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Central Intelligence Agency

Washington, D.C. 20505

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13 November 1985

MEMORANDUM FOR: William F. Martin
Executive Secretary
National Security Council

SUBJECT: Rubles

Bill —

Per our conversation earlier today, attached are some off-the-shelf items on this general subject that you might want to pass on to Tom Dawson. If, after looking this over, he thinks anything else is wanted, please let me know first thing tomorrow morning.

Hope this helps. Have fun in Geneva.

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Executive Secretary

Attachments:

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October 1985

The Cost of Soviet Military Progress

Measuring the Soviet Defense Effort

Over the last two decades the USSR has created an enormous military force. It continues to make a tremendous effort every year to maintain and expand the capabilities of that force. Overall measures of the scale of this effort are important to judging the burden of defense or the Soviet economy and comparisons of US and Soviet defense programs. Because of the difficulties in comparing so many different physical quantities (missiles, planes, men), we use money as a common denominator. Putting things in value terms generally takes account of both quality (better things usually cost more) and quantity.

Soviet statistics are no help in estimating the USSR's defense costs. Moscow publishes only one defense figure, and that is patently false. It could only account for a fraction of total Soviet spending and is probably intended as political propaganda. The CIA estimates Soviet defense costs from the ground up in both dollar and ruble prices. Both measures aggregate all the men, weapons, and material in terms enabling us to compare the figures to other economic aggregates--defense spending in the United States or the USSR's own GNP. Costs are not a measure of military capability (for this we look at how many weapons and military units of each type are deployed and analyze how they are used). But costs do allow us to get a sense of the effort--in aggregate terms--that the USSR has devoted to its military forces over time.

Costs also allow us to see shifts in priorities--for instance, favoring offense over defense, tactical over strategic, or air forces over rocket forces.

Comparisons with US Defense Activities

Estimates of the dollar cost of Soviet defense programs are useful for making gross comparisons with both the levels and the trends of US defense spending. For instance, over the last decade, the cumulative dollar costs of Soviet defense activities (in 1983 prices) exceeded comparable US defense outlays by about 35 percent (see figure). Soviet dollar costs have exceeded US outlays every year since the early 1970s. The gap was at its largest in 1976 when Soviet costs were 50 percent higher than the US outlays. Since then, Soviet costs have grown more slowly and US costs have grown at an accelerating rate. As a result, the gap is now about 15 percent. The estimated dollar costs of total Soviet programs in 1983 were $235 billion, compared with US outlays of $204 billion.

The Burden of Soviet Defense Spending

Estimates of the ruble costs of Soviet military programs can be compared with overall production in the USSR. The ratio of defense spending to GNP represents the share of a nation's total product that is devoted to defense--a number that is often called the "burden of defense." Soviet defense spending now amounts to about 14 percent of GNP; the comparable ratio in the United States is 7 percent. The share of defense in Soviet GNP has remained roughly constant since 1965 because the growth of defense spending has matched

overall economic growth.

The impact of defense clearly falls unevenly on different parts of the economy. Some key industries must devote especially large shares of their output to support defense programs. For example, more than 25 percent of all machinery production is allocated to military procurement even though procurement is no more than 7 percent of GNP. These resources are badly needed by the civilian sector to promote economic growth through investment or to bolster consumer morale by increasing the supply of consumer goods. Those sectors where the impact of defense is especially heavy--high quality metals, precision machine tools, electronic components--turn out the very resources the USSR must have if it is to successfully compete economically and technologically with the West.

CIA calculations show that between 1976 and 1982 the annual rate of increase in Soviet spending was less than in the late 1960s and early 1970s. Our current estimates suggest that growth picked up in the last year or two although the evidence is weaker for recent years. Even though there has been slower growth, Soviet defense spending has climbed to such a very high level that the USSR has added very large quantities of weapons to their forces. For instance, between 1976 and 1983 the Soviets purchased 1100 ICBMs and more than 700 SLBMs for their strategic forces. At the same time they bought about 300 bomber and 5000 fighters. The modernization of the ground forces proceeded rapidly with the introduction of more sophisticated armament, including more than 15,000 new tanks. The Soviets acquired substantial numbers of major surface combatants, nuclear-powered ballistic missile submarines, and attack

submarines.

We are not sure why Soviet defense costs grew more slowly over the 1976-82 period. Several factors probably played a role.

- o The Soviets may have encountered unanticipated technological problems as they tried to deploy the next generation of advanced weapons. We know they have had difficulty translating the results of research and development into weapons systems.
- o Unanticipated economic problems, particularly transportation bottlenecks, almost certainly contributed to the period of slower growth in defense spending.
- o Finally, we believe Moscow took some decisions in other areas that slowed the growth of military procurement. The Soviets recognize that they lag behind the West technologically and have given increased priority to modernization of defense industry and those sectors supporting military production. At the same time, the Soviet leadership has increasingly felt compelled to pay attention to modernization in economy generally.

The Decisions Facing the Soviet Leadership

We know the Soviets plan a substantial modernization of their strategic and conventional forces during the next ten years. This goal presents Gorbachev with a dilemma. According to our estimates, this modernization

would push up total Soviet defense costs by as much as 4 percent a year for the next decade, twice the current rate. During this period when the Soviet economy is likely to grow at a substantially slower rate--perhaps as low as 2 percent. Defense will retain its longstanding priority, but Soviet leaders, including Gorbachev, recognize that in some situations adherance to this priority will make economic conditions worse.

The Soviets are committed to major increases in investment for the food and energy programs. Since assuming control, Gorbachev has reinforced this commitment to strengthening the civilian economy and has begun to lay out an ambitious program to replace the USSR's aging stock of plant and equipment. At projected levels of economic growth, investment in the energy and food programs that required by defense could take so much of the new investment that little would be left to increase investment in new industrial plant and equipment, the transportation sector, or for the production of consumer durables. Ignoring these customers would impair future economic growth and limit the growth in consumer goods important to worker morale. The fundamental problem is that the Soviets will find it extremely difficult to modernize their military forces and rejuvenate their economy at the same time.

US Draft Report Submitted to NATO Economic Committee

October 1985

DRAFT REPORT

The Soviet Defense Effort and Prospects for The Twelfth Five Year Defense Plan

Summary

Over the last two decades the Soviets have pursued a vigorous and relentless effort to expand and modernize their military forces. They have attained rough strategic parity with the US and greatly expanded their conventional forces along the Chinese border and opposite NATO. Soviet defense expenditures reached almost 80 billion rubles (constant 1970 prices) in 1984, double what was spent in 1965. The Soviets are now spending about one-sixth of their GNP on defense.

