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The CIA Approach to Estimating Soviet Defense Spending

A Research Paper

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The CIA Approach to Estimating Soviet Defense Spending

A Research Paper

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The CIA Approach to Estimating Soviet Defense Spending /

Overview

The annual defense budget announced by the Soviet Government is ambiguously defined and misleading as an indicator of the magnitude and trend of total defense spending. Lacking a useful official Soviet defense figure, Western analysts have employed various techniques to estimate expenditures. The Central Intelligence Agency, during the past 25 years, has developed and used the direct-costing or building-block method. Direct-costing estimates help to assess the priorities that Soviet military planners assign to components of the defense effort, the resource constraints confronting them, and the impact of defense programs on the economy.

In the direct-costing approach, each identifiable military item is multiplied by its ruble cost, and the products are summed to give estimates for various categories of defense expenditures and for total military spending. The CIA estimates are derived from a historical base that includes 30 years of detailed military-economic data on Soviet defense activities. Direct costing requires the organization and analysis of large quantities of data, much of which is classified, but it produces estimates that are less uncertain and contain more information than those generated by other methods. Our confidence in the direct-costing estimates varies from one category to another, but we believe there is only a 10-percent chance that our estimate of total Soviet defense expenditures is more than 10 to 15 percent in error for any year during the past decade.

Because defense takes a significant share of the USSR's economic resources—currently almost one-seventh of the gross national product (GNP)—it is useful to relate the expenditure estimates to other measures of Soviet economic activity. When appropriate adjustments are made, the direct-costing estimates of defense expenditures can be integrated into CIA's estimates of Soviet GNP and indexes of industrial production, and they can be used to calculate the impact of defense activity on sectors of the economy.

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Statements by various [] sources during the past 15 years support the magnitude and upward trend of the CIA direct-costing estimates. Other methods for estimating defense spending are pursued by CIA to provide additional perspectives on the Soviet defense effort, but because of their shortcomings they are not adequate substitutes for the direct-costing approach.

*Information available as of 1 July 1982
has been used in the preparation of this report.*

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Contents

	<i>Page</i>
Overview	iii
Introduction	1
The CIA Approach	1
Investment Costs	1
Procurement	2
Construction of Military Facilities	3
Operating Costs	4
Personnel	4
Operations and Maintenance	4
Research, Development, Testing, and Evaluation Costs	5
The Structure of CIA's Data Base for Soviet Defense Spending Accounts	5
Price Base and Factor Cost Adjustment	7
Confidence in the Estimates	7
Independent Checks on the Estimates	8
Soviet Statements on Defense Spending	8
CIA Estimates and Soviet Statistics	11

Table

USSR: Estimates of Soviet Defense Spending and Confidence Intervals for 1960, 1970, and 1980	9
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Figures

1. Estimated Soviet Defense Expenditures, 1951-80	2
2. The CIA Approach to Estimating Soviet Defense Spending	3
3. Comparison of CIA Estimates of Soviet Defense Spending, 1965-80, With Figures Cited by Soviet Sources	10

The CIA Approach to Estimating Soviet Defense Spending

Introduction

In its published state budget, the Soviet Union annually includes a single-line figure for "defense." However, the Soviets have never defined clearly the activities included in this figure. Announced defense spending was 12.8 billion rubles in 1965. During the late 1960s announced spending increased until it stabilized at about 17.9 billion rubles in the early 1970s. It dropped to 17.2 billion rubles in 1977 and remained at that level until 1980 when it declined to 17.1 billion rubles. The 1982 state budget appropriates 17.054 billion rubles for defense, the same figure specified in the 1981 budget.

The announced figure is much too low to fund the extent of military activities detected by independent means of observation. These include an array of functional categories—military research and development, procurement, construction, pay, subsistence, and outlays for operations and maintenance. Moreover, announced defense expenditures declined during the 1970s although we know from other sources that defense activities actually were increasing.

Because of the uncertainties surrounding the true coverage of the announced defense budget and the clear evidence of a much higher level of ruble outlays, two principal methodologies have arisen for estimating how much the Soviets spend on defense. The first relies on deriving implicit costs from published Soviet economic statistics. The second, used only by intelligence organizations because of the large amount of data on Soviet military activities needed to apply it, is the direct-costing or building-block approach. This approach requires the identification and enumeration of physical elements of the defense effort over time and the application of direct-cost factors. Although all methodologies involve uncertainty, we find the building-block approach to be more reliable; we use the analysis of available Soviet statistics to make rough checks on our estimates. Figure 1 shows CIA's esti-

mate of Soviet defense spending for 1951 through 1980, with defense spending defined as we think it might be by the Soviets.¹

The CIA Approach

Figure 2 diagrams the CIA approach to estimating and analyzing Soviet defense spending:

- Detailed data on defense activities and associated unit costs and prices are collected, analyzed, and fully delineated (Inputs).
- These physical and monetary data are combined in the Strategic Cost Analysis Model (SCAM) to calculate detailed spending data (Computations).
- The detailed spending data are aggregated and analyzed both directly and in conjunction with CIA data on economic performance (Analysis).

