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The defense hardware portion of statistics on industrial production, national income, and budgeted expenditures.

A NEW SOURCE FOR FIGURES ON SOVIET MILITARY OUTPUT

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One of the characteristics of the Soviet system of economic statistics is that it is designed to embrace, and in practice must embrace, all industrial activity that takes place in the USSR. This being the case, it has long been considered that the Soviet statistical aggregates "national income" and "gross output of industry" must include somewhere in their totals the amounts for such concealed activities as the production of military and space equipment. On this premise efforts have been directed for some years toward getting the best possible understanding of the two aggregates and their statistical subconcepts and trying to identify where within both sets of them the production of military and space equipment might be included. Although the detailed findings of this work are not yet firm enough to be used in official estimates, the operation has proved exceedingly interesting and now appears sufficiently definitive to warrant an interim methodological report.

Study of Output and Income through 1959

A supposition that the production of hardware for defense and other secret programs was being handled in output statistics as "machine building" was suggested early by the fact that in 1953 the atomic energy program was put under the Ministry of Medium Machine Building.¹ This supposition was confirmed in mid-1959, when it became possible to demonstrate that the Soviet statistic for the "gross output of machine building" was large enough that the total production of civilian machinery might well account for only about half

¹Kramlsh, Arnold. *Atomic Energy in the Soviet Union*, Stanford, 1959, pp. 176-178. Unclassified.

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of it.² Since this machine output is one component of the "gross output of industry" aggregate, the first step was to try to get the best possible figures for the latter, year by year, in absolute ruble values.

The difficulty in establishing such a series lay in the fact that the Soviets had always carefully avoided giving any absolute ruble values for their major statistical categories. The annual values of the gross industrial output had therefore to be built up step by step from casual references to the ruble values of various subordinate elements of the system. Once a value for any single year had been established in absolute terms, however, it would be possible, using the statistical data published by the Soviets in terms of percentage relationships, to expand this with a fair degree of assurance for the years after 1950 into a full annual series. By the end of 1959 such a series was in fact achieved, probably accurate within two percent, in both constant and current ruble prices.³

The end of the year 1959 marked also the first findings in the other approach to the problem, that through national income figures. In an article in the October 1959 issue of *Soviet Studies*, A. Nove and A. Zauberman called attention to the fact that one of the subconcepts of national income, the "increment to state reserves," was carrying a figure of an order of magnitude—5 to 6 percent of the total national income and hence 47 to 57 billion old rubles for the year 1955 and 56 to 67 billion old rubles for 1957—for which there could be "only one possible explanation: this figure must include 'military accumulation,' i.e., a figure representing armaments."⁴

That these state reserves include "reserves of means of defense" was already known from the Soviet literature. For ex-

² C.I.A. working papers: *Value of Soviet Machinery and Military End Item Output 1950-1958, with projections to 1965*, by W. T. Lee, July 1959; and *Gross Production of the Branches of Soviet Industry*, by Clopper Almon, August 1959. Secret.

³ C.I.A. CSM No. 68/59, *Establishment of an Absolute Ruble Value for the Soviet Concept, "Gross Industrial Output."* Confidential.

⁴ Nove, A. and Zauberman, A. "A Soviet Disclosure of Ruble National Income," *Soviet Studies*, October 1959, p. 198. Unclassified.

ample, a Soviet text on the national accounts defines them as follows:

The fund of [state] reserves combines, first, state material reserves having a long-term character; secondly, reserves of means of defense having a special character;⁶ and thirdly, operational reserves of the Council of Ministers, to be made use of, in the course of carrying out the annual plan, for satisfying newly arising current requirements.⁶

Since the first and third constituents of the reserves here named would not in these years have exceeded 6 to 10 billion old rubles, the figures of Nove and Zauberman would mean, averaging the highs and lows, that increments to "reserves of means of defense," representing new military material and equipment, were of the order of 46 billion old rubles for 1955, 54 billion old rubles for 1957, and say 58 billion old rubles for 1958.

From All Industrial Output to Machine Building Only

A variety of data that became available at the end of 1960 and in early 1961 made it possible to strengthen the basis of the series for the value of the gross output of industry. For example, detailed figures for profits earned in state industry published for the first time in the 1959 statistical handbook,⁷ when combined with published statements of rates of profit in state industry, gave directly a set of absolute ruble values for state industry output, a major constituent element of the gross output of all industry. Remarkably precise confirmation of these figures was offered by a statement in the budget speech for 1961 to the effect that a reduction in 1961 indus-

⁶ Although the phrase "having a special character" might be read as restricting this category to certain special means of defense, the magnitude of the sums it covers makes it more probably modify "reserves" in parallel with the "long-term" and "current operational" of the other two categories. The second category should then cover the entire stock of defense hardware.

⁷ Bor, M. Z. *Balans Narodnogo Khozyaystva SSSR (The balance of the national economy of the USSR)*, Moscow, 1956, p. 97. Unclassified.