Military procurement expenditures, which account for roughly two-fifths of total defense spending, have increased by almost half since 1965. Most of this growth took place prior to the mid-1970s; since then, the annual rate of growth has been less than 1 percent. A number of factors contributed to this period of slower procurement growth. These included Soviet difficulties in developing the next generation of technologically advanced weapons, manufacturing constraints in bringing these advanced weapons into serial production, and poor overall economic performance during the period, particularly for industry. We think it likely that Soviet leaders, in recognition of the above problems and to make their defense establishment more competitive in the long run, made policy decisions that resulted in the slower growth of procurement.

The Soviets are now on the eve of the 12th FYP. We project GNP growth is likely to average in the 2 to 3 percent range. Performance has improved some in the last two years but depletion of their raw material base, slow growth of the labor force, and limited prospects for growth of productivity all constrain future growth prospects. While the Soviet economy will undoubtedly have difficulty simultaneously meeting the increasing demands of the major claimants--defense, civilian investment, and consumption--our evidence suggests that Soviet military procurement will grow at annual rates up to 3 percent. Even if procurement grows slowly--less than one percent--the already very high level of military procurement will allow the Soviets to deploy numerous modern weapon systems, many in large numbers. These include the SS-X-25 ICBM, the nuclear powered aircraft carrier, the Blackjack long-range strategic bomber, the MIG-29 aircraft, and the T-80 tank.

8 October 1985

DRAFT REPORT

The Soviet Defense Effort and Prospects For Defense In The Twelfth Five Year Plan

Introduction

1. The present paper updates the previous report on this subject. It is based on the results of a meeting of the Economic Committee with national experts and provides findings based on estimates, in rubles, of the annual cost of Soviet defense since 1965 together with a discussion of prospects for the future.

2. The estimate of Soviet defense expenditures for 1984 is, as in previous years, much higher than the single annual figures published as the official Soviet defense budget. The budget is intended to give the impression not only that defense expenditures have failed to increase but that they have actually declined. Since 1970 the Soviets have announced on four separate occasions slight reductions in their defense budget. This trend is incompatible with known Soviet force levels and military programs. In 1985 the Soviets did announce an increase in the defense budget to 19.1 billion rubles, an increase of almost 12 percent above 1984. Even this announced increase, however, significantly understates their actual expenditures.

3. Our expenditure estimates for Soviet defense indicate that in 1984 the Soviets again funded the largest defense effort in the world, as they have since the early 1970s. This reflects the continuing commitment of resources to the Soviet military establishment. We estimate the Soviets will continue to increase the capabilities of their forces throughout the 12th FYP (1986-90).

Purpose of The Estimate

4. The ruble estimate reveals both the level and trend in the volume of Soviet resources devoted to the military. It permits an assessment of the priority accorded to the military and the resulting impact on the economy. Comparisons of the spending trends for the major classes of weapon systems also permits us to assess the relative importance assigned by the Soviets to the various types of forces.

Methodology

5. The NATO definition of total defense expenditures is used in this paper. Soviet leaders, however, are thought to have a wider concept of defense expenditures that includes such items as expenditures for internal

security forces, part of civil defense, strategic stockpiles, and those space programs which in the United States are financed by the civil administration, but in the Soviet Union are the responsibility of the Ministry of Defense.

6. The estimates presented in this paper are based on the "building-block" or "direct-costing" method. Where the intention is to show trends in real growth, i.e., excluding the effects of inflation, constant 1970 prices are used. To the extent Soviet pricing policies capture true economic cost, however, current prices are a better measure of the shares of resources going to the various end-use categories of GNP and the burden of defense on the economy. Indeed, Soviet perceptions of the share of resources going to defense are most likely to be based on current prices, although our lack of knowledge of how the Soviet Union defines "defense" prevents us from fully understanding the leadership's perception of the burden. It should be borne in mind that there is some uncertainty in our estimates of the Soviet military effort which calls for a degree of caution in the interpretation of the findings presented below. In particular, we have much more confidence in the general trends of the estimates than in specific year to year changes.

7. There are other methods of estimating Soviet military expenditures that involve detailed analysis of Soviet economic and financial data from both open and classified sources. These approaches provide estimates expressed in very aggregate terms: the data cannot be broken down into the detailed expenditure categories provided by the building-block approach. Although they provide levels that are roughly consistent with those of the building-block approach, the many uncertainties--including missing data, incomplete information about Soviet prices and economic statistics, and ambiguous definitions--prevent a complete reconciliation of the methods.

Soviet Defense Programs, 1965-84

Soviet Military Forces

8. Since 1965 the Soviets have introduced hundreds of billions of rubles worth of new military equipment into their armed forces. This spending has bought both force expansion and modernization throughout the Soviet strategic and conventional forces. In the following paragraphs we examine the most important trends in each service.

9. Since 1965 the Strategic Rocket Force expanded from more than 200 to almost 1400 launchers. It was then almost completely reequipped with the deployment of fourth generation missiles such as the SS-17, SS-18, and SS-19 ICBMs, and the SS-20 IRBM. These missiles are more accurate than their predecessors and carry multiple warheads. The increased capabilities of these missiles owing to their greater accuracies and larger numbers of reentry vehicles (nearly a five-fold increase) clearly overcame the previous inferiority to the United States ICBM force.

10. The capabilities of the National Air Defense Force increased as

the Soviets replaced older aircraft with more modern ones such as the MIG-25 Foxbat, SU-27 Flanker, Mig-23 Flogger B/G, and more recently the MIG-31 Foxhound interceptors even though the actual number of aircraft fell. The newer aircraft improved Soviet capabilities to detect and engage not only high and medium altitude targets but also those at low altitudes. The SA-10 began replacing older SAMs, offering better low-altitude capabilities. New, more capable radars began to be deployed (Big Back, Tinshield, etc.). During this time, a significant upgrade to the Moscow ABM system commenced with construction of the Pushkino radar and ABM launcher silos to replace the older, above ground launchers. The Soviets also began building a network of large phased array radars for ballistic missile detecting and tracking.

11. The Ground Forces have undergone considerable expansion and improvement since 1965. Not only have the number of tanks increased by a fourth but the quality of those forces improved with the deployment of modern T-64B, T-72, and T-80 tanks. Other improvements include the addition of surface-to-air missile systems, such as the SA-6 and SA-8 and surface-to-surface missiles like the SCUD-B missile which has a nuclear warhead capability.

12. During this same period the Soviets continued the conversion of their Navy from essentially a coastal defense force to one with substantial capabilities to project Soviet power globally. They significantly increased the number of major surface combatants with the construction of larger surface combatants such as the Kiev CVHG, Kresta II guided missile cruiser, and the Kirov nuclear guided missile cruiser. With the deployment of nuclear powered attack submarines such as the V-class SSN and the C-class SSGN and an increase in the number of ballistic missile carrying submarines, such as the Typhoon SSBN, the Soviets more than doubled the size of the nuclear submarine force.