The building-block elements that comprise the ruble estimate of Soviet defense costs are grouped, for analytical convenience, in three blocks: investment; operating; and research, development, testing, and evaluation (RDT&E).

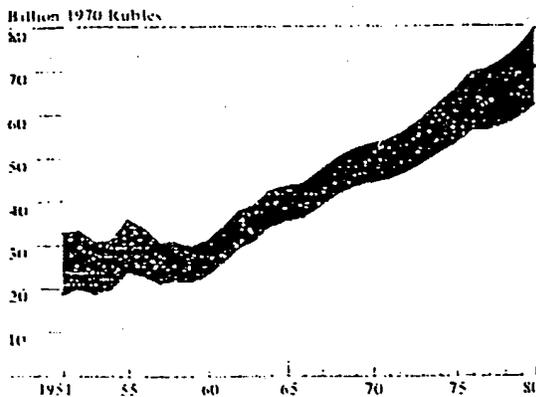
Investment Costs

Investment costs include the replacement, modernization, and expansion of forces through the procurement of weapons and equipment, including major spare parts, and the construction of facilities. The investment category is broken down into over a dozen system-oriented cost accounts, such as the procurement of aircraft, ships, missiles, and land arms,

¹ For a detailed discussion of this CIA estimate, see NFAC Intelligence Assessment SOV 81-10003X (Secret), November 1981, *Soviet Spending for Defense: Trends Since 1951 and Prospects for the 1980s*. For a comparison of the estimated dollar cost of Soviet defense activities and US defense outlays, see NFAC Intelligence Assessment SOV 81-10009 (Secret), October 1981, *A Comparison of Soviet and US Defense Activities, 1971-80*.

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Figure 1
Estimated Soviet Defense Expenditures,
1951-80



Soviet defense expenditures, expressed in 1970 rubles at factor cost, are here defined broadly to include activities the Soviets may define as defense related but which are not included within the US definition. Included are expenditures for internal security forces, construction and railroad troops, and the type of space programs carried out by the military in the USSR but by NASA in the United States. The shaded area represents the confidence interval for each year's estimate of total defense expenditures. The width of the interval changes over time as the weight of the component estimates that make up the total and our confidence in them vary. We believe there is only a 10-percent chance that the true figure for any given year lies outside this interval.

military construction, and the acquisition of other items necessary for the functioning of military forces.

Procurement. In most cases, procurement costs of new weapons and equipment and their initial spare parts are calculated by multiplying estimated annual procurement rates by unit costs. These rates are derived, when possible, from information that directly indicates deliveries to the military. This method is used

for major items like ships and for other items where we have access to delivery data. Alternatively, total production rates for military items can be estimated, and the items not delivered to the Soviet armed forces can be subtracted from the production data. Both methods exclude equipment turned over to foreign countries and, in the case of certain types of aircraft and general purpose vehicles, civilian consumption of dual-purpose equipment. In the relatively infrequent instances where no direct information is available, procurement rates are based on estimates of military requirement:

There are three approaches to pricing Soviet military equipment in rubles: use of the actual ruble price, application of cost-estimating relationships, and derivation of a ruble price by applying a ruble-dollar ratio to the estimated dollar cost of the item.

