THE SOVIET ECONOMY: TOWARD THE YEAR 2000

Edited by Abram Bergson and Herbert S. Levine

The Soviet Economy:
Toward the Year 2000

Edited by
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and

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Preface

This volume presents in revised form the proceedings of a conference held at Airlie House, Airlie, Virginia, October 23–25, 1980. The conference, which was sponsored and supported by grants from the National Council for Soviet and East European Research and the National Science Foundation, had as its theme the long-term prospective growth of the Soviet economy.

It is now more than 60 years since the Bolshevik Revolution, and over 50 years since the initiation of Soviet Russia's First Five Year Plan. On the eve of that plan, the Soviet economy had more or less completed its recovery from the losses inflicted by World War I, two revolutions and a civil war. Under the plan and its early successors, the Soviet government proceeded to transform the USSR from a relatively backward and still overwhelmingly agricultural country into one in which industry would be predominant. Despite World War II, that effort was already far advanced by the mid-fifties when, for example, over half of the Soviet labor force was employed outside agriculture.

More recently, as further plans have unfolded, the economy of the USSR has continued to advance, but growth has slowed, and signs abound that the forces making for retardation are potent. Such a slowdown in an economy advancing toward a late stage of industrial development, though hardly unknown, has perhaps not been as characteristic in the West as often supposed. At all events, this seemed to be an opportune time to inquire into the nature of the conditioning factors that lately have been shaping economic growth in the Soviet case, and to try to gauge to what extent, if at all, they will continue in future to be weighted in the direction of growth retardation.

In appraising prospects, participants were asked to take as a horizon the year 2000. No literal depiction of the state of the Soviet economy in that year was expected, and none has been provided. The concern rather was simply to assure a common focus on a lengthy interval such as the turn of the century demarcates.

In pursuing our theme, participants were asked wherever feasible to base their projections on a review of past trends. In view of inevitable uncertainties about the future, it was felt that the participants might often be able to contribute to the appraisal of prospects chiefly by systematically elaborating previous developments. There seemed generally to be little to be gained at this point, however, from pushing such investigations back more than two or three decades.

An inquiry such as was envisaged would, it was hoped, also contribute by shedding further light on the Soviet growth process at an advanced stage. Concerning that process there is now a sizable literature, but almost unavoidably it has often become increasingly dated, as the Soviet economy has become ever more extensively industrialized.

How the Soviet economy will evolve in the period ahead will depend on diverse circumstances, including not least the possible involvement of the USSR in a major war. What might happen to the Soviet economy should the USSR in fact be involved in such a conflict is an interesting question, but to explore it seemed to be a task properly left to another occasion. Granting that, however, the question remained open as to how Soviet defense outlays in future might compare with those of the recent past. While participants were expressly left to decide for themselves what assumptions might be appropriate in that regard, it was hoped that the implications drawn would contribute to evaluation of how plausible the assumptions had been to begin with. Such defense policies necessarily became a prime concern in one particular essay, that on politics and priorities. Participants were also left to determine appropriate assumptions on other matters. They were asked, though, to explore variants where that might be illuminating.

To our great regret, space did not permit inclusion in full, in this volume, of formal comments on main papers that were submitted at the conference. Thanks largely to the efforts of Holland Hunter, however, a summary of such comments has been prepared which appears here as a supplement to the main papers. This summary also covers some of the informal exchanges that took place at the conference, but in the space available it can not really do justice to that most stimulating discussion. The omission of the bulk of such exchanges is the more regrettable since several of the participants, attending the conference as general discussants, could not be otherwise represented in this volume. We refer particularly to Morris Bornstein, Keith Bush, Walter Connor, Evsey Domar, and Erich Klinkmüller. Holland Hunter also participated as a general discussant. Leslie Dienes, in revising his paper for publication, fully incorporated the comments of Vladimir Treml on the version that was presented at Airlie House.

Editing proceedings of a conference for style is apt to be a notably difficult task. If, nevertheless, this volume should prove unusually free of stylistic lapses, that is very largely due to the exemplary skill and devotion manifest by Truus Koopmans in editing the entire manuscript for the press. Warmest thanks are also due to Elizabeth Goldstein who did much to lighten our task in organizing the conference.

Cambridge, Massachusetts
and
Philadelphia, Pennsylvania
November 1981

Abram Bergson
Herbert S. Levine

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1

An Overview

DANIEL L. BOND and HERBERT S. LEVINE

Time present and time past
Are both perhaps present in time future,
And time future contained in time past.
T. S. Eliot "Burnt Norton"

Introduction

While our paper begins this volume, it could just as well have been the volume's summary paper. For, indeed, the paper is more in the nature of a summary than it is a forecast. In it, we use the framework of our Soviet Econometric Model (SOVMOD) to draw implications for the economy as a whole from individual sector and other partial projections set forth in later chapters.