13. The Soviets have also invested heavily in their Air Force. Since 1965 the production and deployment of fighter aircraft with improved payload and range such as the Flogger and Fitter fighter-bombers bolstered significantly the Air Force's ability to support the ground forces. Other Flogger aircraft were deployed as counter air fighters. The introduction of Fencer light bombers improved the medium range interdiction and night/adverse weather capabilities of frontal and strategic aviation. In addition, the Soviets deployed the longer-range Backfire medium bomber for the deep interdiction mission. This resulted in roughly a 50 percent increase in the medium bomber force. The Bear H, a new variant of the old turboprop TU-95 that carried the AS-15 long-range cruise missile, received operational status during this period, giving the Air Force a stand-off capability against North America.

14. One of the areas of greatest expansion has been in space assets. Since 1965, the Soviets have orbited numerous new systems, such as the Medium Resolution photoreconnaissance satellite, ocean reconnaissance satellites (EORSAT and RORSAT), Launch Detection Satellites, and numerous communications satellites. They have also made impressive strides in their manned space program with the Salyut manned space station. To support these growing programs the Soviets increased the number and size of space-associated ground facilities and shipborne assets.

The Cost of Soviet Defense Activities

Total Soviet Defense Expenditures

15. We estimate total Soviet defense expenditures in 1984 were more than 78 billion constant 1970 rubles, about 40 billion rubles higher than in 1965. During the 1965-75 period, the cost of defense grew at about 5 percent annually, reflecting the rapid expansion of Soviet general purpose forces and military space programs, as well as the expansion and modernization of Soviet intercontinental and theater nuclear forces. Since 1975, however, Soviet defense expenditures have increased about 3 percent a year (see Figure 1). The slower growth in total defense expenditures since the mid-1970s results from a slowing in the growth of military procurement, slower growth in operating and maintenance costs, and little growth in military construction.

16. Soviet military planners devoted about two-fifths of the defense expenditures over the 1965-84 period to procurement and about one-fifth to RDT&E. Operating and maintenance costs accounted for slightly more than one-eighth of total defense costs; personnel costs slightly less. The small remainder went to construction.

The Impact of Defense on The Economy

17. When measured in constant 1970 prices, Soviet military expenditures absorbed a relatively constant 13-14 percent of GNP annually since 1965. The slowdown in the rate of growth in defense expenditures did not lower the burden in either constant or current prices as it has broadly coincided with a slowdown in the rate of growth of the economy. Indeed, in current prices, the share of GNP is estimated to have risen to 14-16 percent by the early 1980s. The higher burden obtained when estimating in the current prices reflects what is believed to be a larger cost increase in the defense sector than in the economy generally. More recently, relative prices for military and civilian goods were affected by the widespread wholesale price reform in industry in 1982 and a revision of construction prices in 1984. A preliminary assessment of these price reforms suggests they did not significantly change defense's share of GNP.

Soviet Military Procurement

18. Procurement accounts for about 40 percent of Soviet defense expenditures. As shown in Figure 2, Soviet military procurement, measured in constant 1970 rubles, has increased by almost half since 1965. Most of that growth took place before 1975; after 1975 there was little or no growth in procurement until recently. The four major components of procurement--naval ships, aircraft, missiles, and land arms all experienced little or no growth during the late 1970s.

19. The most recent estimate of procurement shows some growth in the past few years. The estimate for the end year of our estimate--1984 in this case--is always subject to greater uncertainty than the estimates for the earlier years because of the inevitable delay in obtaining and processing intelligence information and because of the difficulties in