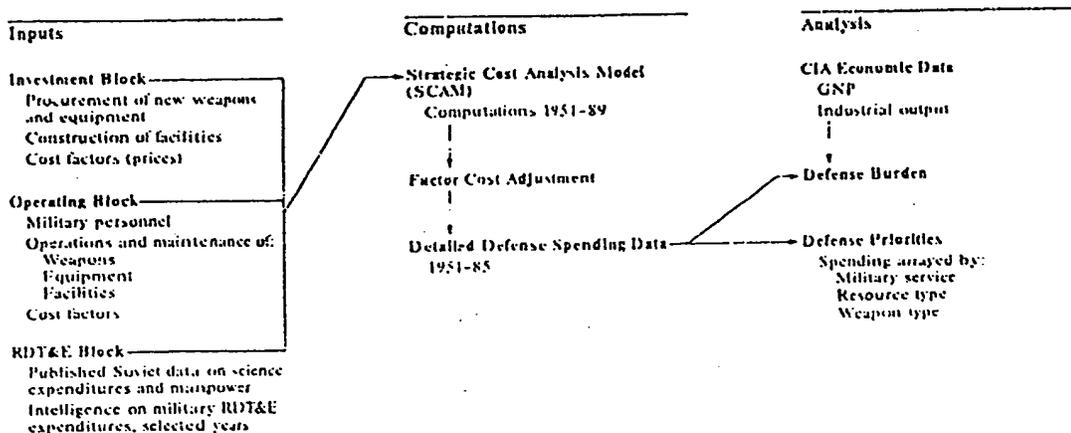
The preferred approach is to use the actual price paid by the military (in most cases the enterprise wholesale price). When this is not known, statistical models called cost-estimating relationships (CERs) are usually employed. CERs relate the costs of a particular type of equipment to its physical or performance characteristics—data obtained from intelligence collection and technical analysis. Model variables usually include system descriptors or performance measures such as size, weight, speed, and thrust. For example, some naval ship costs are estimated as functions of displacement, type of propulsion plant, and horsepower. The technique generates an estimated ruble price for individual weapons within product categories. When neither ruble prices nor ruble-based CERs are available, dollar prices are first estimated and then converted to a ruble price through use of ruble-dollar ratios.

The ruble-dollar ratios used to convert a dollar cost to a ruble price for items in a specific product (weapon) group or subgroup are calculated from the ruble prices and estimated dollar costs of a sample of Soviet weapons in a given category. Our ruble price samples of Soviet military equipment, which have been obtained from [redacted]

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Figure 2

The CIA Approach to Estimating Soviet Defense Spending



Sources have increased substantially in recent years; we now have, for example, actual prices for nearly one-third of the major weapon system procurement programs. This expansion of the ruble sample has increased our confidence in the estimate by lowering the risk of using atypical observations. In addition, a larger sample has allowed us to use more item-specific ruble-dollar ratios and rely less heavily on aggregate ratios. If the item-specific ratios vary significantly within a single weapons category (for example, aircraft), more than one ratio may be used for items in that category. For example, the item-specific ruble-dollar ratios for a second-generation class of weapons might be consistently 20 percent lower than the ratios for third-generation weapons. In such a case, two aggregate ratios would be developed. The lower ratio would be used to transform the estimated dollar cost of all second-generation items to ruble prices, and the higher ratio would be used for third-generation equipment.

Construction of Military Facilities. Costs of constructing facilities for use by the Soviet armed forces are included in the investment category. These estimates are made by:

- Analyzing construction activities at a large sample of Soviet installations to determine patterns of new construction, demolition, and modernization.
- Estimating in physical terms the annual rates of construction for these installations.
- Calculating from ruble-price data the annual construction costs for each type of facility in the sample.
- Developing construction cost estimates on a per weapon or per man basis for each type of installation in the sample.
- Extending the sample results to the entire Soviet military complex by applying these per weapon or per man cost factors to our total order-of-battle or manpower data base.

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The resulting ruble estimates are then adjusted to account for planning and design costs, cost overruns, associated infrastructure requirements, and climatic and regional factors.²

Operating Costs

Operating costs include personnel, equipment maintenance, and logistic costs associated with the routine functioning of the Soviet armed forces.

Personnel. Personnel costs are calculated by multiplying estimates of the number of men assigned to each unit by the monetary and nonmonetary compensation for each man's position and rank. An organizational model—patterned after the Soviet Ministry of Defense and military services—is used to derive detailed manpower estimates that encompass order of battle, manning levels, and rank and position structures of each of approximately 1,200 components comprising the Soviet armed forces.³

Manpower costs are then calculated by multiplying these estimates of the number of men in military organizations by ruble factors covering each type of personnel-associated outlay. Estimates of military pay and allowances are based on another computer model, which incorporates the functioning of the Soviet pay system, a set of tables of organization corresponding to units in the manpower model, and a set of data files containing rates for various types of pay. The pay model produces estimates of pay by unit and by pay category.