⁸ USSR, *Tsentral'noye statisticheskoye upravleniye. Narodnoye khozyaystvo SSSR v 1959 godu (The National Economy of the USSR in 1959)*, Moscow, 1960, p. 799. Unclassified.

trial costs by one percent over 1960 would provide savings of 1.370 billions of new (13.70 billion old) rubles.⁸ The four significant digits of this figure enabled us to establish that our calculations for the output of state industry were correct within a fraction of one percent.

In attempting to derive from the gross industrial output series a value for the gross output of machine building alone, our early methodology was to work through the special Soviet concept "instruments of labor" (*orudiya truda*), since the relationship of that concept to the gross output of industry was given in the handbooks. In February 1961, however, this effort was short-circuited when a Soviet textbook on the technology of machine building presented us with a figure of 255 billion rubles explicitly stated to be the value in 1955 rubles of "machine building and metal working" for 1958.⁹ "Machine building and metal working" differs from "machine building" only by the addition of two minor elements, "metal working" and "repair." Furthermore, to help break any figure for the aggregate into its three constituent elements, we already had from an earlier handbook the rates of growth between 1950 and 1955 for the three elements and for the total.¹⁰

The Repair Problem

The only trouble with this windfall was that the 255 billion figure did not fit. It could not be reconciled with the data we already had on the value of repair and of machine building. This impasse was resolved, however, by Soviet publication in the spring of 1961 of a book on the efficiency of labor¹¹ which gave detailed tables showing the distribution of repair labor in industry in 1958. From a study of these tables came the hypothesis that after 1955 the repair category in

⁸ *Pravda*, 20 Dec. 1960, p. 4. Unclassified.

⁹ Gabrilov, A. N. *Sovremennoye sostoyaniye i napravleniya razvitiya tekhnologii mashinostroeniya i priborostroeniya (Present state and direction of development of the technology of machine and instrument building)*, Moscow, 1960, p. 304. Unclassified.

¹⁰ USSR, Tsentral'noye statisticheskoye upravleniye. *Promyshlennost' SSSR (Industry USSR)*, Moscow, 1957, p. 203. Unclassified.

¹¹ Kheyman, S. A. *Organizatsiya proizvodstva i proizvoditel'nost' truda v promyshlennosti SSSR (Organization of production and the productivity of labor in USSR industry)*, Moscow, 1961, p. 61. Unclassified.

"machine building and metal working" ceased to cover repair work in general and reported only that done in special "repair enterprises." There is no direct evidence that this is what happened, but such a change would be consistent with the new general rule in effect by 1957 that all statistics should henceforth be furnished on an enterprise basis. Before 1955 the "repair enterprises" comprised only those doing work for industry and construction, but, as revealed for the first time in a 1960 textbook on statistics,¹² they came then or sometime thereafter to include those doing the repair of railway rolling stock and of communications equipment. In all this context, the concept of repair includes the manufacture of replacement spare parts.

Using the new tables showing the distribution of repair labor, together with such other data as we have on the amount of repair,¹³ it has been possible to calculate for 1958 a figure of 17 billion rubles as the value of work done in the repair enterprises and hence as the amount of repair contained in the 255 billion aggregate for "machine building and metal working." As the amount of the other extraneous element in this statistic, "metal working," can be estimated from a statement of its weight in the whole¹⁴ to be approximately 31 billion rubles, there is left 207 billion rubles as the value of "machine building" alone. These figures for the three elements, so arrived at, are consistent with the available data on growth rates, which at the year 1958 we have for the "machine build-

¹² Savenskiy, D. V. *Kurs promyshlennoy statistiki (Course of industrial statistics)*, Moscow, 1960, p. 467. Unclassified.

¹³ Bunich, P. "Problemy kapital'nogo remonta osnovnykh fondov v promyshlennosti" (The problem of the capital repair of fixed capital in industry), *Planirovaniye i finansirovaniye kapital'nogo remonta osnovnykh fondov (The planning and financing of the capital repair of fixed capital)*, Moscow, Gosfinizdat, 1958, pp. 5, 31. Unclassified.

_____. "Amortizatsiya i voprosy finansirovaniya remonta i modernizatsii osnovnykh fondov" (Amortization and the question of the financing of the repair and modernization of fixed capital), *Voprosy Ekonomiki (Questions of economics)*, no. 4, 1959, p. 106. Unclassified.

Gudok, 23 January 1959, p. 1. Unclassified.

¹⁴ Smirnov, G. and Yasnovskiy, N. "Perspektivy sorevnovaniya SSSR i SShA v oblasti mashinostroeniya" (Prospects for the rivalry of the USSR and the USA in the field of machine building), *Planovoye khozyaystvo (Planned economy)*, No. 8, 1960, p. 87. Unclassified.

ing" element and for the total "machine building and metal working."