FIGURE 1

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SOVIET DEFENSE EXPENDITURES

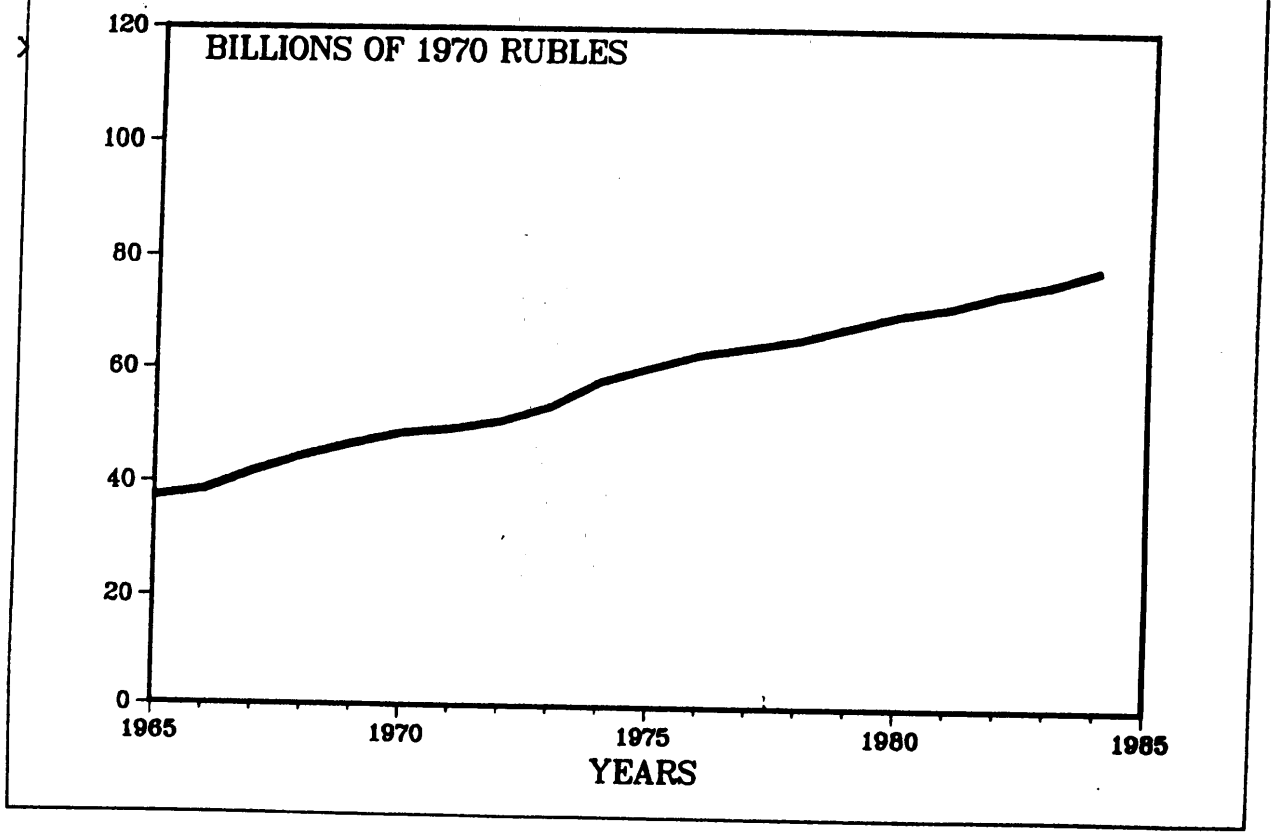

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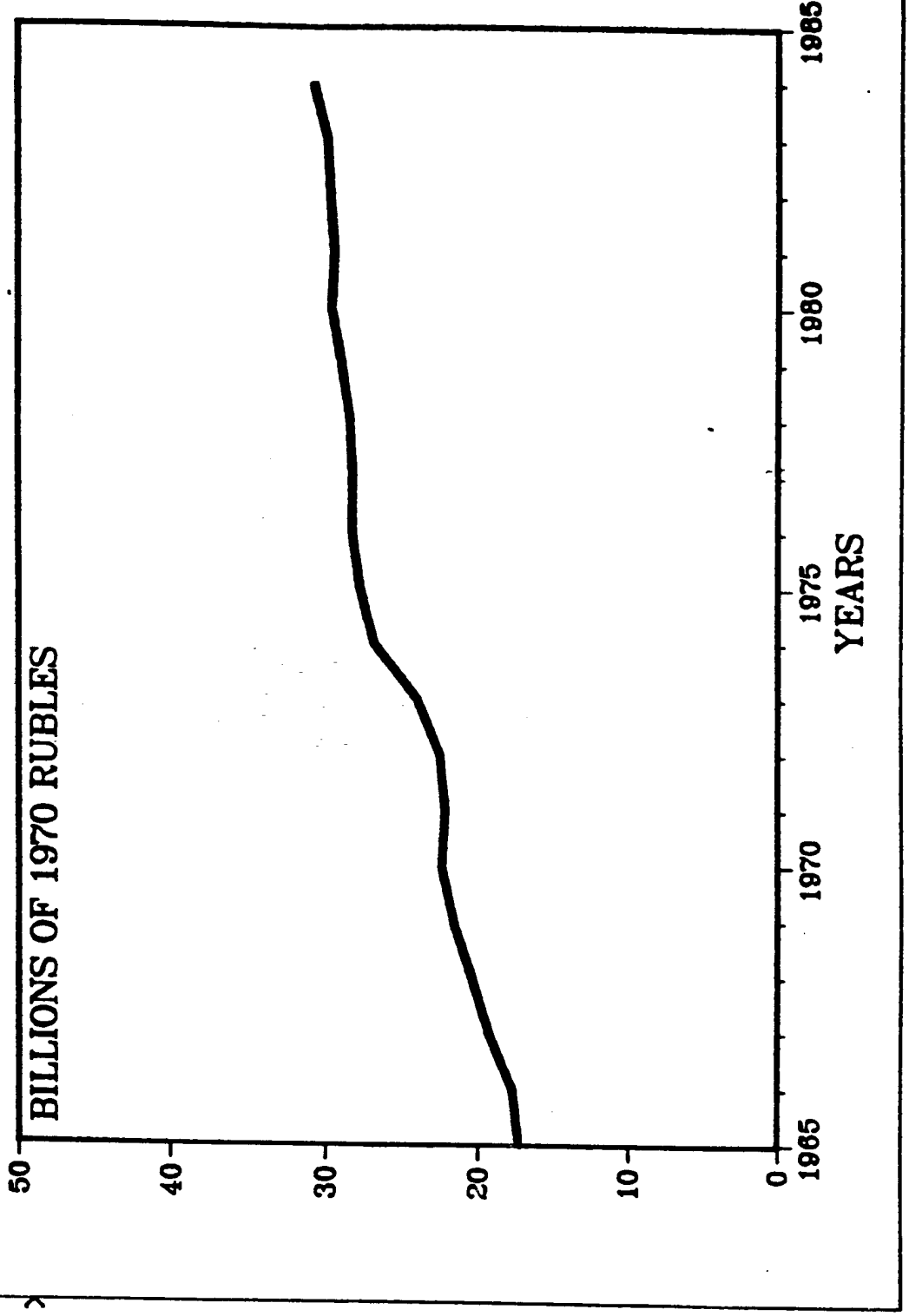
FIGURE 2

SOVIET MILITARY PROCUREMENT



estimating the distribution through time of the costs of systems that are built over several years. The phasing problem is of special concern for recent years like 1984 because it involves judgments about new systems that we think will be deployed in the future but for which the early costs must be phased back to the present. Estimates of missiles and ships are especially influenced by the lead costs of weapons that have not yet been delivered.

20. The Ground Forces claimed the largest share of Soviet military procurement--about one-quarter--during the 1965-84 period. The Navy and Air Force each received about a fifth; followed by National Air Defense Forces at about one-eighth and the SRF with about one-twentieth. The balance of procurement--about one-eighth--went to national command and support (see Figure 3).

21. The Ground Forces and Navy shares were relatively constant over the 1965-84 period. After an increase in the early 1970s, the Air Forces share remained fairly stable. In sharp contrast, the National Air Defense Forces share rapidly dropped during the 1970-75 period and has continued since 1975 to decrease slightly. Because of the Soviet reorganization that occurred in the early 1980s, however, it is difficult to follow the long-term trends of this service. The SRF share has risen and fallen with the deployment cycles of new missile systems.

22. Even during the 1975-84 period, when procurement grew slowly, the sheer size of the USSR's spending permitted the Soviets to introduce an impressive array of highly capable weapons in large quantities. For example, the SRF procured nearly 1,300 new ICBMs. The National Air Defense Forces introduced 1,500 new fighter aircraft including about 80 Foxhound, 1,100 Flogger and 250 Foxbat type fighters/interceptors, and more than 500 SA-10 launchers. The Ground Forces bought 20,000 tanks, 16,000 pieces of field artillery and more than 35,000 light armored vehicles; the Navy procured about 40 major surface combatants (3,000 tons or greater), about 50 nuclear attack submarines, some 30 diesel attack submarines, 24 SSBNs, and 130 Backfire bombers; and the Air Force procured about 4,000 new fighter aircraft including 1,500 Fitters and 2,000 Floggers.

Causes of the Slowing of Procurement Growth

23. Last year's report on Soviet military expenditures advanced several possible factors as explanations for the slowdown in the growth of procurement since 1975. We now believe the pattern in procurement growth has lasted too long a time for it to be solely the result of unanticipated economic or technological problems. In a period so long, the leadership of the Soviet Union could have used its control of industrial priorities to ensure a higher rate of growth of military procurement. Older-generation weapons could have been kept in production while problems with new systems were ironed out; or once the problems were overcome, the new systems could have been produced at more rapid rates. We believe they chose to pursue neither alternative. Further, a wide array of military hardware for both strategic and conventional forces in all five services were affected, suggesting the period of slower growth cannot be easily explained by any one unanticipated problem.