Estimates of the ruble costs of food and clothing also are calculated. These costs are estimated from data on specific allowances—expressed in physical terms—for

these items by individual rank, position, service, geographical area, and special assignments and ruble-price information for each of the types of allowance. Other personnel-related costs (medical, travel, social insurance, and retirement) are estimated from analysis of Soviet practices.⁴

Operations and Maintenance. Operations and maintenance (O&M) costs include outlays for maintenance of weapons, equipment, and facilities, wages and related costs of civilian personnel, petroleum products, and a variety of other direct support costs.⁵

Although the methods for estimating O&M costs vary widely, a common approach is used to calculate maintenance costs for major equipment—aircraft, ships, land arms, vehicles, and electronic systems. This approach reflects the cost-accounting methods that Soviet defense planners use in allocating the maintenance portion of their annual defense costs. The available evidence suggests that the Soviets annually budget for equipment, weapons, and facilities maintenance an even share of the estimated lifetime expenditure for inspections, technical servicing, and specified categories of repair. These share factors, which the Soviets often publish in technical monographs, usually are expressed as a fixed percentage of an item's average wholesale valuation when new. The size of the share is a function of (a) an item's type, size, and complexity, (b) its annual operating rate, (c) its service life, and (d) the frequency and nature of periodic maintenance.⁶

Civilian personnel costs are calculated by multiplying the estimated numbers of civilian employees of the Ministry of Defense by a weighted average estimate of wages, pension contributions, and social insurance costs for similar nondefense jobs in the Soviet econo-



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Estimating the cost of petroleum-based fuels and lubricants (POL) consumed by the Soviet armed forces begins with an inventory of the types and quantities of military equipment that use POL. The estimated number of hours each type of equipment is operated annually is then multiplied by hourly consumption rates for POL products and the ruble price of each type of POL consumed.⁴

O&M costs also include the estimated annual cost of utilities—heat and electricity—used by the Soviet military and the cost of maintaining facilities. Utility costs are estimated by applying a per capita factor for consumption of electric power and space heating to armed forces manpower totals. The cost of maintaining Soviet military facilities is derived by applying ruble-cost factors to the stock value of facilities in each year. The factors vary depending on the type of facility, the type of construction, and level of maintenance believed to be performed.

Finally, the maintenance estimate includes costs of preinduction military training and costs for leasing services from the Ministry of Communications. The ruble costs of preinduction training are calculated by multiplying the number of conscripts entering the Soviet military each year by a per man cost factor derived from a study of Soviet preinduction military training practices. Costs of leasing military communications are obtained by applying an estimated ruble cost for a unit of communications services to an estimate of the number of units that the Soviet military uses annually.

Research, Development, Testing, and Evaluation Costs

The estimated cost of Soviet military research, development, testing, and evaluation (RDT&E) is based on a CIA interpretation of published Soviet data on resources devoted to "science." Although the Soviet data are defined ambiguously, they are used because we lack sufficient details

about specific activities to estimate costs using the building-block approach. Expenditures for total (that is, civilian and military) RDT&E are derived from our RDT&E manpower estimates, Soviet data on average RDT&E wages and social insurance costs, and estimates and reports of the share of labor costs in total RDT&E expenditures. A basis for estimating civilian RDT&E expenditures is found in a Soviet article,⁵ which gives a figure for the share of officially reported expenditures for science that "promotes scientific and technical progress." Civilian expenditures are subtracted from the total RDT&E estimate to derive expenditures for military RDT&E. The trend of our estimate of military RDT&E expenditures is reinforced by physical evidence on the resources—facilities and manpower—that the Soviets devote to this effort.

The Structure of CIA's Data Base for Soviet Defense Spending Accounts

A brief outline of the structure of CIA's data base for Soviet defense spending is shown in the inset. It illustrates the level of detail at which the expenditure estimates are made. Within the military mission elements, most weapon systems are classified by individual type—for example, SS-18 missiles and SU-7 interceptors—but large or expensive weapon systems are classified by components—for example, an aircraft's engines and their costs with separate entries for its airframe and avionics.

Yearly expenditure estimates are calculated for each resource category account applicable to a weapon system or military mission element. For example, the procurement accounts of the Kresta-class guided-missile cruiser would include entries for ships, missile systems, nuclear weapons, and naval supplies and equipment during each year these ruble outlays are estimated to have been made. Operating costs for the Kresta-class started when the first Kresta began service with the Soviet Navy and will continue as long as the ships of the class are in service.

⁵V. Trapeznikov, "Nauchno-Tekhnicheskiy Progress i Effektivnost' Nauki," *Voprosy Ekonomiki*, February 1977.