Since the model embodies a set of accounts and relationships embracing the entire economy, it serves to enforce consistency among the independent sectoral projections presented in individual papers, and to help bring out their implications.[1] A prime illustration of this is the calculation in SOVMOD, through its energy demand component, of the energy-consumption and foreign-trade consequences of the model's projections of domestic growth, and the energy- and fuel-production forecasts made by experts on Soviet energy. These consequences are perhaps surprising, or at least rarely noted in the literature on the future of the Soviet economy. They illustrate the important principle that projected difficulties affecting an economy are not necessarily additive. In fact, it often happens that one set of problems alleviates another set of problems.

The approach we take in this paper, which is more in the nature of what could be called prospective analysis than forecasting, is necessitated by the long time period over which the analysis is being conducted.[2] In any projection or forecast the attempt is made to distinguish relationships and trends that are more or less invariant over the relevant time period from those that can be affected by uncertain events and by policy decisions of central leaders. In short-term

forecasting, the uncertainties are usually sufficiently limited so that the projections produced by a model like SOVMOD can be viewed with some confidence. But as the time period lengthens, the uncertainties increase, and the sensible use of a macromodel shifts from forecasting to prospective analysis. In this mode, the total-system-consistency property of the macromodel is used to produce a "reasonable" projection of the economy (a baseline), and then alternative assumptions about the course of uncertain events and policies are used to construct alternative projections (scenarios) that can then be compared with the baseline projection for analysis of differences or similarities.

This shift in role has required a number of revisions in the structure of SOVMOD from earlier versions that were designed primarily for medium-term studies. In essence, SOVMOD has been sufficiently altered so that it can be used more in a simulation mode than in the forecasting mode, which has marked its previous use. In making these alterations, less attention was given to the depiction of short-term response patterns which play an important role in other versions of SOVMOD, and greater emphasis was placed on introducing the detail and structural specifications necessary for ensuring consistency among forecast values over the long term. By consistency we mean that through the model we attempt to explicitly define the supply of factors and goods, the demand for these factors and goods, and the process by which the two are brought into balance. These issues are discussed in detail in the next section of the paper.

In the third section of the paper, the baseline projection is described. Sources and assumptions used in setting the values for key exogenous variables are discussed. This is followed, in the fourth section, by the construction and discussion of several alternative scenarios. The paper ends with a brief set of conclusions.

In developing the baseline projection we have attempted to use, as much as possible, the information and opinions on the likely future of the Soviet economy provided in the other papers, while, at the same time, providing a depiction of Soviet prospects that is neither overly optimistic nor pessimistic. This is important in that, when alternative projections are prepared and compared with the baseline case, we want to be able to discuss cases that suggest possible sources of better performance for the economy, as well as cases that assume more stringent limitations on future growth.

1.1 Structure of the Model

As stated in the introduction, the economic issues examined in this paper have been explored through an econometric model of the Soviet Union (SOVMOD), created at the University of Pennsylvania by a joint effort of Stanford Research Institute (SRI) International and Wharton Econometric Forecasting Associates, Inc..[3] The version of

the model used for this study (SOVMOD IV), is a modified form of the original family of models and has been created especially for use in long-range forecasting. The main features of this model are briefly described below.

Before moving on to that description, however, it should be noted that the model itself is only one ingredient in the process of economic analysis and forecasting. The elaboration of a model projection is an interactive process between the model and the analyst. Frequently, the skill and judgment of the analyst are the most important factors in obtaining a valid projection. The model serves as a framework for superimposing regularities observed in the past upon the future while preserving a certain degree of consistency. The analyst must judge when and make explicit why past regularities should be relaxed and/or additional consistency should be imposed upon the model solution. For this study the authors have attempted to draw from the work of the other contributors to this volume, and wherever possible to use their expertise in setting projected values for exogenous variables and adjusting the baseline forecast when appropriate to fit their analyses.

There are advantages and weaknesses in using an econometric model like SOVMOD for analyzing Soviet economic trends. The major advantage: the results reflect a comprehensive, integrated, internally consistent model of the Soviet economy rather than an analysis of a single sector or several sectors loosely related in aggregative terms. In addition, since the model is an interdependent system of technical and behavioral relations, the analysis is able to encompass, in quantitative terms, the indirect as well as the direct effects — the total system impact — of the various assumptions under consideration in the alternative scenario projections.