FIGURE 3

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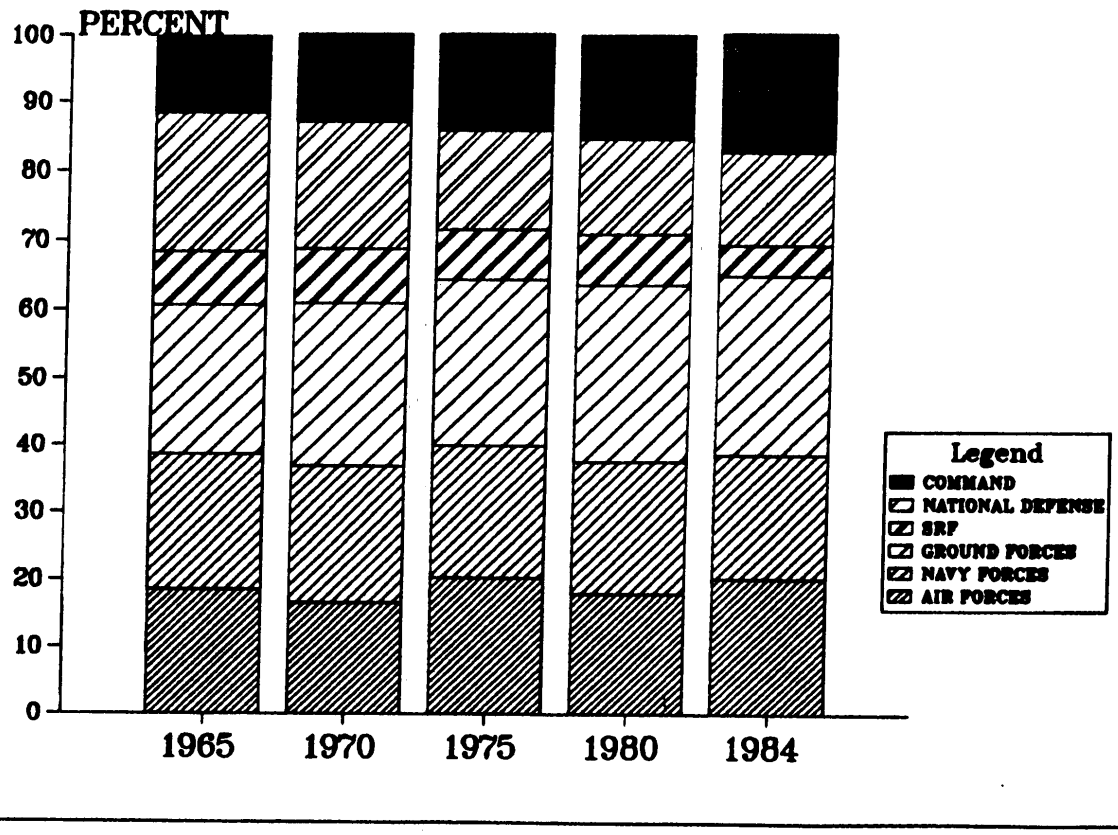
SOVIET MILITARY PROCUREMENT BY SERVICE SHARES



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24. We think it likely Soviet leaders, perhaps in anticipation of future economic and technological problems, took definitive actions that resulted in the slower growth of procurement. In making any such decision, Soviet leaders would have considered Soviet economic performance, particularly that for industrial sectors; current and future Soviet technological capabilities to counter Western advances in new weapon systems; and the military threat facing the Soviet Union.

25. One of the pressing problems facing the Soviet leadership was the general state of the Soviet economy. The leadership, in conducting its military-economic planning, was certainly aware of the progressive downturn of the economy as the growth of industrial output slowed and future prospects for improvement looked poor. Indeed, a year or so before implementation of the 1976-80 FYP, the Soviet leaders decided on a strategy for economic growth which stressed increases in efficiency and improvements in product quality. This strategy met with little success. Soviet efforts to improve the economy were thwarted, in part by shortages of key materials and transportation problems. Clearly these problems have affected defense since the mid-1970s despite the traditional priority accorded it.

26. The Soviet leaders were undoubtedly also concerned about their ability to counter the technological sophistication of the latest generation of Western weapons. We believe they decided to attenuate plans to procure current-generation weapons so as to allocate additional research capacity and time to develop new generations of advanced weapons and to modernize their manufacturing facilities by introducing new equipment and management techniques to improve their production processes. The Soviets did produce some high technology weapon systems, but difficulties remained:

-- Technical Difficulties. Modern Soviet weapons embody ever higher levels of technology, but there is evidence that the Soviets have experienced considerable difficulty, particularly in the R & D phase, in solving technological problems encountered in producing new weapons. Although problems in design or on the test ranges are nothing new, some of the delays encountered during this period were prolonged.

-- Manufacturing Constraints. Even after production of new weapons was begun, the Soviets were slow in achieving a high level of serial production of some high technology weapons systems in recent years. This deliberate pace probably reflected the underlying difficulties of incorporating advanced production standards and techniques.

27. While the Soviet military leadership undoubtedly was not complacent about the military "threats" they faced, they may have believed in the mid-1970s that their military posture was at least adequate. They had accomplished much over the previous decade. By most measures, the Soviets had achieved strategic parity with the West. They probably saw that their production and deployment of numerous modern conventional weapons had placed the Warsaw Pact forces on a par with NATO. Thus, the Soviet leaders may have been in more of a mood to accept slower growth for the military while other pressing problems were addressed, including preparing industry for the longer term.

28. When Soviet leaders reviewed their defense plans for the 11th FYP (1981-85), Western defense spending had begun to accelerate. But at that time the Soviet economy's performance was especially poor. Economic growth fell sharply after 1978 especially during the 1979-81 period when the Soviet Union experienced unusually hard winters. Industrial performance--where the impact of defense would be heaviest--experienced slower growth during 1979-82, though the machinery-producing sector (the source of most military hardware as well as producer and consumer durables) remained one of the fastest growing sectors. However, the technological gap between Western and Soviet weapon systems remained. New Western aircraft such as the F-16 and Harrier aircraft were not being matched by the Soviets and the West appeared even further ahead in the development of computers and data processing equipment.

29. Thus, as the 11th FYP approached, we believe Soviet leaders faced a dilemma. On the one hand, the capabilities from the US and NATO were growing with expanded defense budgets and the development of advanced weapon systems. This growth in Western capabilities threatened the achievement of some Soviet military missions. On the other hand, Soviet leaders faced a slowing economy with little immediate prospects for significant improvement. Adding to this was the steadily growing need to face the causes behind the slowing economy: poor agriculture, falling efficiency of capital, slow (if any) growth in labor productivity, and smaller increments to the labor pool. Effectively, the failure of the more productive use of resources strategy for economic growth and the difficulty of the defense industries in producing advanced technology weapons argued against the resumption of historical rates of defense growth without sacrificing efforts to modernize the defense industries and restore the economy. The Soviet leaders apparently decided spending for defense procurement would continue at its high levels, but with only modest growth.