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*Outline of the Structure of CIA's
Soviet Defense Spending Accounts*

By Military Mission

Intercontinental attack forces
 Bombers
 Ballistic missiles (ICBMs)
 Ballistic missile submarines
Peripheral attack forces
 Bombers
 Ballistic missiles (MR/IRBMs)
 Ballistic missile submarines
Strategic defense forces
 Interceptor aircraft
 Surface-to-air missiles
 Antiballistic missiles
 Control and warning systems
Ground Forces^a
 Rifle divisions
 Tank divisions
 Airborne divisions
 Tactical missiles
General purpose naval forces
 Major and minor
 surface combatants
 Attack submarines
 ASW aircraft and carriers
 Fleet air defense aircraft
 Amphibious warfare ships
 Naval auxiliary ships
Tactical air forces
 Fighter aircraft
 Light bombers
 Transport aircraft
 Reconnaissance aircraft
Airlift forces
 Airlift aircraft
Support forces
 Intelligence
 Communications
 Command

By Resource Category Account

Investment Block
 Procurement Group
 Land armaments
 Ammunition
 Ships and submarines
 Aircraft
 Missile systems
 Electronic systems
 Nuclear weapons
 Military space systems
 Civil space systems
 Vehicles
 Organizational equipment
 Engineering equipment
 Naval supplies and equipage
 Aircraft ground support equipment
 Construction Group
 Air facilities
 Naval facilities
 Missile facilities
 Nuclear facilities
 Ground force facilities
 Other facilities
Operating Block
 Operations and Maintenance (O&M) Group
 (There is an O&M account for each military hardware account in the procurement group and for each account in the construction group. There are also accounts for petroleum fuels and other energy products, leased communications, preinduction military training, civilian pay, and military publishing.)
 Personnel Group
 Pay and allowances
 Food
 Clothing
 Medical services
 Pensions
 Social insurance payments
 Military travel
RDT&E Block^b

^a Ground forces estimates include detailed estimates of the numbers of men, tanks, armored vehicles, artillery, and other equipment assigned to divisions.

^b Military RDT&E expenditures are estimated as a total annual figure.

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Price Base and Factor Cost Adjustment

The CIA methodology provides an estimate of the level of and trend in the annual Soviet resource commitment to defense. Ruble prices are used to reflect the relative resource cost of military programs and activities within the Soviet economic system.

The defense estimates are presented in constant prices so that they reflect real changes in defense activities, excluding the effect of inflation. Prices in the Soviet Union are established by the central authorities and are used primarily for accounting purposes. In general, they are held constant between benchmark years, in which major price reforms occur. The purpose of these reforms is to bring transaction prices into line with real resource costs, which are undergoing continuous change not reflected in the constant official prices. In 1967 the Soviets undertook a major reform intended to make prices more representative of the actual resource costs that characterized the late 1960s.⁸ Implementation of the reform was essentially complete by 1970. For this reason CIA has used 1970 prices as the basis for its defense expenditure estimates as well as for other measures of Soviet economic performance.

The CIA estimates of Soviet defense spending are calculated initially in "established prices," which we believe are representative of the Ministry of Defense outlays for goods and services, adjusted to reflect ruble prices of 1970. These prices are established administratively, not by market forces, and are often inaccurate reflections of relative scarcity and value. An alternate estimate is obtained by adjusting the established prices to reflect the average cost in the economy as a whole of the factors (resources) used to produce the military goods and services. This procedure is called factor cost adjustment.⁹ When the

⁸ A reform involves changes in the methods used to calculate prices, as well as revisions to the lists of established prices. The first such reform since 1967 is now under way and is scheduled to take effect in 1982. We expect that gathering sufficient intelligence on the new price reform and analyzing this information to change the price base year will take several years.

⁹ For a summary of the adjusted factor cost concept and the rationale for its use, see Abraham S. Becker, *The Burden of Soviet Defense: A Political-Economic Essay*, Report R-2752-AF, the Rand Corporation, October 1961, pp. 4-12 (U).

direct-costing estimate of annual defense expenditures has been adjusted to 1970 factor cost, the component can be integrated with the economic categories—consumption, investment, administration, research and development, and other outlays—of CIA's estimate of Soviet gross national product (also in 1970 factor cost terms) to measure the share of resources devoted to military activities

Confidence in the Estimates

The reliability of CIA's cost estimates depends on the accurate identification and measurement of the physical characteristics of the Soviet armed forces over time and the application of appropriate cost factors. Our confidence in the estimates varies from one category to another:

- We are most confident of our estimates of military manpower costs because we know the manning levels, rank structures, and pay schedules for both uniformed and civilian personnel.
- We also are confident of our estimates of military procurement, especially for naval ships and aircraft systems. Construction of surface ships is easily observed, and costs are estimated directly in rubles, using Soviet data, which we believe are reliable. Initial estimates for aircraft are made in dollars, but the factors used to convert these estimates to rubles are based on the largest and most reliable sample of ruble prices. We are somewhat less confident of our estimates of lower visibility items of the equipment and support infrastructure—for example, base and airfield furnishings, field equipment for the ground forces, and portable shipboard items—whose costs must often be measured in more aggregate terms by using Soviet cost-estimating relationships or US analogs adjusted to known Soviet practices.
- We are somewhat less confident of our estimates of O&M costs and construction of military facilities. Nonetheless, present estimates are substantially more reliable than earlier methodologies, which drew heavily on US analog experience, especially for POL consumption and aircraft and naval ship maintenance. Estimates of military construction also reflect improved methods and data, especially for figures since the early 1960s.

