Title	THE PROSPECT OF SOVIET ECONOMIC POLICY
Sub Title	
Author	KATO, HIROSHI NIWA, HARUKI
Publisher	Keio Economic Society, Keio University
Publication year	1965
Jtitle	Keio economic studies Vol.3, (1965.) ,p.122- 141
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260492-19650000-0122

THE PROSPECT OF SOVIET ECONOMIC POLICY

HIROSHI KATO and HARUKI NIWA

1. THE TRANSFORMATION OF ECONOMIC POLICY

The Soviet economy is now confronted with the two major issues: the inefficiency in industry and the stagnation in agriculture. Especially, the latter makes a serious problem, as the underproduction in agriculture greatly affects the people's standard of living. Indeed, this tardiness in farming is considered even to have caused the Soviets shift her policies in agriculture. The Khrushchev's principle policy in agriculture was the exploitation of virgin soil and the increase of Indian corn production. But as everybody knows, this proved a failure which became a distant cause of Khrushchev's political downfall.*

The exploitation policy of virgin soil worked effectively at first as a supplementary measure to relieve the shortage in cereals. The fact is that, excepting 1958, the output of cereals and the cultivated land increased proportionately, in other words, the crop per unit of land remained the same as before. Not only that the production of wheat per hectare did not increase, but the production of cereals in Ukraine even decreased on account of the transfer of labor from Ukraine to Kazackstan and Siberia. The *National Economic Statistics of the Soviets*, 1961, p. 325 indicates the decrease of the cultivated land from 750 hectares in 1953 to 200 hectares in 1961 in Central Oblasch of the Soviet Socialist Republic because of the shortage in labor. Thus taking Ukraine alone, the Soviets suffered 5,000,000 tons of decrease in crop. Khrushchev expressed his expectation in the speech delivered in March 1962 for the increase in cereal production of 2 mt. per hectare. But judged by the decreasing tendency in the output: 1.1 mt. in 1956, 0.9 mt. in 1958 and 0.6 mt. in 1962, his was certainly an unrealizable surmise. The output in 1963 was as low as 0.5 mt. per hectare. On the other hand, the output of Indian corn per hectare increased as it was expected, showing an increase of 3 or 4 centner per hectare. But the cultivated land for it being only 10% of all the cultivated land for cereals, the increase was not considerable enough

* Concerning the prospect of the success of Khrushchev's policies, the author discussed in the first chapter of his work *Economic Growth of the Soviets and Her Economic Planning*, indicating that Khrushchev's policy would be successful, if a large investment is done in chemical fertilizer and agricultural implements, but if otherwise, it would turn a failure, and along with it, Khrushchev's political life would come to an end.

to reflect on the total amount of increase in cereal output.

Thus the output of cereals tended to diminish as follows: 141,200,000 tons in 1958, 125,900,000 tons in 1959, 134,400,000 tons in 1960, 134,400,000 tons in 1961, 147,500,000 tons in 1962 (164,000,000 tons as originally planned) and made an epochal poor showing in 1963. Against the planned crop of 172,100,000 tons for 1963, the actual output amounted to 18 per cent less than the previous year, properly estimated, it seems to have been 25 per cent less. Such being the case, the 7 Year Plan (1959–65) reduced the yearly increase rate, 10.9%, of the 6th Plan (1956–60, but abandoned in 1958) to 2.5%, in other words, the planned output of 191,600,000 tons for 1965 was lowered to 173,600,000 tons. However, even this looked hardly possible to be realized, much less the required amount for the year of 1970, 230,000,000–263,000,000 tons. As a drastic measure to help the situation, Khrushchev resorted to increasing the production of chemical fertilizer, claiming that the cultivated land of 77,000,000 hectares would be quite sufficient to cover the national requirement of output, if the crop pe hectare be raised from one to three tons with the use of fertilizer.

This policy with emphasis on chemical industry aiming at the increase of fertilizer production, hence a large supply of food and the elevation of people's standard of living and efficiency, especially with the application of various plastic parts of latest development, was a much expectant attempt by Khrushchev for the improvement of the nation's economic conditions.

The object of this essay is to examine the standard of living (the substance standard of living) of the Soviets so as to predict the prospect of the policy described above.

2. AN OUTLINE OF THE MODEL

It has been already clarified[1] that the growth of Soviet economy had to go through an extremely biassed process of development, that

[1] The real wage level of the Soviets fell off heavily already in 1930's before the latest war. It was only as late as the second half of 1950 that the succeeded in restoring the 1928 year level prevalent before the first five year plan, and went further beyond. In this while, the production of mining and manufacture industries made a rapid progress, raising its level about 10 times during the period from 1928 to 1961 (calculated by the net production index generally applied in east European countries.) It is quite natural that the Soviet economy is often criticized for its unbalanced development in production and consumption.

Japan also was subjected to this kind of criticism; in her case the production of mining and manufacture industries from 1929 through 1962 increased 6.8 times, but the level of real wage rose only 1.9 times.

is, it had to tackle with a "tardy improvement of real wage in relation to the high level growth of production." Looking over the arbitrarily set price system of the Soviet planned economy, we get struck with the necessity of analyzing the Soviet economy in physical term rather than money value. Seeing that it is clearly possible to analyze this "interrelationship between the economic growth and the real wage," the author decided to examine the fluctuations of the real wage level in the past and make a numerical predict of their future trend.

The real wage in city estimated in phisical term may be defined as the "amount of consumer goods supplied per worker in city." If the supply of consumer goods to city is made at the rate over above the increase rate of the urban working population, as a result of an attained high level of economic growth, the urban real wage is raised to that extent, but it gets lowered, if the supply of consumer goods should fail to meet the increasing rate of working population.