At the same time, the limitations of the model should be recognized. Excessive precision should not be attributed to the results of the projections. Any projection reflects, to a great extent, the judgment and insight of the analysts and not merely the mechanical number-processing power and precision of the computer. It must also be added that, since the model has been specified to reflect past behavior or trends in the Soviet economy, if the basic structure of that system changes radically it is unlikely that the model will provide much guidance in projecting the future states of that system.

A. *Factor Allocation*

Theoretical analysis of the Soviet centrally planned economy considers the supply (production) side as dominant in contrast with the emphasis on demand factors in the analysis of Western market economies. Thus, broadly speaking, the direction of major causality in the model runs from fully employed inputs (labor and capital) through the production process to final uses.

Two very important variables in the model are total population and available labor force. Population is an exogenous variable and we have

used the projections presented in Murray Feshbach's paper. For the baseline forecast we have also used Feshbach's assumption of a constant labor-participation rate of 88% (of the able-bodied population) in order to obtain values for the total labor force.

The first step in the simulation process is to allocate the total labor force among the various sectors and branches of industry used in the model. Six main sectors are identified, which are:

Agriculture
Industry
Construction
Transportation and Communications
Trade and Distribution
Government, Housing, and Other Services

Industry is divided into the following twelve branches:

Electric Power
Petroleum Products
Coal and Coal Products
Ferrous Metals
Nonferrous Metals
Chemicals
Machine Building and Metal Working
Forest Products
Paper and Pulp
Construction Materials
Textiles and Apparel
Food Products

In the model, the share of labor going into each sector or branch is determined as a function of a log time trend, with parameters estimated by using data for the last ten years. This specification has the convenient property of insuring consistency throughout the forecast period between total labor supply and the sum of sectoral employment levels. Of course there is little in terms of explanatory or predictive content to such equations, except that the inertia in the system of labor allocation is very strong — as is reflected by the close fits observed in such equations over the historic period of the last decade. To allow for simulations where the allocation of labor is set differently from that predicted solely on the basis of trends, adjustment terms are included in each equation that allow the model user to adjust the pattern of labor distribution but still retain the necessary consistency between the aggregate and sectoral allocations. For the baseline projection, however, no adjustments were made, and it, therefore, reflects continuation of current trends in labor allocation.

A similar approach is used in allocating total investment among sectors. However, in the baseline projection the adjustment options

were used to direct greater investment into the fuel and transport sectors to correspond to the forecast presented by Robert Campbell in this volume that investment in these sectors would rise to levels observed in the "pre-oil" period of Soviet development.

The final step in the factor-allocation process is the conversion of the flow of investment into capital stock. This process is modeled using econometrically estimated functions relating net capital formation to current and past levels of investment in the sector, with allowance made for depreciation of existing stocks.

B. *Agriculture*

The agricultural component of SOVMOD is described in detail in Green (1979). Crop and livestock production are treated separately, with further disaggregation provided for forecasting the volume of grain and meat output.

"Normal" output of total crops and total grain (for which historic time-series values are obtained by interpolating between levels of output in years of moderate harvests) is determined using production functions in which the independent variables are land, labor, capital and current purchases (primarily fertilizer). The deviation of actual output from these "normal" output levels is then explained by three weather variables — spring and summer precipitation, winter temperature, and winter precipitation (snow cover).

The outputs of total animal products and meat are determined by the size of the herd and the amount of feed available for livestock. The ratio of feed supply to herd size varies with the state of the harvest. A key policy variable in this area is the rate of growth of the livestock herd. For the baseline projection an average annual rate of growth of 1.5% was used. This is a rather modest rate of growth, and would reflect a retreat by the Soviet leadership from their earlier, rather ambitious plans to increase domestic meat production.

Total agricultural production is the aggregate value of crops and of animal products with feed, home-produced or imported, subtracted.

A rather difficult problem facing the modeler of Soviet agriculture is the prediction of future weather conditions. One frequent approach is to assume average weather conditions for each year in the projection period. But this removes a major structural relationship from the analysis of Soviet agriculture, i.e. the impact of variable weather on the grain-harvest–feed–livestock–meat nexus. We have "solved" this problem by introducing variable weather in our projections through the use of historic weather conditions for the forecast period. The actual weather pattern from the period 1958 to 1978 was used to set values for 1980 to 2000 (with the sequence of yearly observations disturbed only where it was necessary in order that each five-year benchmark reported in our tables would be a year of fairly normal weather).

The agriculture component in SOVMOD has been expanded by the

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