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- We are least certain of our estimates for Soviet military RDT&E which are derived in the aggregate from a methodology applied to Soviet statistical data. However, we have independent evidence on the manpower and physical facilities devoted to military RDT&E programs that strongly supports—albeit roughly—our judgments on the overall magnitude of the military RDT&E effort and the rapid growth of resources devoted to it

To calculate a confidence interval for our estimate of total defense expenditures, subjective estimates of confidence were made by the appropriate analysts on each of 38 detailed resource accounts that comprise the major cost categories (procurement, construction, personnel, O&M, and RDT&E). Standard deviations of error derived from the subjective confidence estimates were combined to give a standard deviation of error for the total while taking into account dependency relationships. The resulting 90-percent confidence intervals for total defense expenditures and for the major resource category groups in estimates for 1960, 1970, and 1980 are given in the table. (The confidence interval for our estimate of total defense spending for each year since 1951 is depicted in figure 1.)

As the table and figure 1 show, the width of the confidence interval changes over time. The interval is wide through most of the 1950s because we have less evidence on nearly all of the component estimates for that period than for subsequent years. The interval is narrower in the 1960s and early 1970s, reflecting the greater information base underlying those estimates. The interval widens again in the 1970s as the estimate of spending for military RDT&E, in which we place relatively low confidence, increases as a share of the total, and the estimate of military personnel costs, to which we attach high confidence, decreases as a share

In the aggregate, we believe that our total ruble valuation is no more than 10 to 15 percent in error for any year during the 1970s. Because direct costing is based on observation and therefore reflects the actual changes in Soviet defense activities over time, we are confident that the trend of these estimates is correct. We have greater confidence in the general trend than

in our estimates of changes from year to year, which are sensitive to judgments regarding the phasing of costs for major long-term procurement programs. (1)

Independent Checks on the Estimates

The direct-costing method provides the most reliable and detailed estimates of Soviet defense spending available in the West. Other intelligence information and other methods, however, can be used to check the reasonableness of both the level and trend in Soviet spending indicated by the CIA estimates

Soviet and [] Statements on Defense Spending

Since 1965 various [] have provided some independent information against which to judge CIA defense estimates. Comparison of these estimates with the values reported by [] involves considerable uncertainty.

There is no way to ensure that all of the figures refer to the same set of defense activities, because the Soviet statements do not define what is included in "defense." In addition, the [] were probably citing figures in current prices, the conventional form of Soviet financial data, while the CIA estimates are in constant (1970) prices. (1)

Figure 3 compares CIA estimates for the 1965-80 period with selected Soviet statements. The CIA estimates define defense more broadly than do US defense accounts and include space programs and internal security that the Soviets classify as defense. We think [] probably also classify these activities as defense. For any Soviet statement that did not indicate a specific date of information, the estimate is shown for the latest year to which it might pertain

[] He reported that in 1970 he saw a classified document at

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USSR: Estimates of Soviet Defense Spending and Confidence Intervals for 1960, 1970, and 1980.*

	1960 Best Estimate			1970 Best Estimate			1980 Best Estimate		
	Billion 1970 Rubles	Percent of Total	90-Percent Confidence Interval ^b (percent)	Billion 1970 Rubles	Percent of Total	90-Percent Confidence Interval ^b (percent)	Billion 1970 Rubles	Percent of Total	90-Percent Confidence Interval ^b (percent)
Total defense spending	26.9	100	± 14	48.7	100	± 9	70.6	100	± 12
Procurement	13.8	51	± 20	23.1	48	± 9	32.6	46	± 16
Construction	1.5	6	± 66	3.3	7	± 26	2.9	4	± 34
Personnel	5.8	22	± 16	7.7	16	± 8	8.7	12	± 11
O&M	3.3	12	± 15	6.9	14	± 11	10.1	14	± 12
RDT&E	2.5	9	± 50	7.6	16	± 50	16.3	23	± 50

* Because of rounding, components may not add to the totals shown.
^b We believe that there is only a 10-percent chance that the true value of a particular expenditure category lies outside the range defined by this interval. For example, we estimate that there is only a 10-percent chance that total defense spending in 1960 was more than 14 percent away from our best estimate of 26.9 billion rubles. The confidence intervals in this table illustrate the principle that combined error estimates expressed as percentages tend to become smaller as the number of items included in their calculation increases. The confidence interval estimates for total defense

spending were derived by combining the subjective confidence estimates of 38 resource category accounts, more than twice the number included in the calculation for any of the component categories shown. When the intervals are expressed as percentages under these conditions, the interval for the total can be smaller than that of any component, as is the case for the 1960 best estimate. The calculated intervals generally support our feeling of greater confidence in our estimates for the higher levels of aggregation than in those for the lower levels.