Especially, it is important to know in this connection that there is a relative difference in the level of consumption and in the "pattern of consumption" between city and country.

In other words, labor force does not call for a large amount of consumer goods so long as it exists in rural environment, for it is sustained by the self-sufficiency, frugal pattern of life there. It is a fact that in spite of almost a half of the Soviet population reside in country, the greater part of consumer goods (about 76% in 1960) are catered for city dwellers.

With the progress, in industrialization, however, as country folks migrate to town for work, their pattern of life undergoes a sudden change. The result is that they are unable to live, unless each of them is supplied a much greater amount of consumer goods than what he had required when he was living in country. As the concentration of labor in city gets under way, it is natural that the production of consumer goods is increased. In this process of interaction between the concentration of labor in city and the supply of consumer goods, the urban real wage would cease to rise or begin to dwindle, if the production of consumer goods lags behind.

Table I shows the shift in the "supply of consumer goods per urban workers", in other words, in his real wage. Naturally, this is in a very close accord with the movement of the real wage index obtained by the "ordinary method" of deflating the nominal wage index by the consumer price index.

Needless to say, the increase of urban workers due to such an economic growth and the increase in the supply of consumer goods

TABLE I. THE SHIFT OF THE "REAL WAGE" OF SOVIET URBAN WORKERS, CALCULATED BY THE AMOUNT OF CONSUMER GOODS SUPPLY

	Urban worker population	Consumer goods for cities	Production of consumer goods	Consumer goods supply for urban workers, per	Peference Niwa's real wage	
		Total cupply of consumer goods			Formula L	Formula P
	(1)	(2)	(3)		(4)	
1928	100	700%	100	100	100	100
32	155	68.2	108	68	35.9	80.0
37	210	68.9	162	76	63.4	75.9
40	264	70.2	175	66	43.7	68.3
50	277	76.0	174	68	57.0	80.7
55	346	73.5	290	88	77.6	120.1
59	361	75.3	378	112	93.4	141.2
60	377	76.0	390	112	—	148.0

Note: (1) Inclusive of soldiers and the workers whose assigned jobs are not known. Bergson and Kuznets, ed. by: *Economic Trends in the Soviet Union*, 1963, p. 77, estimated by Eason.

(2) The gravity in the total retails of the social retail agencies. For the year of 1928 is included the amount of retails at private agencies. These are official statistics.

(3) The indexes of the consumer goods productions, weighted by the final goods that have been estimated by Kaplan and Moorsteen. The amounts of production after 1955 were calculated by the Greenslade and Wallace index, that has been weighted by the final goods, and were linked to the other indexes. These consumer goods do not include the unprocessed foodstuff.

(4) Niwa's estimation "The Soviet Retail Price Index and the Real Wage Index," Economic Studies Quarterly (Kikan Riron-Keizaigaku), Vol. XII, No. 3, June 1962. The calculation inclusive of the Kolchoz markets.

for city are in a complex interrelationship on account of a number of variables concerned. They are also influenced by such exogenous factors as the movement of the entire worker population, the investment policy of government, the rise and fall in the production of arms, the change in the area for cultivation and some other things.

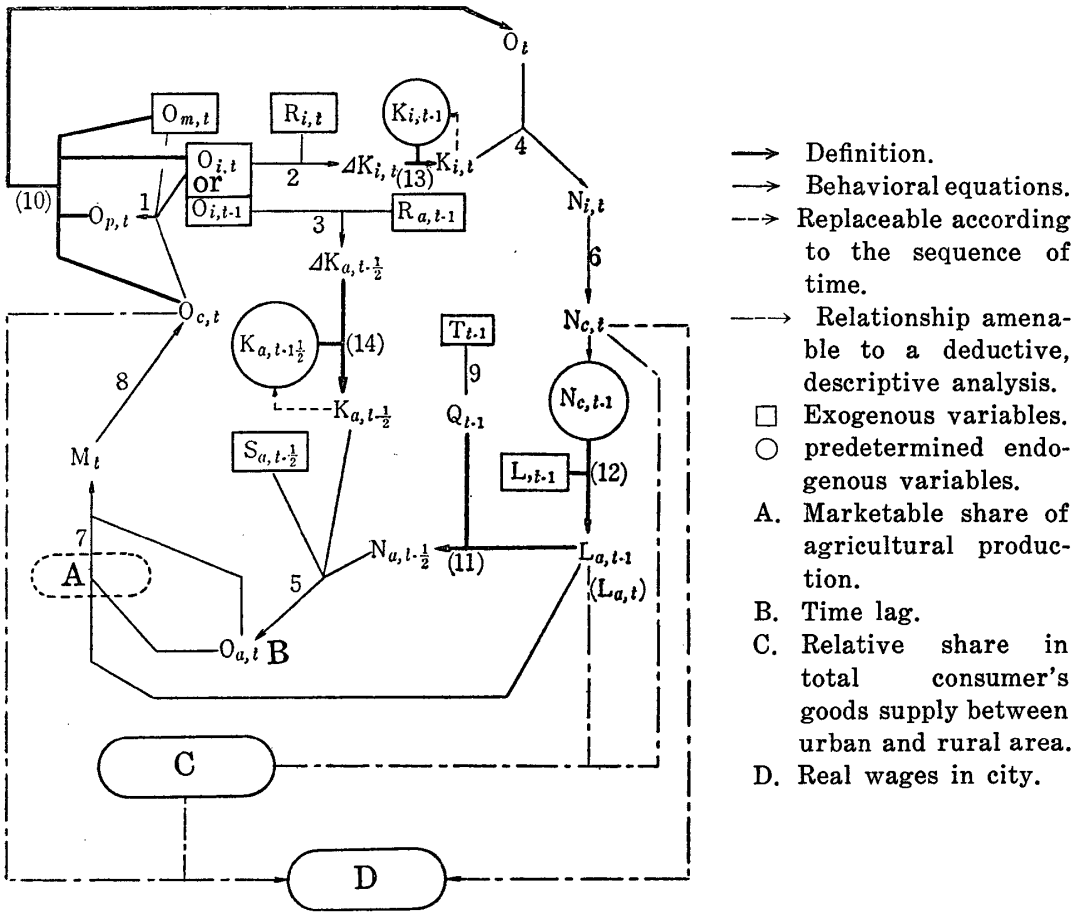
So long as such a variety of factors are interwinded, it seems best to approach the problem through the analysis of a model with simultaneous equations.

