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CENTRAL INTELLIGENCE AGENCY
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INTELLIGENCE REPORT

Investment And Growth In The USSR

Introduction

One of the principal features of Soviet economic development has been the government's policy of investing the maximum possible amount of the national product. This report explores the possibility that this traditional investment policy is no longer capable of providing the rate of economic growth desired by the Soviet leadership. After World War II, this policy for a time met with much the same sort of success in promoting high rates of economic growth as it had before the war. In the process, however, the investment rate (investment in buildings and equipment expressed as a share of gross national product) increased from 12% in 1950 to 23% in 1960. Since 1960, it has grown more slowly -- to about 26% in 1969.

The steady rise in the investment rate during the 1950s brought about a very rapid increase in the stock of capital in the economy. At the same time, output grew almost as rapidly, so the ratio of capital to output remained at a fairly low level. According to Simon Kuznets, a leading student of comparative economic development, "... the distinctive feature of the USSR record is that so much capital formation was possible without an increase in the capital-output ratio to uneconomically high levels."* He was referring to growth prior to 1958. The USSR now seems to have lost that distinction.

* Economic Trends in the Soviet Union, Ed.
A. Bergson and Simon Kuznets, 1963, p. 357.

Note: This report was produced solely by CIA. It was prepared by the Office of Economic Research.

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In the 1960s the growth of output of industry, construction, and national income, as announced by the Soviet government, slowed dramatically. The growth in capital stock also declined, but not as much as the growth of output. The resulting fall in the ratio of output to capital was noted by Soviet politicians and technicians alike. Such a decline in the return on capital investment threatened the basic Soviet strategy of economic development. The economic difficulties of this period contributed to Khrushchev's fall from power in 1964 and led to the promulgation of Kosygin's reforms in 1965. At first, Khrushchev's successors tended to treat the decline in the output/capital ratio as a temporary phenomenon resulting from Khrushchev's bad management. More recently, they have reluctantly recognized that a turning point has been reached in the method of achieving economic growth.*

The role of investment and capital in Soviet economic growth is explored in this report by means of an aggregate production function. A production function is a relation between inputs -- usually capital and labor -- and the resulting output, or production. Production functions of one kind or another are often used for medium-range economic forecasting, but in previous work

* *The gist of the leadership's remarks to the December (1969) plenary meeting of the CPSU Central Committee has been reported as follows: "The definite reasons for our difficulties are essentially connected with the fact that we have entered a stage of development that no longer permits us to work in the old manner but demands new methods and new solutions The raising of the effectiveness of social production has indeed become the key problem, primarily because the main factors in our economic growth have changed. If we were previously able to develop the national economy primarily by quantitative factors, i.e., by increasing the number of workers and by high rates of accumulation of capital investments, then henceforth we must count primarily on qualitative factors of economic growth, on raising the effectiveness, the intensification of the national economy." (Pravda, 13 January 1970, p. 1.)*

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on the USSR both the general form and the precise characteristics of the relationship between output and inputs have been usually assumed or specified by analogy with Western practice.

In this report a relatively new form of production function is fitted statistically to the Soviet postwar experience. This function -- known as the Arrow-Chenery-Minhas-Solow function after some of the economists who first proposed it -- has the characteristic of allowing for rapidly diminishing returns to capital. This function is compared with production functions previously used for forecasting Soviet economic growth. The various functions are then used as a basis for discussion of the following questions:

- a. What return on investment can be expected in the USSR in the coming years?
- b. Can the USSR rely on an upswing in the growth of investment -- perhaps at the expense of military expenditures -- to restore the rates of economic growth achieved in the 1950s (or mid-1960s)?

The production functions in this report are based on the past performance of the Soviet economic system -- in particular, on the past efficiency of its economic organization and on the past rate of adoption of new technology. If the USSR were to be more successful than in the past in its efforts to reform economic management or to expedite the process of introducing new technology, its performance would exceed that which the production functions project. Finally, it should be noted that the various future trends in investment and military expenditures assumed in the report are not predictions but are projections to illustrate the effects of possible alternative programs.

