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REVIEW: WIDENING HORIZONS IN SOVIET ECONOMIC THOUGHT

Soviet interest in contemporary Western economic thought has intensified recently. Sharply criticized this year for "lags" in their support of the planners, Soviet economists are interested not only in better understanding of Western economies and in comparison of their growth with Soviet economic growth, but also in "borrowing" and adapting certain theoretical tools used by Western economists which may be of use in improving the efficiency of the planning process. If the USSR can adapt these new mathematical techniques and formulas to its own economic problems, it will be able to make better use of the high-speed electronic computors only recently made available to its economic planners

Increasing Western Contacts: Increased Soviet interest in Western economic science shows itself in the participation of Soviet economists in international meetings, the favorable reception given some Western economists in the USSR, and the publication in Russian translations of various Western works on economic theory. This summer a Soviet delegation, led by A. I. Petrov, deputy director of the Economic Research Institute of USSR Gosplan (the State Planning Committee), played an active role in a conference of European economists at Geneva on the comparability of systems of national economic accounts. An official exchange delegation of Soviet economists interested in the American economy is expected soon in the United States.

Western economists visiting the USSR appear to receive special attention if their known specialities are deemed relevant to Soviet economic problems and their solution. Professor Wassily W. Leontief of Harvard--renowned for his development of the so-called "input-output" technique of interindustry analysis now being considered for adaption for use in Soviet economic planning--was received with considerable warmth and invited to give a series of lectures. A translation of his book on this technique was issued while he was in the USSR. John Montias of Yale and Herbert Levine, an economist from Harvard's Russian Research Center who is familiar with Western economic applications of mathematics, also were given opportunities to talk with top Soviet economists.

Although the USSR and most other bloc countries failed to participate in a recent international conference on income and wealth held in Yugoslavia--perhaps because of the cool relations between Yugoslavia and the bloc--the Soviet Government invited a number of French economists and statisticians who had participated in the Yugoslav conference to visit the USSR in late September "to discuss problems of measuring economic growth."

Reasons for Soviet Interest: Three principal reasons for the current Soviet interest in Western economic science stand out. In the first place, knowledge of Western economic science increases Soviet capabilities to interpret statistics, make predictions about the economies of Western countries, and assess the relative economic positions of the "capitalist and socialist camps."

The economic competition with advanced Western economies also necessitates increased understanding--if not acceptance--of Western economic concepts. At the Geneva economists' conference, Petrov, despite the demurrers of several satellite delegates, proposed that the next conference consider the problem of comparison of prices for specific products in various countries. This, in turn, could lead to a comparison of the volume of production for various countries, perhaps in terms of some international currency.

In other words, the USSR seems interested in setting ground rules for judging the race between the USSR and the United States in industrial production by prior agreement and understanding among economists and statisticians. To achieve this, the USSR may find it necessary to furnish Western economists with somewhat more complete Soviet methodological and statistical data.

Perhaps the most important and pressing reason for Soviet interest in Western economic science, however, is the officially alleged "lag" in Soviet economic science. This lag seems to make Soviet economists eager to "borrow" and adapt to their own use certain theoretical tools used by Western economists. At the 21st party congress early this year, A. N. Nesmeyanov, president of the USSR Academy of Sciences, charged that the solution of important economic problems "clearly lags behind the demands of the rapidly developing national economy and the topical issues involved in the building of Communism."

I. I. Kuzmin, then still chairman of USSR Gosplan, told the congress that "many scientist-economists stand aside from the solution of the most important practical problems." He reviewed some of the urgent problems confronting Soviet economists, including the problems of developing transport, "expanding economic collaboration with socialist states," determining the economic effectiveness of capital investments, and accelerating technical progress.

In particular, Kuzmin noted that "many methodological problems pertaining to drawing up a balance sheet of the national economy have not been sufficiently studied." Such criticism may be attributed in large part to the inconsistencies in planning which seem to have contributed to the difficulties of implementing the now superseded Sixth Five-Year Plan. The economists allegedly failed to provide the planners with adequate and effective tools.

