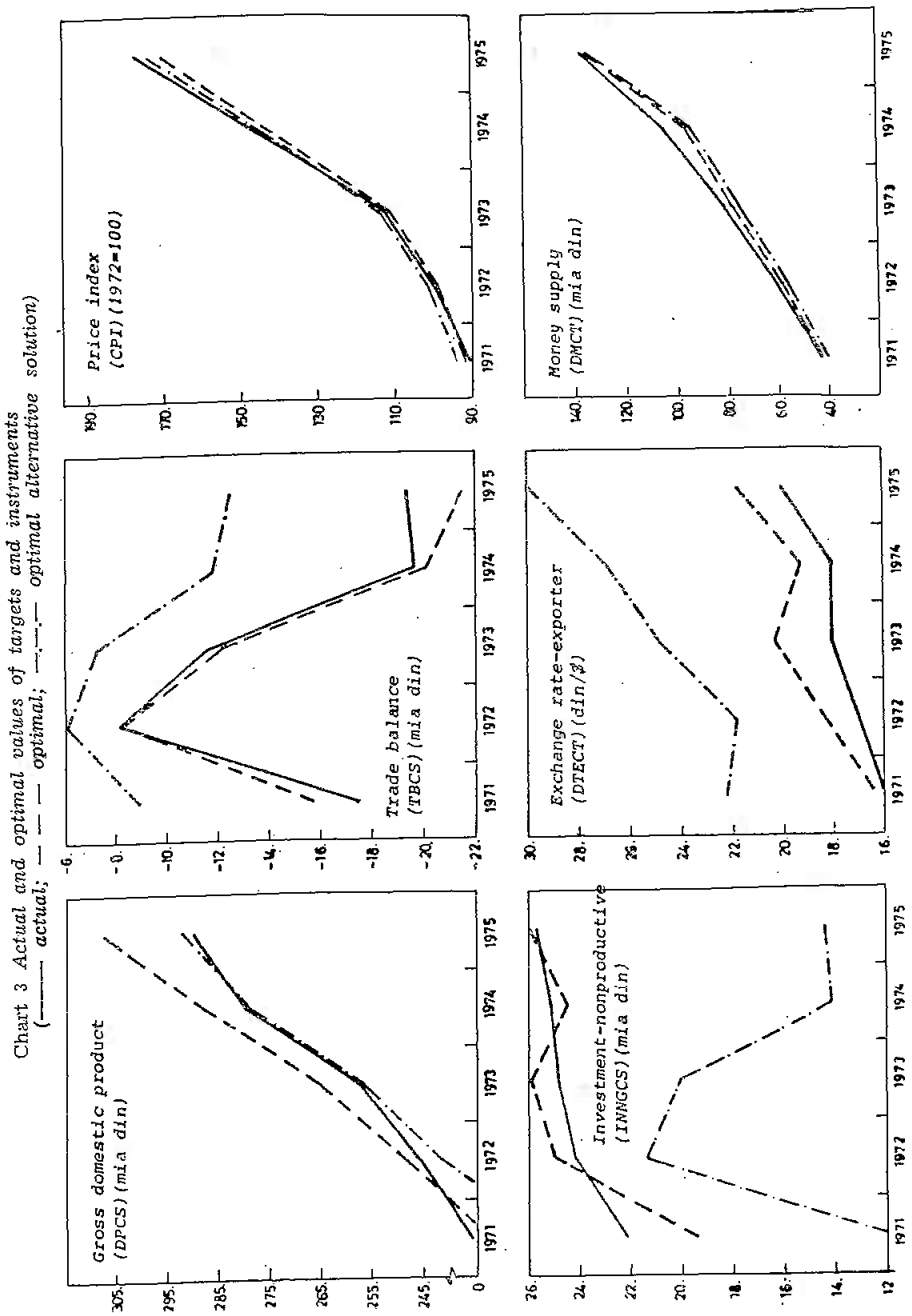

Chart 3 *Actual and optimal values of targets and instruments (——— actual; — — — optimal; —.—.— optimal alternative solution)*

The change in weights influenced the values of the feedback control coefficients. For both solutions, the optimal feedback control matrix G_1 is given in Table 4 (G_t reaches a steady state matrix already in period 2). They reflect in general an intensive, active role of nonproductive investments on values of instruments, and the change of the weight of the trade balance stresses the role of the exchange rate.