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consuming 18 percent of the "budget." The report did not specify which budget—the all-union or the much larger state budget—Brezhnev was referring to.¹⁶ Because 18 percent of the all-union budget is less than the 12.8 billion rubles announced as the defense budget for 1965, it must have applied to the state budget. In this case, defense spending would have been somewhat more than 18 billion rubles in 1965.

Statements that we believe reasonable were made by Brezhnev (1965 and 1972) and Kosygin (1968). The values they provide for 1968 and 1972 are consistent with the 1969 and 1970 values C

but the figure for 1965 is much lower and more difficult to reconcile L

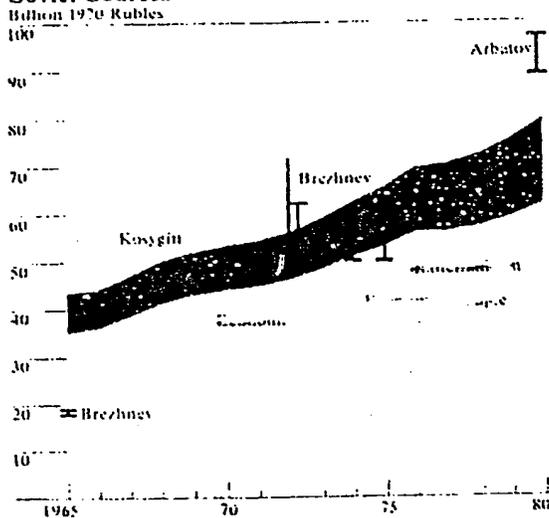
In 1965 Brezhnev told E that the Soviet Government regretted the need for high defense expenditures, which were

¹⁶ The all-union budget funds those organizations and programs that are of national importance and generally come under the purview of the USSR Council of Ministers. The state budget, which is much larger, includes this all-union budget plus the budgets of the individual union republics and local governments.

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Figure 3
Comparison of CIA Estimates of Soviet Defense Spending, 1965-80, With Figures Cited by Soviet Sources



The CIA estimates in this figure are the same as those in figure 1, but here only the upper and lower limits of the 90-percent confidence interval are given for the years shown. These estimates are in constant 1970 prices, but the values mentioned by Soviet sources are assumed to be in current prices.

- In 1968 Kosygin [] that the USSR spent between 200 and 250 dollars per capita on defense. At the official 1968 exchange rate, this equates to about 42 to 49 billion rubles for 1967 and about 43 to 49 billion rubles for 1968.
- In 1972 Brezhnev [] that "every third ruble in the governmental budget goes for defense." Brezhnev [] used the words *gosudarstvennyy byudzhel*—

state budget. If "every third ruble" means approximately 30 to 36 percent, total Soviet defense spending in 1972 would have been between 52 and 62 billion rubles.

Since the mid-1960s other statements have been collected from individuals with less access to highly classified Soviet statistics. While these statements often consist of impressions, rather than certainties, the figures mentioned are consistent with the Kosygin and Brezhnev remarks cited:

• [] as a rule of thumb, the actual Soviet defense budget was three to four times the published version. []

[] when the published figure hovered around 17.9 billion rubles. Application of [] formula yields values of 54 to 72 billion rubles for actual annual defense spending from 1969 to 1972.

• In 1974 [] stated their "firm opinion" that military expenses of the USSR were at least 50 to 60 billion rubles. They did not claim access to a specific figure, but based their judgment on their knowledge of Soviet economics and planning procedures.

• An [] who had worked at the Scientific Research Institute of Economics, an organization associated with the USSR Gosplan, reported in 1980 on informal impressions within the institute. He said that certain researchers there believed the annual Soviet military budget during the mid-1970s to be from 50 to 60 billion rubles.

• Early in 1981 []

[] Soviet military spending is nearly 60 percent of the total USSR budget. The remark was made in the context of the need for arms limitation talks and a US-Soviet summit. Because [] comment suggests such a high defense burden, it is

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more likely that he was referring to the smaller all-union rather than the larger state budget. A share of 55 to 60 percent of the 1980 all-union budget is 89 to 97 billion rubles."