To clarify quantitatively the relationship between the economic growth and the real wage level, and further, to analyze and predict fairly comprehensively and synthetically the major economic indexes of Soviet economy, the author has constructed a long term plan model of the Soviet economic growth, which consists of 9 behavioral equations and

5 definition equations (Soviet economic growth model No. 3). A smaller form of model would be sufficient, if only the analysis of real wage is to be made, but it is necessary to construct a model at least of this size, since it was author's intention to construct a more or less "synthetic model". Besides, the author's model was arranged as a recursive model, and the hypotheses of the behavioral equations were made by "the method of serial least squares".[2] The period of the observed statistical materials was generally from 1935 to 1961 (the periods during and immediately after World War II excluded). The materials were used on the basis of one for 1955 as 100, or its converted index 0.1 for the same year.

Next are presented the equations which compose the "Soviet economic

FIG. I. THE MODEL ON THE ECONOMIC GROWTH OF THE SOVIETS



⟶ Definition.
⟶ Behavioral equations.
⇢ Replaceable according to the sequence of time.
⟶ Relationship amenable to a deductive, descriptive analysis.
□ Exogenous variables.
○ predetermined endogenous variables.
A. Marketable share of agricultural production.
B. Time lag.
C. Relative share in total consumer's goods supply between urban and rural area.
D. Real wages in city.

[2] Concerning the recursive model and the estimation by serial least square method, refer to Takao Fukuchi: *Introduction to Econometrics*, pp. 164-67, published by Toyo Keizai Shimposha, 1962, Yujiro Hayami: "Memorandum on to the Least Square Method", *Economic Studies Quarterly*, Vol. XIV, No. 1, 1963, September Issue, pp. 60-63.

Exogenous variables, 7

$O_{m,t}$	Output of munition.	$R_{a,t-1}$	Relative share of investment in agriculture in total investment.
$O_{i,t}$	Flow of capital goods to final demand sector.	$L_{,t-1}$	Total labor force
$R_{i,t}, R_{i,t-1}$	Relative share of investment in manufacture and mining in total investment.	$S_{a,t-\frac{1}{2}}$	Land (Sown area).
		$T_{,t-1}$	Time (year).

Endogenous variables, 14

$O_{p,t}$	Output of mining raw materials and intermediary producer's goods	$O_{a,t}$	Agricultural output.
		M_t	Supply of agricultural raw materials to consumer's goods industry (purchased by the government).
$O_{c,t}$	Output of consumer's goods.		
O_t	Output of mining and manufacture.	$N_{i,t}$	Employment in mining and manufacture
$K_{i,t}$	Volume of fixed capital stock in mining and manufacture.	$N_{c,t}$	Employment in non-agriculture.
$K_{a,t-\frac{1}{2}}$	Volume of fixed capital stock in agriculture (Amount at the end to the year $t-1$)	$L_{a,t-1}$	Total labor force in agriculture.
		$N_{a,t-\frac{1}{2}}$	Actual employment in agriculture (Converted into full time employment in agriculture).
$\Delta K_{i,t}$	Changes in Ki, change from the previous year.		
$\Delta K_{a,t-\frac{1}{2}}$	Changes in Ka from $t-1\frac{1}{2}$ to $t-\frac{1}{2}$ changes from the previous years, estimated at the end of each year.	$Q_{,t-1}$	Ratio between $La_{,t-1}$ and $Na_{,t-\frac{1}{2}}$ ($La_{,t-1}/Na_{,t-\frac{1}{2}}$).

Predetermined endogenous variables, 3

$K_{i,t-1}$
$K_{a,t-1\frac{1}{2}}$
$L_{a,t-1}$
$N_{a,t-\frac{1}{2}}$
$O_{,t-1}$
$N_{i,t-1}$
$N_{c,t-1}$

} One of these

Behavioral equations

(1) $\log O_{p,t} = 0.9064(0.361 \log O_{i,t} + 0.365 \log O_{c,t} + 0.274 \log O_{m,t}) + 0.1980$
$\hat{S}=0.03248 \quad \hat{R}=0.9879$

(2) $\Delta K_{i,t} = 0.0967(O_{i,t} \times R_{i,t}) + 0.4659 \quad \hat{S} = 1.704 \quad \hat{R} = 0.9253$

(3) $\Delta K_{a,t-\frac{1}{2}} = 0.1088(O_{i,t-1} \times R_{a,t-1}) - 0.0276 \quad \hat{S} = 2.059 \quad \hat{R} = 0.9267$