Soviet Defense Efforts During the 12th FYP, 1986-90

30. For the short run Soviet options to change military procurement significantly are limited. Because of the lengthy development time of major weapon systems it is unlikely the Soviets could deploy by 1990 a major weapon system not already in or about to enter testing. On the other hand, the RDT&E and investment expenditures already expended for systems already in testing or early production argue against major cancellations. Therefore, we believe the Soviets would consider only marginal changes in production rates for systems to be procured over the next five years. We are confident, therefore, that Soviet procurement will continue at about its same high level. Even without additional growth in procurement the military can introduce a large assortment of new weapon systems into the forces. Before presenting our forecast of future Soviet defense spending we will consider the military forces we anticipate they will produce and deploy, the current state of the Soviet economy, and the technological capabilities of Soviet industry.

Future Soviet Forces

The Strategic Rocket Forces

31. The SRF will continue to develop counterforce capabilities to attack the missile silos and military bases of the West and strive for flexible capabilities against other military and industrial targets in the absence of a new arms control agreement. We expect the SRF to deploy three new ICBMs: the SS-X-24, SS-X-25, a follow-on to the SS-18 ICBM, and a follow-on to the SS-20 IRBM. These programs are aimed at maintaining or increasing the Soviet lead over the West in most measures of nuclear attack capability and at upgrading their nuclear war-fighting capabilities. However, the Soviets will also have to seriously consider the impact on RDT&E for defense and procurement caused by the United States SDI program. If they are to maintain their warfighting doctrine, whole new technologies and systems must be developed and deployed -- a very expensive endeavor.

National Air Defense Forces

32. Charged with defending the Soviet Union from strategic enemy attack, the National Air Defense Forces will continue the deployment of new interceptor aircraft, and surface-to-air missile systems for air defense, and an anti-ballistic missile system to defend against incoming ICBM and SLBM reentry vehicles. New interceptor aircraft such as the MIG-31 Foxhound, the MIG-29 Fulcrum and the SU-27 Flanker are sophisticated, high-performance platforms with radars that enable them to detect and engage low-flying targets from any altitude.

33. The Soviets will replace older fixed SAM systems with the new SA-10 system, primarily in its mobile version, which has a better capability than earlier SAMs against such targets as cruise missiles. The Soviets should also continue their antiballistic missile (ABM) programs with the SH-08 and modified Galosh anti-ballistic missiles.

Ground Forces

34. The Soviets will maintain their quantitative advantage over the West in standing forces by continuing to produce modern tanks such as the T-64B, T-72, and T-80 tanks. Many of these tanks, with improved armor, require fewer crew members than earlier tanks and have larger caliber main guns with longer ranges and automatic loaders to increase firing rates. Additional firepower will be acquired with the production of new surface-to-surface missiles such as the SS-23 and follow-on systems. The Soviets will upgrade division air defenses with the production of the SA-11, SA-12, and SA-15 SAM systems.

Air Forces

35. The Soviets will continue to improve their air capabilities with the production of modern high performance aircraft such as the MIG-29 Fulcrum and the SU-27 Flanker. In addition, the first Soviet long-range strategic bomber since the 1950s, the Blackjack, will enter force-wide service during this period.

Naval Forces

36. The Soviets will increase their capabilities at sea with the production of their first full sized nuclear powered aircraft carrier,

another Kirov nuclear powered cruiser, and a new class nuclear powered cruiser. The production of newer submarines such as the Oscar SSGN with cruise missiles will provide substantially greater capability than their predecessors. In addition, the Navy will continue to receive Backfire medium bombers intended for strikes against surface ships and begin deployment of a new sea-based fighter/bomber to replace older aircraft.

Military Space

37. The Soviets will continue their ambitious space program. We have identified 14 Soviet space systems that are in development and are likely to undergo testing in the next 10 years. Included are spaced-based laser ASAT weapons, a real-time photo reconnaissance system, and a new launch detection satellite covering the world-wide foreign missile threat. We also see steady growth in construction at the design bureaus, production facilities, launch complexes, control sites, space support ships, cosmonaut training facilities, and other elements of the space support infrastructure.

The State of The Economy

38. In sharp contrast to the successful military establishment, the Soviet leadership will begin the 12th FYP with a technologically backward economy buffeted by a decade of slowing growth punctuated by harvest shortfalls, industrial bottlenecks, labor and energy shortages, low productivity, and declining efficiency of investment. Although Soviet economic performance has improved in 1983 and 1984 from the low levels of 1979-82, the current forecasts suggest that GNP growth will average 1.5-2.5 percent per year for the remainder of the 1980s. Consequently, the Soviet economy may face difficulties in simultaneously meeting the increasing demands of the major economic claimants: defense, civilian investment, and consumption. Gorbachev has stressed the necessity of modernizing inefficient industrial facilities. But such modernization requires increased investment which can only come at the expense of some other claimant. Thus, we expect the 1986-90 period to prove particularly difficult for Soviet planners as they choose between competing claimants for relatively scarce industrial resources and technology.

39. Demographic factors are certain to keep the growth of the labor force at very low levels. The growth rate of the labor force will fall from less than 2 percent in the 1970s to almost no growth in the 1980s. Further, what little increase in the labor force does occur will be concentrated in the relatively less productive non-Slav worker of the labor force. Consequently, this demographic change will lower GNP growth unless offset by gains in labor productivity which we judge unlikely.

40. The partial depletion of the raw material base in the developed European regions of the USSR will increasingly force expensive new investments in remote areas of Siberia. This problem is particularly acute for the energy sectors of the Soviet economy where oil production is slowly declining in the face of continued growth in domestic demand. We expect gas production to continue to increase rapidly, offsetting the drop in oil output, but it is unclear how efficiently Soviet industry can convert to its use.

41. The Soviets cannot count on foreign trade to provide a way out of their difficulties. The oil and gas markets are likely to be soft for most of the decade, arms sales will face increased competition from other suppliers, production problems and growing domestic demand will hold back increases in exports of most nonfuel minerals, and low quality and poor marketing techniques will continue to retard increases in exports of machinery and other manufacturing goods. Consequently, we expect the decline of productivity and the higher costs for resources and energy to generate a greater demand for civilian investment to keep the economy growing. Civilian investment, however, will have to compete with defense and defense absorbs a large share of many of the most critical resources.