The statements that apply to the 1967-75 period conform to the magnitude and upward trend of CIA estimates. Furthermore, the reports falling close to the 1970 base year are generally within the 90-percent confidence band, broadly confirming the CIA estimates in those years. The values mentioned by [redacted] for the period since 1970 tend to be higher than the constant-price CIA estimates. This is consistent with a moderate rate of inflation in Soviet defense expenditures. An inflation rate of only 3 percent annually in defense expenditures over the 1970s is sufficient even to reconcile the estimate derived from [redacted] statement with the CIA constant-price estimate for 1980

On the other hand, the 1965 figure derived from Brezhnev's comment is much lower than the CIA estimate for that year. The most likely explanation is related to differences in prices. The Brezhnev figure reflects prices in effect before 1967 when the Soviets undertook a major reform intended to make prices more representative of actual resource costs. In particular, defense production appears to have been subsidized before 1967; "we believe that military prices were increased substantially around the time of the reform." These higher military prices are reflected in the constant 1970 price estimate made by the

"A more recent statement by [redacted] made for a different purpose to a home audience in the USSR tends some support to the interpretation that he was referring to the all-union budget. In a Moscow [redacted] he noted that US estimates on Soviet defense spending implied that the USSR spends 70 percent of its "budget" on defense. He claimed that this is simply "impossible."

[redacted] was earmarked for military needs. Because we know that the [redacted] refers to the larger state budget (see K. N. Plotnikov, *Ocherki Istorii Byudzheta Sovetskogo Gosudarstva*, Moscow, 1954, p. 324), the "nearly 60-percent" figure [redacted] cited must apply not to the state budget but to the smaller all-union budget.

"P. V. Sokolov, *Politicheskaya ekonomiya: Stalinizm—pervaya fazo kommunisticheskogo sposoba proizvodstva* (Moscow: Voenizdat 1974), p. 29

[redacted]

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CIA for 1965 as well as the later current price estimates derived from Soviet sources. This may explain much of the discrepancy between the figure derived from the Brezhnev report in 1965 and the other estimates.

CIA Estimates and Soviet Statistics

Analysts inside and outside CIA attempt to estimate selected categories of Soviet defense spending by calculating military residuals from published Soviet economic data." In general, the process involves subtracting identifiable nondefense items from various Soviet economic data series to leave a residual series that is assumed to represent expenditures on military goods and services. Because of the numerous assumptions necessary to estimate defense spending this way, the uncertainties in the calculation and in the content of the residuals are substantial.

There is much uncertainty about the defense activities included in the announced defense figure—a factor in most applications of the residual methods. For example, one approach to estimating Soviet defense expenditures is based on the assumptions that the published defense budgets for most years since the early 1950s have consisted of operating and military construction costs and that the budgets have been frequently manipulated for political purposes." An earlier approach, since rejected, attempted to fit both procurement of military hardware and operating outlays into the announced Soviet budget for defense." The CIA believes that during the postwar period the announced defense budget has been primarily a political tool whose content is too variable and uncertain for analytical purposes

In addition to uncertainty resulting from the ambiguity of Soviet definitions, estimates of defense spending based on Soviet statistics are subject to uncertainty stemming from the manipulation of Soviet data. For

"See the forthcoming DDI Research Paper on the estimation of Soviet defense expenditures from Soviet economic statistics.
"William T. Lee, *The Estimation of Soviet Defense Expenditures, 1955-75: An Unconventional Approach* (New York: Praeger Publishers, 1977) pp. 278-279, 328, and 338-335.
"Cited in Stanley H. Cohn, *Estimation of Military Durables Procurement Expenditures From Machinery Production and Sales Data*, Informal Note SSC !N-78-13, Stanford Research Institute, September 1978, p. 1

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example, most experts now believe that Soviet data on the output of the machine-building and metalworking (MBMW) sector includes procurement of most military hardware. Nevertheless, because the Soviets do not reveal the share going to defense, Western experts must estimate defense procurement as the difference between total machinery production and rough estimates of the MBMW output going to all nondefense purposes. Because such residuals embody all errors in assumptions which themselves may vary from expert to expert, it is not surprising that there is a wide variation in Western residual estimates of Soviet defense spending.

CIA has compared results from these alternative methods with its direct-costing, building-block estimate. Even if the CIA estimate is expressed as a fairly wide range to accord with the presumed content of the residuals, it is only in some years that the ranges

overlap. In other periods, the residuals diverge markedly from the direct-costing estimates. Apart from the ambiguities inherent in the residual methods, the results are not linked to military force estimates, and they do not produce the breakdowns of defense expenditures by military mission, branch of service, and detailed resource category that direct costing provides. In contrast, direct-costing estimates can be used to analyze the detailed structure of Soviet outlays, to measure the rates of change in total defense spending as well as its components, and to estimate the share of the USSR's resources taken by defense activity.

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