Regime Action: Besides encouraging economists to look for what could be borrowed from the West, the Soviet regime this year undertook organizational measures to cope with the "lag" and to facilitate introduction of new techniques, Soviet or Western, in economic analysis. Changes in administering economic research included establishment of a separate Economics Department of the USSR Academy of Sciences and the creation of a State Scientific-Economic Council of the USSR Council of Ministers under Kuzmin. The new council reportedly has responsibility for guiding and coordinating economic research and theoretical work relevant to the further development of the Soviet economy.

Construction of a new Siberian Department facility of the USSR Academy of Sciences is already under way near Novosibirsk. This facility is to comprise a complex of institutes, including an economics institute, and when completed will be supported by a modern high-speed electronic computer which will permit the use of sophisticated mathematical and statistical approaches. Western economists have been told that Novosibirsk will be the center of a new and major effort in Soviet analysis of interindustry and interregional economic relations.

The increasing pressure placed on "lagging Soviet economic science" to provide support to the planners in the solution of problems seems already to have softened the almost theological

approach to Marxism which has characterized theoretical work by Soviet economists in the past; in comparison, recent economic policy has been remarkably flexible and pragmatic. The regime has initiated programs and set tasks whose implementation may well force Soviet economic science further out of its rigid theoretical dogmatism.

AN EXAMPLE OF A MATERIAL BALANCE AS USED IN THE USSR

SUMMARY INTERREPUBLIC BALANCE OF (Commodity) FOR 1960

[illegible]

	[illegible]	[illegible]	Of Which, By Union Republics: [illegible]	[illegible]	[illegible]	Other Republics	Imports	Other Receipts
Total Receipts	1500	1650	930	325	150	295	100	50
[illegible]	1300	1200	[illegible]	[illegible]	100	200	--	--
[illegible]	--	150	--	--	-	-	100	-
[illegible]	150	[illegible]	--	-	-	--	--	50
Balance at Beginning of Year								
At Suppliers	270	300	147	[illegible]	30	50	--	--
[illegible]	180	200	[illegible]	50	10	45	--	--
Total Distribution	1500	1650	930	325	150	295	100	50
For Production and Investment Programs of Union Republics	680	840	425	150	75	100	100	50
RSFSR	210	300	210	45	--	--	20	25
Ukrainian SSR	136	250	55	65	75	-	30	25
[illegible] SSR	60	75	40	--	--	35	--	--
[illegible] SSR	30	25	15	10	-	-	--	--
[illegible] SSR	25	30	25	--	--	5	--	--
Azerbaydzhan SSR	50	60	60	--	--	--	--	--
Lithuanian SSR	20	30	--	2	--	6	20	--
Latvian SSR	40	50	--	7	--	35	20	--
Tadzhik SSR	25	30	20	--	--	--	--	--
Estonian SSR	30	40	--	1	-	29	10	--
Deliveries for All-Union Needs	470	520	315	60	45	60	--	--
For Production and Investment Programs of Union Ministries and Departments	250	270	150	50	25	45	-	--
Market Stocks	45	50	15	[illegible]	10	15	--	--
Exports	30	40	40	--	-	--	--	--
State Reserves	30	35	25	--	--	--	--	--
Other Expenditures	20	25	25	-	--	--	--	--
Undistributed Reserves	95	100	50	20	10	20	--	--
Balance at End of Year								
At Suppliers	250	200	90	45	20	45	--	--
At Consumers	200	210	100	70	10	70	--	--

91014 5B UNCLASSIFIED 15 OCTOBER 1966

Mathematical Approaches: In view of the emphasis on mathematics in Soviet scientific training and research, new approaches--both native and borrowed--in Soviet economic thought seem to rely heavily on mathematical techniques. This is facilitated by the existence of the comprehensive system of statistical reporting administered by the Central Statistical Administration, and this system is reportedly being adapted to the needs of the new methods.

New approaches are based on past and present planning practices involving working out "balances" for material-technical supply. These specify in physical terms the availabilities and allocations of particular commodities for the plan period. Such techniques are used to determine the internal consistency of plan drafts.