42. The average share of all resources going to defense is measured by the ratio of defense spending to GNP. However, the impact of defense spending varies considerably from one sector of the economy to another. For example, the total military requirement for products from machine building and metalworking (MBMW) is much higher than the average defense share of GNP. Soviet leaders (including Chernenko and Gorbachev) have repeatedly singled out MBMW as crucial to future economic development because it is the source of most of the machinery for capital investment and consumer durable goods for the population as well as most military hardware. In particular, the MBMW sector manufactures the advanced technology products (computers, electronics and the like) that are crucial for Gorbachev's goals for modernization of the economy as well as to producing technologically more sophisticated weapons systems. Other sectors that are key in their support of military procurement activities include chemicals, electric power, fuels, transportation and communication, and forest products. These sectors are also critical to economic growth and there is a great deal of interdependence among them.

43. In addition to the direct but heavy requirements of the military on the economy the demand for military goods impinges indirectly on a wide range of industrial sectors. For example, military hardware is procured directly from MBMW, which draws heavily from metallurgy, which, in turn, demands large inputs from the coal industry. Thus, large indirect military demands may be created in some industries even though direct military purchases from them are small.

Technological Difficulties

44. The level of Soviet technological development--both for the technologies embodied in the weapon systems themselves and the technologies necessary for the industrial production of the weapon systems--lags behind Western levels. Even though the defense sector has systematically siphoned off high quality resources, the military has encountered technological production problems in its quest to produce sophisticated new weapon systems. As a result, the Soviets have pursued an active program of technological transfer and theft. Aside from providing them with advanced technology not otherwise available, it saves the Soviets RDT&E money and enables them to incorporate countermeasures into their own weapon systems. These activities help explain how the Soviets have managed to deploy some of the sophisticated weapons systems currently in their force.

45. It will be a major challenge for the Soviets to develop the technologies that must be embodied in the next generation of weapons. They face substantial technological hurdles in all the defense industries. They are using solid propellant rocket motors for their newest ICBMs (the SS-X-24 and SS-X-25) but it will be some time before they convert the entire force to this more reliable technology. Their inadequate computer processing technologies will severely constrain their capabilities to match the US and its NATO allies in SDI research. The gap in composite fiber technology is widening with the West and could hold them back from matching the West in the development of new aircraft.

The Threat

46. Balancing the economy's requirements for additional resources are Soviet perceptions of outside threats stemming mostly from the West but also from the East particularly China. The Soviets are very well aware of the greater willingness on the part of the United States and its allies to support a reinvigorated defense effort--one which threatens to undercut the gains the Soviets had made since the early 1970s. Improvements in US strategic weaponry, particularly the deployment of the D-5 SLBM and the projected deployment of the MX ICBM and the B-1 bomber, pose a considerable threat to the capability of the Soviet military to achieve their objectives. Recent NATO deployments of Pershing II and cruise missiles in Europe and the modernization of European forces with the deployment of new weapons such as the Tornado aircraft and the Leopard II and Challenger tanks also present problems for the Soviet military. Finally, the US's proposed SDI research program worries the leadership. Judging by past Soviet reponses to Western military improvements, the Soviets see their ability to wage and win a nuclear war diminished by these new weapons.

Future Military Procurement

47. The exact level of future Soviet military procurement is unknown. However, based upon Soviet military doctrine, past trends in military procurement, and evidence of weapon systems under development or testing, we can estimate a range for Soviet military procurement in the 12th FYP. This range represents the uncertainty associated with the procurement of future weapon systems. The top of the range implies growth of 3 percent per year (below the 1965-75 rate) and spending as high as 37 billion rubles (constant 1970 prices) by 1990. With this effort, procurement for the 12th FYP would exceed that of the 11th FYP by more than 21 billion rubles. At the lower end of the range, military procurement would exhibit little or no growth and reach about 32 billion rubles by 1990 (see Figure 4).

48. We estimate the impact of military procurement on specific industries by projecting the share of the expected economic growth--the so-called growth dividend--that would be consumed directly or indirectly by military procurement. Figure 5 compares the additional output of the branches of the economy that would be consumed by military procurement if procurement grew at 3 percent a year. If the economy grew slowly then nearly half of the additional output of metallurgy, two-thirds of fuels, and one-fifth of machine-building would be earmarked to support defense. Other industries would also be affected, but to a lesser degree, If the

FIGURE 4

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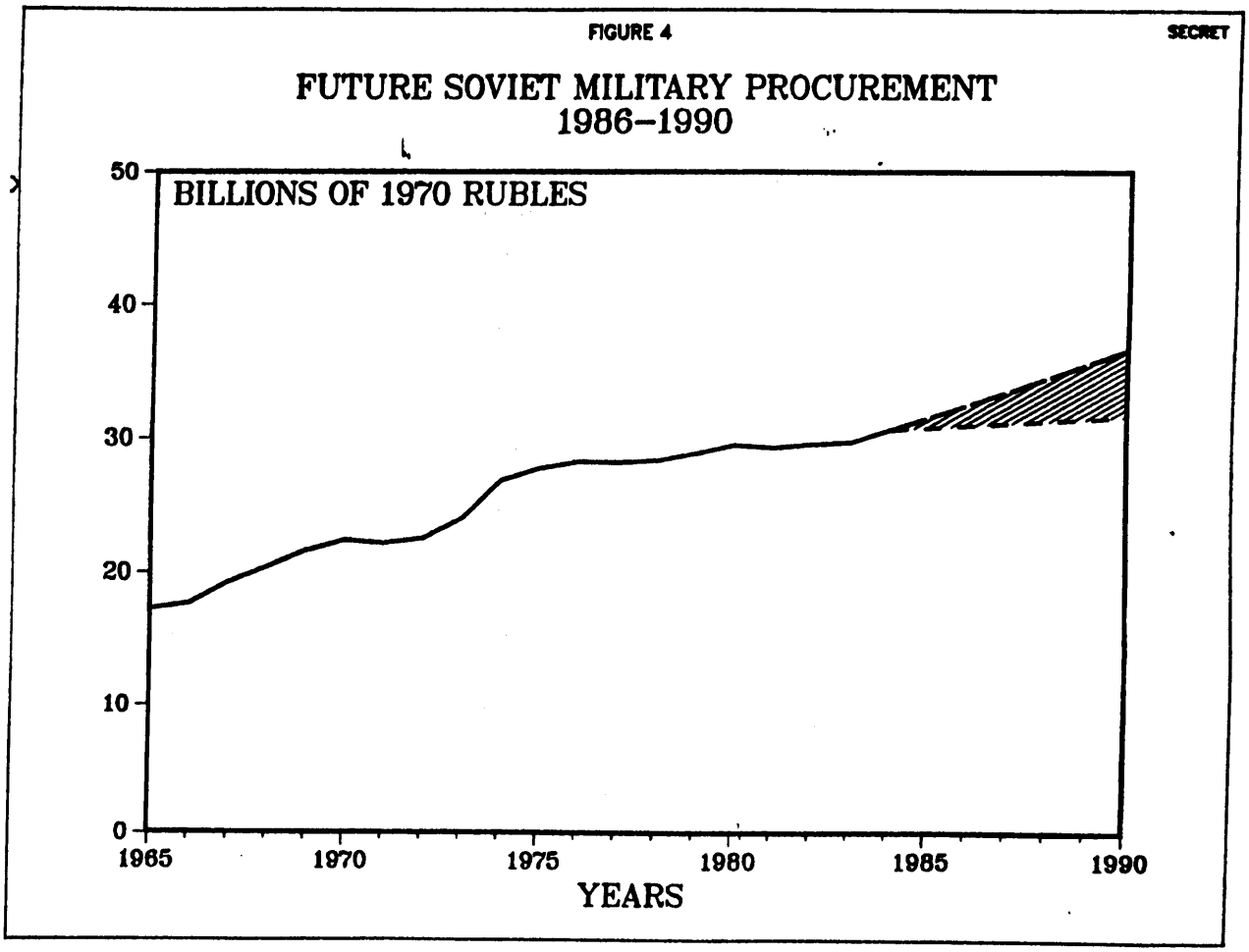