The production functions cover both the non-agricultural non-service sectors of the economy as a whole and industry alone. Agriculture is excluded because year-to-year changes in production

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are affected so much by variation in weather as well as in the amount of land cultivated. Services such as education, health, and housing are excluded because output in these sectors is measured by the amount of inputs of either labor or capital; no separate measure of output exists.

The statistical basis for the production functions described in this report is found in CIA estimates of GNP originating in the non-agricultural and non-service sectors of the Soviet economy (or, alternatively, in industry) in 1950-68. The data on labor inputs (expressed in man-hours) and on capital services (reflecting annual average fixed capital stock) are derived almost entirely from published Soviet sources.

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Conclusions

43. The finding of this report is that Soviet economic growth since 1950 is best described by a production function in which strongly diminishing returns to new investment occur. This function, known as the ACMS function, fits the growth of the Soviet industrial and non-agricultural non-service sectors better than a Cobb-Douglas production function of the kind formerly used. In trying to achieve the highest possible volume of investment, Soviet economic policy has forced the capital-labor ratio continuously upward, and this strategy accentuates the effect of diminishing returns. Under these conditions, the ACMS production function estimated for the USSR -- with its relatively low substitutability of capital for labor -- generates a gain in output per unit increase in capital stock that falls off sharply over time. This pattern of growth accurately matches the observed Soviet slowdown since the 1950s.

44. If the relation of output to inputs in the USSR is of the character described by the ACMS function, the situation confronting the Soviet leadership is indeed discouraging. A continuation of the growth of man-hours and capital

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stock at the same rate as in the 1960s would result in a projected average annual rate of growth of output in the non-agricultural non-service sector of only 4.0% a year during 1969-80 -- far less than the 7.0% a year achieved in 1961-68 or the 8.6% in 1951-68. In a turnabout from its earlier economic history, the USSR would have to deal with a series of planning periods in which the growth of the labor force -- not the growth of capital stock -- is the real constraint on the rate of growth of output.

45. Should returns to investment -- or what amounts to the same thing, the substitutability of capital for labor -- actually be somewhat higher than the value projected by the ACMS function, the prospects would be brighter. Nevertheless, diminishing returns to new investment would be a serious problem for the leadership over a wide range of plausible functions. Studies of Western economies have found the substitutability of capital for labor to be lower than that inherent in the Cobb-Douglas production function, so a like finding for the USSR is credible.

46. Given a diminishing rate of growth of output with respect to capital, a transfer of a billion rubles from other end uses to investment was found to have a smaller and smaller effect on growth over time. This would be true for a simple transfer of funds from defense to investment. But high-quality resources, particularly scientific and technical manpower, now employed in defense might have a more than proportional effect on growth. Even so, it is doubtful if the potential of these resources could be fully realized without some drastic shake-up in the management of civilian R&D and investment.

47. The implications of such strongly diminishing returns to new investment for Soviet policy are pointed. Having assembled a huge stock of capital, the USSR needs to adopt a different strategy for growth. According to Simon Kuznets,

Modern economic growth is distinguished by the fact that the rate of rise in per capita product

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was due primarily to improvements in quality, not quantity of inputs -- essentially to greater efficiency -- traceable to increases in useful knowledge and better institutional arrangement for its utilization.*

48. A change of priorities favoring a higher rate of capital formation will not insure even a continuation of present rates of economic growth. While the USSR recognizes that it is behind the West technologically and that it is not closing the gap, the policies necessary to spur technological progress are not obvious. The discussion above suggests that the USSR will have to choose between accepting a lower (and possibly still declining) rate of growth and attempting to improve the managerial efficiency of the system on a broad front. The dilemma for Soviet leaders is that no one has suggested a sure-fire program of reform that will spur economic progress and also insure the degree of central control that the leadership considers to be essential.

* Modern Economic Growth -- Rate, Structure, Spread, 1966, p. 491.

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