Table 4

Optimal feedback control matrix G_t

Instrumental variables	Lagged variables TBCS (—1)	CPI (—1)	DMCT (—1)
Basic solution			
INNGCS	.0837	.3041	.5138
DTECT	.0393	.0511	.0373
DMCT	.0005	—.0133	—.0674
Alternative solution			
INNGCS	.0236	.3285	.4529
DTECT	.0795	.0348	.0780
DMCT	—.0019	—.0118	—.0670

Finally, there is a comparison of the objective function values using optimal and actual values of instruments and targets:

Optimal economic policy	2510.3	10040.1	($b_{22} = 10$)
Aotual economic policy	3391.7	15115.7	($b_{22} = 10$)
Optimal/Actual	1.35	1.51	

Although we give actual economic policy a certain priority (actual values of instruments are used as desired values) the differences are still significant. In the base solution it is due to better realization of GDP growth, and in the alternative solution due to significant decrease of trade deficit.

V. CONCLUSION

The results, based on some methods developed in the theory of quantitative economic policy and applied for evaluation of macroeconomic policy of the 1971—1975 Five-Year Plan show:

— that selected targets could be realized by a more active economic policy using all the instruments at their disposal; and
— that, assuming the estimated objective function guided the decision-makers, the economic policy of that period was satisfactorily efficient.

In spite of all the assumptions and weaknesses of the approach, it demonstrated its usefulness in formulating quantitative values of targets and instruments, particularly it we realize that policymakers need information on quantitative reactions among macro aggregates. In their decisions, these reactions are implied in the selection of instruments, but quite often without proper information.

Received: 13. 4. 1982
Revised: 11. 5. 1982

REFERENCES

(1) Aoki, M., On a generalization of Tinbergen's condition in the theory of policy to dynamic models, *The Review of Economic Studies*, No. 131, 1975.
(2) Holbrook, S.R., Optimal economic policy and the problem of instrument instability, *The American Economic Review*, No. 1, 1972.
(3) Klein, L.R., *Models of the economy as a whole*, Study Materials, University of Pennsylvania, Wharton School of Economics, 1978.
(4) Norman, A.L. and Jung, W.S., Linear quadratic control theory for models with long lags, *Econometrica*, No. 4, 1977.
(5) Pfajfar, L., *Analiza delovanja jugoslovenskega gospodarstva in načrtovanje ekonomske politike z ekonometričnim modelom*, Doktorska disertacija, Univerza Edvarda Kardelja, Ljubljana, 1980 (Analysis of the functioning of the Yugoslav economy and economic policy planning using the econometric model, Ph. D. thesis).
(6) Pissarides, C.A., A model of British macroeconomic policy, 1955—1969, *The Manchester School of Economic and Social Studies*, No. 3, 1972.
(7) *Družbeni načrt Jugoslavije za dobo 1971—1975*, Uradni list SFRJ, No. 35, 1972
(The Five-Year Plan of Yugoslavia for the Period 1971—1975).

OCENA MAKROEKONOMSKE POLITIKE JUGOSLAVIJE U RAZDOBLJU PETOGODIŠNJEG PLANA 1971—1975 POMOĆU TEHNIKA KVANTITATIVNE EKONOMSKE POLITIKE

Lovrenc PFAJFAR

Rezime

U članku se porede stvarna kretanja izabranih instrumenata ekonomske politike u razdoblju petogodišnjeg plana 1971—1975 sa njihovim vrednostima dobijenim na osnovi aplikacije nekih od pristupa razvijenih u teoriji kvantitativne ekonomske politike. Ocena uspešnosti ekonomske politike zasniva se ostvarivanju triju glavnih ekonomskih ciljeva tog perioda: vrednosti društvenog proizvoda (DPCS), salda trgovinskog bilansa (TBCS) i kretanja cena proizvođača (CPI).

Polaznu tačku u analizi predstavlja godišnji makroekonomski ekonometrijski model jugoslovenske privrede koji se temelji na društvenim računima i obuhvata sve važnije elemente formiranja i raspodele društvenog proizvoda. Ukupno uključuje 55 varijabli, od kojih su 34 endogene. Pošto je model nelinearan u varijablama, a upotrebljeni postupci traže linearan oblik modela, najpre je izvršena njegova linearizacija i to pomoću Taylorove formule razvoja funkcije. Pokazalo se da linearizirani parametri strukturnih jednačina ne odražavaju signifikantno variranje u tom kratkom periodu, pa se njihova prosečna vrednost koristi kod izračunavanja dinamičkih multiplikatora.