The problem of integrating these separate balances into a single system or plan has confronted Soviet planners for decades, but the recent availability to Soviet planners of advanced computers, coupled with the increased complexity of the expanding Soviet economy, have prompted development of improved techniques to cope with the problem. Since a Moscow conference of statisticians in mid-1957, Soviet economists have mounted a major effort, originating, borrowing, and adapting methods for achieving consistency in plans broader than for a single commodity. Leontief's input-output techniques have been given particularly close attention.

Input-Output Techniques: Potential Soviet application of input-output techniques in planning differ from the usual Western use of these methods, i.e., analysis of past relations among parts of the economy. The problem confronting Soviet planners is: Given the relations among industries (and desired changes in these relations), what are the possible combinations of production targets for various industries and activities which can best implement the economic policies and programs of the regime and enable it to attain its principal goals?

On the other hand, the usual problem confronting Western economists in their use of these techniques is: Given the production and sales statistics of a group of industries and activities for a certain period, what is the pattern of relationships that these statistics imply? The Soviet problem thus involves factors beyond those usually incorporated in Western work.

INPUT-OUTPUT ANALYSIS

INPUT-OUTPUT ANALYSIS is a method of studying the interdependencies among "industries" or differentiated activities of an economy; it is particularly useful for the study of large and complex modern economies marked by a high degree of industrial specialization. Transactions among industries are arrayed systematically on a "transactions table" which summarizes in simplest terms the flows of goods and services among industries within an economy for a given period, usually a year.

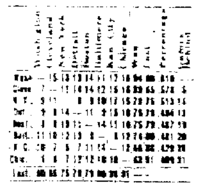
Such a table implies a set of "input-output ratios" detailing the amounts of various inputs necessary to produce a unit of output for each industry. These ratios may be arrayed into a "technology table" arranged like the transactions table. The technology table then reflects the "technology" or pattern of "structural relationships" which governs production in the economy for the period under consideration. If the transactions table has been expressed in value terms, the technology table can be used to show the amount paid by any industry to other individual industries to purchase the intermediate goods needed for its own production. It is possible, for example, to see how many pennies the auto industry spent for steel for every dollar's worth of autos it produced during the period.

The technology table is an especially powerful tool for planners. If the planners, say, wish to increase the output of autos by 50 percent in the coming plan period, the technology table gives them a means to check their plans for steel output with the planned increased auto output to forestall possible raw material shortages. (They might also check the "second order" effects of an increase in steel output on their plans for the output of coal.)

If portions of the technology table itself are altered --say, less steel per auto is to be used, either because of new design or greater efficiency in fabrication—the new input-output ratios can be used for planning.

Complete mathematical "solution" of the system of equations implied by these tables --a step adding considerable refinement to their use--calls for numerous computations, running into the millions if industries are differentiated in sufficient detail to yield useful planning data. Timely solution, of course, requires high-speed electronic computers.

INPUT-OUTPUT TABLES are first cousins of the familiar baseball "won-lost" table that shows at a glance how many games each team in a league has won and lost in its play with each of the other teams in the league.



THE TWO BASIC TABLES

At least the "transactions table" and the "technology table" must be worked out for even the simplest interindustry analysis. Although tables useful for planning purposes would need perhaps hundreds of "industries," brief, truncated tables of as few as three industries can be used for some purposes.

In the simple illustrative input-output tables below, interindustry relations are depicted for only three of the many industries of a hypothetical complex modern economy for a single year. Note that flows within an industry are ignored--an industry's purchases from itself are shown as zero. This particular hypothetical economy is assumed to carry on no foreign trade.