(4) $(0.289 \log K_{i,t} + 0.711 \log N_{i,t}) = 0.7399 \log O_t + 0.5197 \quad \hat{S} = 0.00962 \quad \hat{R} = 0.9982$

(5) $\log O_{a,t} = 1.2550(0.30 \log S_{a,t-\frac{1}{2}} + 0.41 \log N_{a,t-\frac{1}{2}} + 0.29 \log K_{a,t-\frac{1}{2}}) - 0.4547$
$\hat{S} = 0.02184 \quad \hat{R} = 0.9814$

(6) $\log N_{a,t} = 1.1088 \log N_{i,t} - 0.2048 \quad \hat{S} = 0.01327 \quad \hat{R} = 0.9939$

(7) $\log M_t = 0.7258(2 \log O_{a,t} - \log L_{a,t-1}) + 0.5827 \quad \hat{S} = 0.01782 \quad \hat{R} = 0.9944$

(8) $\log O_{c,t} = 0.8459 \log M_t + 0.2829 \quad \hat{S} = 0.01474 \quad \hat{R} = 0.9955$

(9) $\log Q_{,t-1} = -0.2309 \log T_{,t-1} + 0.3866 \quad \hat{S} = 0.02927 \quad \hat{R} = 0.8559$

Definition

(10) $\log O_t = 0.162 \log O_{m,t} + 0.216 \log O_{c,t} + 0.224 \log O_{i,t} + 0.408 \log O'_{p,t}$

(11) $\log N_{a,t-\frac{1}{2}} = \log L_{a,t-1} - \log Q_{,t-1}$

(12) $L_{,t-1} = 0.464 N_{c,t-1} + 0.536 L_{a,t-1}$

(13) $K_{i,t} = K_{i,t-1} + \Delta K_{i,t}$

(14) $K_{a,t-\frac{1}{2}} = K_{a,t-1\frac{1}{2}} + \Delta K_{a,t-\frac{1}{2}}$

growth model No. 3". The numbers of the equations were set as a matter of convenience, indicating no causal relationship. S and R mean the standard deviation and the coefficient of correlation respectively of the errors of subordinate variables, estimated by the method of serial least square.

The model is presented below diagramatically to fascilitate understanding. (Figure I)

As is clear with the equation No. 1, this model assumes that the final demand determines the productive level of mining raw materials and intermediary producer's goods. Observing the above assumption, one gets the impression that this model has some similarity to the Leontief system in its primary thought scheme. Ours, however, is entirely different from the Leontief's system of theory, for our model aims at clarifying the significance of net products, and so the coverages of the production of mining raw materials and intermeriary producer's goods (O_p) and the flow of capital goods to the final damand (O_i) do not overlap each other. Also, so the equations No. 4 and No. 5 clearly indicate, our model adopts the orthodox production function and admits the mutual substitute among the various productive factors at a specific point of time. We assume, however, that no substitutability is possible between "agricultural raw materials" and "capital and labor" at a specific point of time, although the possibility of substitutability between capital and labor in mining industry is granted. The fact that the production function in mining industry, excepting the equation No. 1, used the equations No. 4 and No. 8 at the same time, comes from the above assumption.

In estimating the productive correlations both in manufacture and agriculture, the multiple recurrence was not used for fear of the multicoliniality and the complication of calculation. We constructed a "simple investment index", and by corresponding this "index" with the productive index, we estimated the productive correlation as one variable recurrent equation. The result was quite satisfactory, although we did not apply the multiple recurrence.

All the behavioral equations, excepting the capital formation corre-

lations, that is, the equations No. 2 and No. 3 were estimated according to the logarithmic line formula, so that each equation would effectively show the powerful characteristic of each index of the Soviet economy as a "growing economy", although it is on one variable recurrence equation.[3]

As is clear from above, our model serves to explain 14 endogenous variables by 7 exogenous variables. It can also easily calculate and predict many other important economic quantities by utilizing those estimated values. Such indexes as the capital coefficient, labor productivity, capital equipage rate, workers' ratio between city and country, marketing rate of agricultural products, etc. are their examples.

However, it should be known that this model represents the time lag only in two cases and its influence revealed is relatively small. Also, three fluctuations of stocks are not shown either. So, this model is not proper to the purpose of ascertaining an undulating fluctuation of a matter; it helps mainly to trace and predict a "shift of level trend."

3. PREDICTION AND ANALYSIS

The quickest way to find how effective the "Soviet Economic Growth Model No. 3" is, is to attempt "a prediction for the past" (simple interpolation).

Of course, our greatest concern is to make various experimental prediction for the future.

This Model No. 3 may strike us at a glance that it will render us some inconvenience in prediction making, because it makes use of the equation by logarithm and the equation by actual figure together. This, however, is just superficial. The capital formation equations, that is, the equations No. 2, No. 3 and No. 14 being placed in the first part of the serial order, they can be managed separately. Among other equations, the definition equation No. 12 is the only one which is involved with actual numbers. This No. 12 has an additional significance of showing the possibility of L, the total labor power index, as defining itself as the weighted arithmetic average of the two indexes N_c and L_a. In this case, it is possible to assume that the value by the "weighted arithmetic average" be taken as an approximate value of the "weighted geometrical average", provided that the equal weight

[3] As to the details of this method, refer to Haruki Niwa: "A Simplified Econometric Model of Soviet Economic Growth, (Revised)", *Sociology Department Studies, Vol. 9, A Collection of Essays, Department of Sociology, in Commemoration of the 75th Anniversary of the Founding of Kansei-gakuin*, November 1964.

is applied. Besides, the net influences which L, $t-1$ and N_c, $t-1$ exercise on the great majority of the endogenous variables is relatively small, as they mutually offset. It is, therefore, permissible to replace the equation 12 wity the following approximate equation by the weighted geometrical average:

$$\log L, t = 0.464 \log N_c, t - 0.531 \log L_a, t \qquad (12')$$

Having completed in this way, the predictions of K_i, t and K_a, t, we can now easily manage the predicting task all by means of logarithmic calculation.