U analizi se kao instrumenti koji stoje na raspolaganju nosiocima ekonomske politike za ostvarivanje pomenutih ciljeva tretiraju sledeće egzogene promenljive: materijalni izdaci opšte i kolektivne potrošnje (SPCS), neprivredne investicije (INNGCS), prosečno postignuti kurs kod izvoza (DTECT) i uvoza (DTUCT), te novčana masa krajem godine (DMCT). Dinamički multiplikatori za pomenute ciljeve i instrumente prikazani su u tabeli 1.

Prve procene vrednosti instrumenata koje garantuju puno ostvarenje planskih ciljeva uz uslove linearizirano modela dobijeni su pomoću dinamičke generalizacije Tinbergenovog postupka fiksnih ciljeva. Potreban uslov rešenja problema ispunjen je kada je broj cilejva jednak broju instrumenata, pa su u račun uključeni sledeći instrumenti: neprivredne investicije (INNGCS), prosečno postignuti kurs kod izvoza (DTECT) i novčana masa krajem godine (DMCT). Dobijeni dinamički instrumentalni multiplikatori koji iskazuju potrebnu promenu instrumenata po jedinici promene cilja u pojedinoj godini dati su u tabeli 2. Kretanja instrumenata za puno ostvarenje planskih ciljeva (7,5% godišnji rast realnog društvenog proizvoda, 0% rast realnog salda trgovinskog bilansa, 15% rast cena proizvođača) zajedno sa stvarnim kretanjima varijabli prikazana su u slici 1. Uvođenjem pretpostavke da je cilj nosioca ekonomske politike ostvarenje planskih ciljeva sa što više instrumenata uz njihovu najmanju moguću promenu (minimizacija dužine vektora instrumenata) dobija se rešenje prikazano jednačinom (8). Matrica dinamičkih instrumentalnih multiplikatora u tom rešenju nije više bloktriangularna i njeni elementi su i pod uticajem dužine planskog razdoblja. (Jedno od mogućih rešenja prikazano je u tabeli 3). Rezultati upotrebe tog pristupa (dati u slici 2) pokazuju, da je planske ciljeve moguće ostvariti mnogo smirenijim kretanjima većeg broja instrumenata, što je u potpunoj saglasnosti sa stavovima teorije ekonomske politike.

U poslednjem odeljku prikazana je upotreba optimalne kontrole i to linearno kvadratnog problema koji se u analizi optimalne ekonomske politike fleksibilnih ciljeva najčešće i koristi. Parametri kvadratne preferencijalne funkcije nosioca ekonomske politike utvrđeni su na osnovi stvarnih odnosa među izabranim varijablama ciljeva i instrumenata uz dodatno korišćenje početnih multiplikatora iz tabele 1. Algoritmom A. L Normana i W. S. Junga pripremljena su dva alternativna rešenja optimalne ekonomske politike koja se međusobno razlikuju u pretpostavci o vrednosti parametra kod postignutog prosečnog kursa kod izvoza

(DTECT). (Povećanje parametara za 100%). Rezultate prikazuje slika 3, a koeficijenti matrice optimalne kontrole sa povratnom spregom dati su u tabeli 4.

Rezultati u članku pokazuju da je u periodu petogodišnjeg plana 1971—1975:

a) postojala konsistentnost izabranih ciljeva i instrumenata ekonomske politike

b) da su postojale mogućnosti punog ostvarenja postavljenih ciljeva uz aktivniju upotrebu u analizu uključenih instrumenata

c) da je ekonomska politika tog perioda, uz pretpostavku realnosti dobijenih preferencija među ciljevima i instrumentima, bila zadovoljavajuće uspešna. Vrednost preferencijalne funkcije na osnovi stvarnih kretanja varijabli u celom razdoblju prekoračuje njenu optimalnu vrednost za 35%, na što najviše utiču relativno značajnija odstupanja kod društvenog proizvoda i prosečno potsignutog kursa dinara kod izvoza.