TRANSACTIONS TABLE
(billion dollars)

PRODUCING INDUSTRIES / PURCHASING INDUSTRIES	Coal Mining	Steelmaking	Auto Mfg.	Other	[illegible]	Output
Coal Mining	0	50	10	60	[illegible]	[illegible]
Steelmaking	[illegible]	0	70	130	0	205
Auto Mfg.	10	15	[illegible]	[illegible]	220	[illegible]
Other	[illegible]	[illegible]	125	[illegible]	[illegible]	[illegible]
Primary Input	100	55	[illegible]	[illegible]	[illegible]	[illegible]

The Transactions Table arrays the flows of goods and services between "industries" of an economy. In this case these flows are measured in dollars for some year. The "Households and Government" column represents final demand; the "Output" column gives total sales of the particular "industry." Consider the steelmaking industry: it sold $70 billion worth of steel to the auto-manufacturing industry; it sold no significant amount of steel to final consumers; its total sales were $205 billion, of which $130 billion were transactions with other industries not specified on this truncated table. "Primary input" is labor.

MATCHING TECHNOLOGY TABLE

PRODUCING INDUSTRIES / PURCHASING INDUSTRIES	Coal Mining	Steelmaking	Auto Mfg.
Coal Mining	.000	.244	.032
Steelmaking	[illegible]	.000	.222
Auto Mfg.	.067	.073	.000

The Technology Table arrays the inputs per unit of output (in this case, $1) implied by the transactions table. To keep the table simple, only the three "industries" under study have been included. Once again consider the steelmaking industry: for every dollar's worth of steel it produced (and sold), the table shows that it spent over 24 cents on purchases from the coal-mining industry and over 7 cents on purchases from the auto manufacturing industry, in the first instance probably for coking coal and in the second perhaps for trucks.

PROBLEMS AND PITFALLS

How broadly to define "industry." Sectors of economic activity may be defined broadly or narrowly. If highly differentiated, say on a single product basis, with thousands of "industries," tables become massive and computation cumbersome. On the other hand, if broad definitions are applied, such as "manufacturing industry," the resulting analysis has little relevance for operational planning. Present Soviet efforts may involve tables as large as 1200x1200, but are more likely to utilize tables of less than 200 industries (a 200x200 table).

Problem of relative prices. For many applications it is useful to have the transactions table expressed in a common denominator (as in the sample table to the left, which uses dollars). This means that physical flows of goods and services must be "priced." Distortions in relative prices may arise from several practices--for example, charging different purchasers different prices for the same item or service, or using "going" prices when these involve several different relative price patterns. Planning implementation would be complicated if the pattern of values used by the planners deviates widely from the scale of values of purchasers.

The data problem. In US applications of input-output analysis, the task of obtaining adequate data has generated long lags between the year studied and the completion of a transactions table for that year. Soviet input-output analysis, with the pervasive reporting and compilation efforts of the Central Statistical Administration, may be much more timely.

Making the analysis "dynamic." Any but the crudest and simplest planning applications require use of "dynamic" techniques, especially taking account of and planning for changes in the technology or structure of the economy. The methodological and statistical complications of this task are formidable. Accurate forecasting of the efficiency of operating new capital equipment not yet installed is only one aspect of this complex task. Soviet planners will continue to rely heavily on adjustments in the course of plan implementation to correct for miscalculations in the initial plan.

93012 5A UNCLASSIFIED 15 OCTOBER 1966

The extensive computations involved in these techniques are manageable, however, with the use of advanced computers. The principal problems confronting Soviet workers in using these techniques probably involve the suitability for those purposes of the existing data and of the data-collecting techniques and also the problem of reducing measurements of the flow of goods and services to a common accounting unit. The existing structure of Soviet relative prices may be found inadequate for this purpose.

Soviet "Operations Research": While striving to perfect overall national planning by new mathematical techniques, the planners are not overlooking potentialities in these techniques for improving planning in areas of smaller scope. Mathematical approaches, similar to those associated in the West with "operations research," are being utilized increasingly by Soviet planners, economists, and engineers for the solution of detailed and complex production problems, especially those arising from the scheduling and programming of automatic-line production. Such applications, in turn, could aid the development of improved national planning.

The provision of digital computers for automatic control of production may well furnish facilities and experience suitable for adaptation to much wider planning applications than those initially conceived.