Table II was constructed by the above described method. It presents the coefficients of reduced form.

In case when the estimation by the serial least square method is used as in this model, it does not take a separate calculation to obtain

TABLE II. COEFFICIENT MATRIX OF REDUCED FORM

Exogenous variables / Endogenous variables	$O_{i,t}$	$O_{m,t}$	$S_{a,t-\frac{1}{2}}$	$L_{,t-1}$	$T_{,t-1}$	Estimated $K_{a,t-\frac{1}{2}}$	Estimated $K_{i,t}$	Estimated $N_{c,t-1}$	Invariables
$O_{c,t}$	—	—	0.4623	0.0335	0.1459	0.4470	—	−0.0156	−0.0268
$N_{c,t}$	0.4009	0.3038	0.1873	0.0135	0.0591	0.1811	−0.4507	−0.0063	0.6880
O_t	0.3475	0.2633	0.1623	0.0117	0.0512	0.1569	—	−0.0055	0.0714
$O'_{p,t}$	0.3272	0.2484	0.1529	0.0111	0.0483	0.1479	—	−0.0052	−0.1891
$O_{a,t}$	—	—	0.3765	0.9601	0.1188	0.3640	—	−0.4455	−0.6536
M_t	—	—	0.5465	0.0396	0.1725	0.5284	—	−0.0184	−0.3661
$N_{i,t}$	0.3616	0.2740	0.1689	0.0122	0.0533	0.1633	—	−0.0057	0.8052
$N_{a,t-1}$	—	—	—	1.8657	0.2309	—	—	−0.8657	−0.3866
$L_{a,t-1}$	—	—	—	1.8657	—	—	—	−0.8657	—
$Q_{,t-1}$	—	—	—	—	−0.2309	—	—	—	0.3866

Reduced form (in actual figures)

Note: (1) L_a should be calculated with actual figures. This table, however, presents the coefficients to be used in approximate calculation by logarithm.

(2) K_a and K_i are endogenous variables, but they can be estimated directly from exogenous variables. Since, however, they can be calculated with actual figures, it is necessary that the ones transformed into logarithm be used. N_c is a predetermined endogenous variable.

the values of the "predictions for the past" (simple interpolation), as they are automatically calculated in the estimating process of each parameter. However, since some influence due to the cumulative errors in calculation is comprised in these interpolate estimate values, especially in our case since the reduced form, which replaced the equation No. 2 with No. 12′, were used in actual prediction, we decided to go through the process of "predicting for the past (simple interpolation)" once more for assurance's sake, partly for the purpose of checking our reduced form of model.

Table III and Table IV are the attempt to compare the results of simple interpolation in a progressive course with $N_c, t-1$ of reduced form as the initial value—starting respectively in 1934 before the war and 1950 after the war—with the actual figures. Judging from the way the problem originally posed, we have presented the values only of the two endogenous variables in our model, that are strategically most important, O_c and N_c. As the readers may easily see, their predictive accuracy is very high, and they may take our model as fully useful.

In making a "prediction for the future", it is necessary to have some assumptions. Needless to say, we can set many interesting

TABLE III. COMPARISON OF THE INTERPOLATE ESTIMATE VALUE O_c WITH THE ACTUAL FIGURE (THE ACTUAL VALUE OF 1955 AS 100)

	Estimated O_c	Actual O_c
1933	50.1	47.0
36	52.5	52.6
37	55.4	56.7
38	58.3	59.8
39	60.7	63.2
40	65.3	61.2
51	72.7	70.9
52	77.9	76.2
53	82.1	84.9
54	87.6	92.1
55	96.1	100
56	105.9	107.9
57	114.7	114.7
58	121.9	120.6
59	129.4	150.1
60	138.7	134.4
61	146.3	142.0

TABLE IV. COMPARISON OF THE INTERPOLATE ESTIMATED VALUE OF N_c WITH THE ACTUAL FIGURES (1955 as 100)

	Estimated N_c	Actual N_c
1935	52.9	53.5
36	55.4	57.1
37	59.2	58.7
38	62.9	63.8
39	67.8	64.9
40	78.0	73.0
51	84.8	88.3
52	91.8	91.5
53	92.8	94.4
54	94.7	98.7
55	103.3	100.0
56	107.1	103.4
57	110.2	107.4
58	111.2	112.1
59	115.4	117.5
60	120.1	123.8
61	132.7	130.8

predictions or make an analytical study of policies by experimentally supposing the possible combinations of different exogenous variables. Besides the simple interpolations, we hereby decided to make a prediction and analysis of the two supposed cases: the enforcement of a large scale reduction in armament and the alteration of the investments allocated by the government in different industries. The results are presented below under the general title Table V:

TABLE V[4]

Simple Extrapolations

Hypothesis A:

1. Period of analysis; 1962–1970. We assume R_i, 60 and R_a, 60.
2. Output of arms. O_m grew by 9% (average annual rate of growth) during 1964–1970. Estimated to be 195 for 1963 on the basis of 100 for 1955.
3. O_i grew by 9% (average annual rate of growth) during 1962–1970.