The 1955 value of "machine building and metal working" was derived by carrying back the 1958 figure of 255 billion in accordance with the published rate of growth for the aggregate. The resultant figure, 174 billion old rubles, was later quite closely confirmed by Khrushchev's statement on 17 October 1961 that the output of machine building and metal working in 1955 was 17 billion new (170 billion old) rubles.¹⁵ When the "metal working" and "repair" elements are calculated respectively at 22.7 and 11.3 billion old rubles in 1955, machine building for that year is left at 140 billion rubles. If the repair figure is adjusted to the old practice by adding 12.5 billion rubles for sundry repair outside of the "repair enterprises" (5.3 billions for machine tractor stations, 4.2 for trucks and cars, and 3.0 for other), the values of the three elements and their adjusted total are completely consistent with the old 1950-1955 growth rates published for them. Thus all of the data now seem to fit, and our hypothesis about repair appears vindicated.

From Machine Building to Defense Hardware

With a series for the gross output of machine building so established, the rest of the way is reasonably straightforward. "Gross output" reflects, not completed production, but costs put into machine building, including those put into any increased amounts of work still in process at the end of the year. With a regularly rising rate of production, increases in the amount of work in process are to be expected, and these have to be estimated in order to convert gross output into what is known as "commercial output."

Furthermore, gross output adds together the output of all machine building enterprises, despite the fact that products of some enterprises enter as input into the production of others and thus are counted twice. This fact, however, has also bothered the Russians, and they therefore keep a special account for the value of such items (*pol'fabrikaty*) figured into the "gross output of machine building."¹⁶ Two chance ref-

¹⁵ *Pravda*, 18 October 1961, p. 5. Unclassified.

¹⁶ Goloshchapov, V. A. *Spravochnik po bukhgalterskomu uchetu (Reference book for accounting)*, Moscow, 1961, p. 359. Unclassified.

erences to this statistic, consistent with each other, inform us that in 1955 it represented 30 percent of material purchases,¹⁷ which were themselves 59 percent of costs,¹⁸ which were 90.5 percent of value,¹⁹ and that in 1958 it accounted for 17 percent of the value of gross output.²⁰

With these two adjustments one can derive from the gross output series one for the value of the final output of machine building. Roughly, in 1955 rubles, the figures are 112 billion for 1955 and 163 billion for 1958. These include the output of consumer durables. They also include each machine building plant's own repair work and any contract repair or manufacture of replacement parts it did for anyone outside the machine building industry. From the data on repair labor a maximum figure of 10 billion rubles can be calculated for this repair work in 1958. A corresponding figure for 1955 would be 6 billion. The subtraction of these would leave 106 and 153 billion rubles for new machines in 1955 and 1958 respectively.

More work on this series, as well as on these adjustments, will have to be done. But when the value of consumer durables is excluded from the figures so far reached and they are adjusted for exports and imports, they leave a net output of "capital" equipment approximating 100 billion rubles in 1955 and 144 billion rubles in 1958. Since we know how much of these amounts were put back into the civilian economy as "capital investment"—about 50 billion rubles in 1955 and 82 billion in 1958—we have left to cover the value of military and other secret equipment produced—over and above repair work, the manufacture of replacement parts, and probably the output of conventional ammunition—something like 50 billion rubles in 1955 and 62 billion in 1958.

¹⁷ Zverev, A. et al. *Finansy i sotsialisticheskoye stroitel'stvo (Finance and socialist construction)*, Moscow, 1957, p. 124. Unclassified.

¹⁸ USSR, Tsentral'noye statisticheskoye upravleniye. *Narodnoye khozyaystvo SSSR v 1956 godu (The National Economy of the USSR in 1956)*, p. 100. Unclassified.

¹⁹ Zverev, A. "Gosudarstvennyy byudzhet vtorogo goda shestoy pyatiletki" (The state budget in the second year of the Sixth Five Year Plan), *Planovoye khozyaystvo (Planned economy)*, No. 3, 1957, p. 18. Unclassified.

²⁰ Demchenko, M. N. and Slastenko, Ye. N. *Spetsializatsiya i kooperirovaniye—rezervy rosta proizvodstva (Specialization and cooperation—reserve for the increase of production)*, Moscow, 1961, p. 67. Unclassified.

Output-Income-Budget Correlation

The Nove-Zauberman calculations from national income figures, which upon adjustment as outlined above gave values for military accumulation of 46 billion rubles in 1955 and 58 billion in 1958, are closely comparable to these results of 50 and 62 billion, respectively, arrived at from estimated production figures. The correlation supports the view that military production of a "capital" nature is accounted for as an increment to "reserves of means of defense" and a corollary thesis that such production is charged to the budget not as a current expenditure but as an "accumulation."

There is no problem in finding places in the Soviet budget outside the explicit defense allocation where sums of these magnitudes could be charged. The several unassigned residuals in the budget, taken together, are quite sufficient to cover them. For example, the residual in the category "Financing the National Economy—Industry and Construction" in 1958 was calculated at 30 billion old rubles, and in the same year the planned residual for Financing the National Economy and for the budget as a whole totalled between them more than 48 billion.²¹

²¹ C.I.A./RR ER 61-28, *The Soviet Budget for 1961*, pp. 27/28. Unclassified.