[4] "Ri_{60}, Ra_{60}" and "Ri_{55}, Ra_{55}" in Table V mean the values of Ri and Ra in 1960 and those in 1955 are characteristically very high respectively in those particular years.

4. Total labor force grew by average annual rate of growth, 16% during 1960–70. In this present model, L excludes soldiers and household employees from total labor force. We assume that total of soldiers and household employees are approximately constant at 6.8–7.0 (million) persons.
5. We assume that area of cultivation will reach 237.0 (million) hectares by 1970.

The Results of Estimation (actual figure in 1955 as 100):

		O_c	N_c	O_cN_c
1960	actual	134.4	128.8	109
	estimated from the model	137.8	120.1	115
1966	extrapolated from the model	192.7	171.1	113
1968	extrapolated from the model	213.9	185.4	115
1970	extrapolated from the model	237.2	201.0	118

Evaluation:

According to the simple extrapolation, it seems difficult to expect a large increase in urban real wages.

Effects of the Reduction in Defence

Hypothesis B:

We assume the rate of growth in the output of arms after 1964 to be zero, and as for the others, it is assumed to be the same as in case of simple extrapolation.

The Results of Estimation (the actual figure in 1955 as 100)

	O_c	N_c	O_c/N_c
1966	192.9	158.2	122
1968	214.2	162.8	132
1970	237.8	167.8	142

Evaluation:

Compared with the case of simple extrapolation, the effect of assuming the zero growth rate of the output of arms on urban real wages is large.

Effects of the General Enhancement of Weight in Manufacturing and Agricultural Investment

Hypothesis C:

We assume the investment policy that raises the importance of investment in manufacture and agriculture by cutting investment

in tertiary industry and housing to certain extent. In the investment allotment plan of this sort, it is assumed that R_i, 55 and R_a, 55 are maintained during the period 1962–170. As for others, the investment allotments are the same as in the case of simple extrapolation.

The Results of Estimation:

	O_c	N_c	O_c/N_c
1966	197.5	169.5	117
1968	221.1	183.5	120
1970	246.8	198.7	124

Evaluation:

Compared with the case of simple extrapolation, the rise in R_i and R_a seems to have favorable influence on urban real wages. However, it is doubtful if the actual existing situation will permit a decrease in the investment for tertiary industries or housing.

Influence of the Investment Drive for Chemical Industry

Hypothesis D:

In 1961, the investment in chemical industry was 11.6 hundred million rubles (assumed) and took 3.2% of the total amount of investment which includes the investments for the concentrated planning, non-concentrated planning and the voluntary investment by colhose. If we estimate the investment in chemical industry until 1970, on the basis of the above assumption, the relative weight of industrial investment, consequently the investment, in chemical industry will increase substantially by 1970 even when we assume that the total amount of investment will grow at the average annual rate of 9%. (It is provided here that the relative weights of investment in other sectors of industry are not lowered.) We assume that this rise in the relative weight of industrial investment, R_i, is made possible by the decline in the relative weight of agricultural extrapolation. Other assumptions are similar to the cases of simple extrapolation.

The Results of Estimation:

	O_c	N_c	O_c/N_c
1966	189.8	169.1	112
1968	204.9	179.1	114
1970	217.8	188.5	116

Evaluation:

This estimation is based on the special assumption that the drive in investment in chemical industry affects R_a only. Its effect on urban real wages is rather bad in the case of simple exploration. If put differently, the assumption of simple extrapolations R_i, 60 amounts to telling that the drive in the investment for chemical industry sacrifices the relative importance of investment in other sectors and is managed within R_i. Since, however, it is difficult to cut down the investment in other sectors, and curtail one in housing and tertiary industries, the chances are that the necessary adjustment is made at the expense of the investment in agriculture as happened in this case. If an effective radical change in the chemicalization production function is slow coming, the chemical industry drive would bring rather a baneful influence on urban real wages. But the extent in this case was not so bad as was feared.

As the results of calculation clearly show, Oc/Nc of simple extrapolation, which in the decisive factor in the trend of urban real wages, has risen very little. This is a serious showing as it strikes us as though the wage level has reached its "possible highest level", bespeaking that the urban real wage of the Soviets will never rise markedly in the future, if left alone by itself.

Needlees to say, the value O_c/N_c can not be taken as the index of real wage, as it is. As is shown in Figure 1, it is important that the distribution percentage between city and country (in the Soviets, the supply weight for city has changed very little for the last 35 years, remaining rather constant around 70%.) is considered, when we try to look into the real wage level. Also, it is essential that the soldiers and the household employees are included in calculation. As these factors are difficult to be expressed by coefficient, we have to be satisfied with their rough estimates as presented in Table VI. At any rate, a large rise in the real wage level is not likely to happen.

It is possible, howeve, that the value of O_c/N_c rises fairly high and the real wage turn upward, if some measures are taken to reduce armaments, and the increase in the production of arms, O_m, is suspended. (The urban real wages in this case may be calculated by the same method as one of Table VI, probably showing about 40% rise for the period 1960–70.)

The policy with emphasis on a further increase of investment in industry and agriculture may theoretically somewhat elevate the value of O_c/N_c as compared with the case of simple extrapolation, but the economic conditions of the Soviet at present (For example, the residence

TABLE VI. THE FORECAST OF URBAN REAL WAGE ACCORDING TO THE EXTRAPOLATION OF THE MODEL (ACTUAL VALUE OF 1960 as 100)

	1966	1968	1970
Output of consumer goods	143	159	176
Urban working population (soldiers and household employees excluded	138	149	162
Urban working population (soldiers and household employees included)	134	144	155
Supply percentage of consumer goods to agricultural villages	17.8%	16.3%	14.6%
Supply percentage of consumer goods to cities	82.2%	83.7%	85.4%
Real wage level (in city)	115	122	127

Note: The supply percentage of consumer goods to cities was 76% in 1960. Concerning the time when the Defence reduction was and will be effected since 1964, in other words, when the growth rate of O_m is zero, we tried to see through the future prospect of urban real wage with the same method as above. The obtained results are presented below. (actual value of 1960 as 100):

1966	1968	1970
120	130	141

area per person shrank about 10 per cent in 1961 as compared with the first part of 1920.) can hardly admit such a policy. Suppose the policy like this is forcibly put in effect, the living of the people would be greatly menaced through a further shortage in service and housing.

This dilemma would be tided over, if a miraculous progress is attained in farming and the consumer goods industry is releaved of its hopeless dependence of agriculture for its raw material. Judging from the serious stagnation in agriculture at present, it is natural that some sort of measure be adopted to realize the above objective. The ambitious program "chemicalization" that has been lately launched out should certainly be called a significant adventure to bring about a radical transformation or shift in the coefficient of production itself.

The assumptions R_i, 60 and R_a, 60 of simple extrapolation in Table V is another way of expressing the assumption that the "baneful effects" of the chemicalization drive are managed within R_i at the expense of investment in other industries. But since it is very difficult to sacrifice the investment in other industries, or to cut down one in housing and the tertial industry, we have conceived a possible case of enlarging R_i at the sacrifice of R_a, as is shown in Table V.

Naturally, we expected its malinfluence on the urban real wages, which has prove worse than in case of the simple extrapolation. But its degree was not so bad as was feared.

Of course, there is an ample chance in this area that a more optimistic result may come out according to the change in the productive coefficient of chemicalization. But it is quite possible that the huge investment plan for chemicalization now on foot would bring an adverse influence on the level of urban real wages, if a radical change of the production function through chemicalization should come tardily.

Concerning other endogenous variables, it is possible to attempt some interesting predicts and analyses, but we are unable to go into their

TABLE VII. COMPARISON OF PREDICT VALUES CONCERNING THE MAJOR ENDOGENOUS VARIABLES

	O	O_c	O_a	M	K_i	N_c	N_i	L_a
1966	235	193	164	233	287	171	158	83
1968	270	214	178	263	345	185	170	78
1970	311	237	193	297	413	201	183	73

TABLE VIII. STRUCTURE OF THE WORKER POPULATION, ACCORDING TO THE SIMPLE EXTRAPOLATIONS OF THIS MODEL

	N_c (in million)	L_a (in million)	L (in million)	N_c (%)	L_a (%)	L (%)
1960	55.1	52.1	107.2	51.4	48.6	100.0
1966	76.1	42.6	118.7	64.1	35.9	100.0
1968	82.5	40.2	122.7	67.2	32.8	100.0
1970	89.4	37.4	126.9	70.5	29.5	100.0

Note: (1) Exclusive of household employees.
(2) Actual value for 1960.

TABLE IX

Industrial Labor Productivity (O/N_i, actual values of 1955 as 100)		Industrial Labor and Capital Rate (K_i/N_i, actual value of 1955 as 100)	
1966	149	1966	182
1968	159	1968	203
1970	170	1970	226
Average Coefficients of Industrial Capital (K_i/O actual value of 1955 as 100)			
1966	122		
1968	128		
1970	133		

Note: The forecasting values of industrial babor productivity, capital equipage rate and average capital coefficients are according to the extrapolations of this model.

details here on account of the limitation in space. All we can do is to put together the previously mentioned predict values on the basis of various assumptions of simple extrapolations in connection with some major endogenous variables. They are presented in Table VII. Examining the Table, we get impressed by one thing which is worth noticing, that is, O_a has accomplished a fair growth, and M has gone beyond it.

This not only shows the extrapolated conditions of O_a having made an extensive growth in the period set for the observation of compositional estimate, but at the same time denotes the necessity of the "marketable share of agricultural products" to be largely raised in the future. It is dangerous to directly compare O_a and M, since their coverages differ of each other. But roughly considered, the raising of the marketable share of agricultural products seems theoretically possible, even though the consumption of agricultural products by per farmer may not be reduced, as the farming population has diminished.[5]

This also means the previously mentioned forecasted value of real wage level being derived from the basic facts of the relatively favorable condition in the production and growth of agriculture and the heightened marketing rate of agricultural products. So, the real wage of the Soviet will "hit against its ceiling", or possibly even decline, if the agricultural bad time as happened ih 1963 should come repeatedly and the marketable share of agricultural products should begin to fall.

As was mentioned before, it is possible to calculate and predict the important economic indexes as related to the numerical values given in Table VII. Here are presented the predicts of the capital coefficient of mining industry, the labor productivity and the capital equipage of mining industry and the ratio of working population between city and country. (Tables VIII, IX)

[5] Calculated of the items used for the computation of M index, the marketing rate of M against Oa in 1955 (the government procurement and purchase marketing rate against the net product) was 52.7%. Using this as the basis and utilizing the figures in Table VII, we have estimated the trend of government procurement and purchase marketable share as follows:

1955: 52.7%, 1966: 74.6%, 1968: 77.9%, 1970: 81.3%

Concerning the consuming amount of the agricultural products other than the government procurement and purchase, that is, the amount of products used for farmers' own consumption and for the supply to the colhose market, we have made the following predicts on the basis of above figures:

Actual value of 1955 as 100, 1966 : 88, 1968 : 83, 1970 : 76.

Compared these with the trend of La presented in Table VII, we have found that it is not so necessary to cut down the consuming amount for one's own self per farmer.

In spite of a markable rise in the labor and the capital rates, labor productivity exhibits a relatively small ascent, and as its reflecting corollary, a rising trend in capital coefficient. This "high degree growth in productivity level and the relatively small ascent in real wage level" is another way of representing distinctly the unbalanced feature of the Soviet economy. It is seriously significant to know that a prediction can be made of a further decline in the ascent rate of real wages relative to the rising trend of productivity.

Concerning the fluctuation in capital coefficient and the rate of labor share, author explained in the January Issue of this magazine, 1963. As described by the well-known Aruzumanin Essay, published in June Issue of the *Communist Bloc Problem*, 1964, the elevation of consumption level can not be expected without the lowering of capital coefficient. This is an issue which goes beyond the ken of the production function of which the model had assumed to deal, and this is the point which the new economic policy of the Soviet should try to seek its possible solution.

TABLE X. THE INTERPOLATE ESTIMATE VALUES OF K_a AND K_i

(With 1934 and 1955 as the initial value estimating points respectively of the pre-war and post-war time, a comulative calculation was made.)

	K_a		K_i	
	Estimate value	Actual value	Estimate value	Actual value
1935	38.8	39.1	23.0	22.7
36	42.0	41.6	26.1	25.0
37	45.5	44.4	28.9	27.3
38	48.9	49.2	32.0	30.6
39	51.7	50.4	35.0	33.6
40	55.2	50.7	38.7	37.6
1951	59.4	60.7	63.8	64.4
52	65.4	67.7	71.2	71.7
53	72.1	74.6	79.2	80.7
54	80.4	85.0	87.9	90.0
55	91.2	100	98.0	100
56	105.2	117	109.0	111
57	118.9	129	120.5	125
58	133.7	141	133.0	134
59	149.3	157	157	144
60	165.3	170	162.3	163
61	182.0	—	178.8	—

This study of ours makes no pretense to discuss on the fluctuation in the predict values of the growth rates of various economic indexes, as this primarily aims at elucidating on the "unbalance between the production level and the real wages." And we think we have been fairly successful, as we consider the mechanism of "unbalance" has been both theoretically and positively clarified.[6]

4. AN EVALUATION OF THE POLICY

Through the analysis above, it has been established that the economic level of the Soviet (including the living standard as well as the production level) as promised by Khrushchev could never be realized, unless a fairly large reduction in capital coefficient is accomplished. The key to the attainment of this objective depends on how far the Soviet would succeed in her chemistry encouragement policy.

Of course, by rectifying some weaknesses in her administration (for example, the adoption of profit rate system) they may be able to change the situation for better. But there is no denying that the reduction of capital coefficient through the chemicalization of industry and the efficiency enhanced by the use of plastic substitutes would play important roles in this connection. The prediction like this is quite tenable in the light of some factual evidence from advanced countries in Europe. According to the investigation by the Ministry of International Trade and Industry, the marginal capital coefficient was 2.33 for the 20,000 ton scale of ethylene, while it was reduced to 1.78 if applied with 100,000 ton scale of ethylene. Really, the decline of capital coefficient as a result of effective chemicalization of industry in Europe is remarkable.

It is risky, if we expect the same could be said of the Soviet, as it appeared in other countries. It seems, however, quite possible that this same technical phenomenal relationship will occur to some extent in the Soviet, as her investment in chemical industry increases.

Another thing which we are looking forward to in the chemicalization program in industry is the substituting value of plastic manufactures. In Europe and America it is generally considered it possible to cut cost by one-third by using plastics, according to a report of the Society of Plastics Industry. Bushuev expresses his expectation in the

[6] Haruki Niwa: "Simple Economic Model of the Growth of Soviet Economy (revised)", *Sociology Department Bulletin*, November 1964, Kato and Niwa: "Analysis of the Growth of Soviet Planned Economy by a Simplified Econometric Model", *The Japan Economic Policy Association Report*, May 1964.

Communist, No. 1, 1964 of plastics substituting metal goods and being capable of reducing cost by one-second or one-third.

As of 1963, the plastics production in the Soviet was 5,800,000 tons, that is, as small as 2.5 kg consumption per person. (in 1960, 13.8 kg in the United States and 7.1 kg in Japan) She is trying to increase it to 3,500,000, tons or 4,000,000 tons per year by 1970. If materialized, it will be 14 kg per person, reaching 1960s' level of the United States.

The third of which the Soviet expects much is a larger supply of food through the increase of chemical fertilizer. To bring the fertilization to the same level as East Germany requires about 10 times more production. The increase target for 1970 is set only at four times that of 1963. One can not expect a speedy gain in this field either.

Having surveyed all the possible means which may help chemicalize the Soviet industry, we come to think that the best program in the chemical industry encouragement policy will be the economy in expenditures. (Generally, chemical industry is considered to take about 10 per cent of all the industries. On the assumption that about 30 per cent economy in chemical industry is possible, the industry as a whole will save about 3 per cent of their expenditures.) So, after all there is very little hope of whatever policy may be taken. Probably the reallocation of investment and the reorganization of economic system will be eventual inevitabilities.

The revised model, No. 4, is developed by Haruki Niwa of Kansei Gakuin University. Reference in his work, "Review" (published by Oa Kyokai, the association of Communist Bloc Studies).