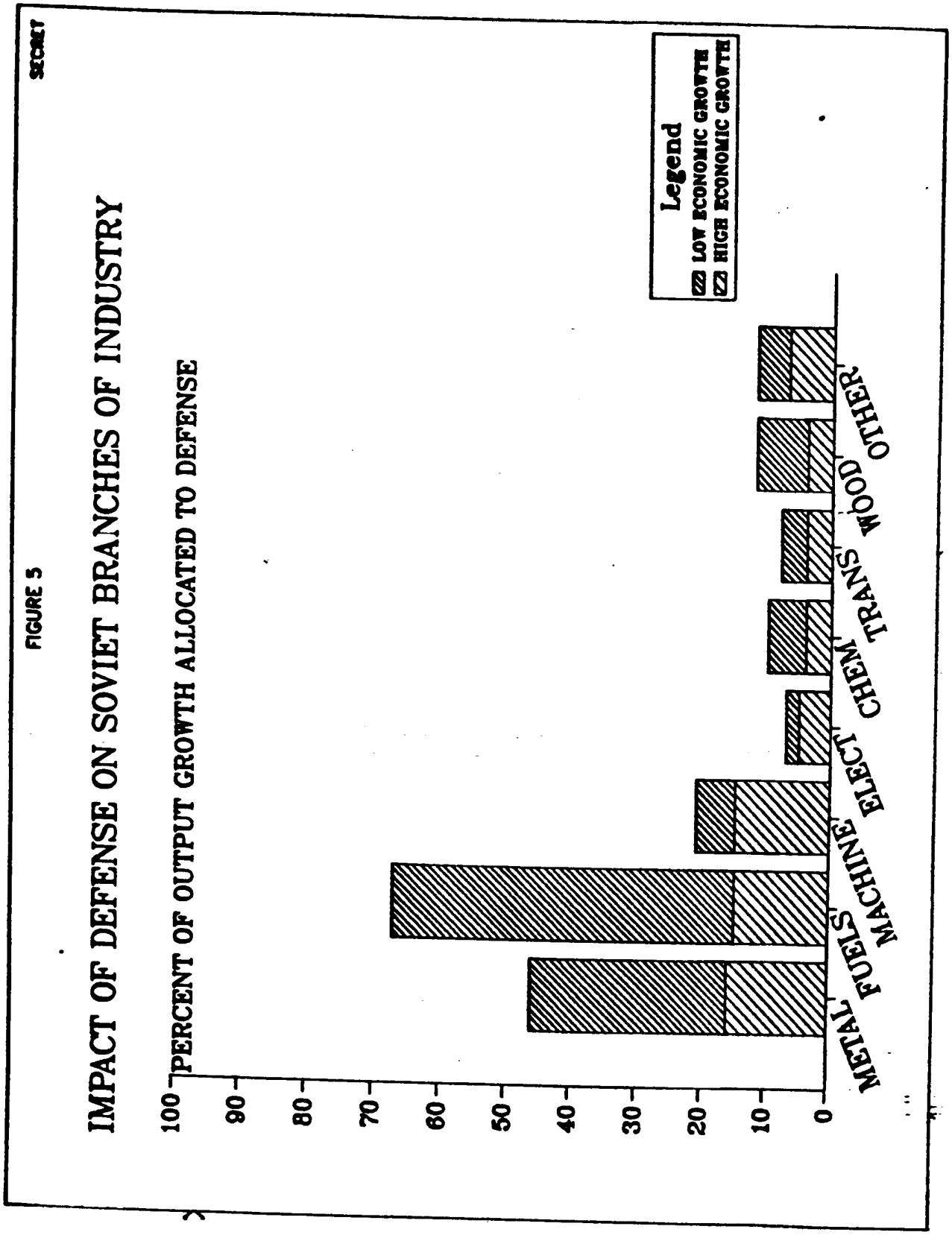

economy grew at a faster rate then only about 15 percent of the expected growth in metallurgy, fuels, and machinery branches of the economy would be consumed by procurement. The other branches would also experience significant reductions. If procurement grew slowly, then the share of output growth devoted to procurement would be insignificant.

Conclusion

49. Since the early 1960s the Soviets have undertaken a vigorous and relentless effort to build, deploy, and maintain powerful military forces second to none. Though the range of uncertainties is large concerning Soviet defense options for the 12th FYP, we know the Soviets will continue to improve their forces throughout the 1980s with new weapon systems. Because of the already high levels of military procurement, the Soviets will deploy numerous modern weapon systems, many in large numbers, no matter what they are deciding about actual growth rates in defense.

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USSR: MEASURES OF ECONOMIC GROWTH AND DEVELOPMENT, 1950-80

STUDIES

PREPARED FOR THE USE OF THE

JOINT ECONOMIC COMMITTEE

CONGRESS OF THE UNITED STATES

DECEMBER 8, 1982

Attached is a forward to a major study prepared by the CIA on the above topic. It explains why we cannot accept official Soviet data and why it is necessary for us to calculate our own measures.

Printed for the use of the Joint Economic Committee

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FOREWORD

By Chairman Henry S. Reuss

The Soviet Union does not publish measures of economic growth and development comparable with those of Western countries. Rather, it publishes measures of growth that are geared to its own definitions of economic phenomena and its own political requirements. In addition, it follows a policy of secrecy with regard to much of its economic activities and has been inconsistent in the comparability and coverage of the economic statistics that are published. The result is a large gap in the information available in the West concerning the performance of the Soviet economy. To help fill this gap, the Central Intelligence Agency (CIA) has been called upon to provide quantified estimates of the value of Soviet gross national product (GNP), its rate of growth, its size relative to U.S. GNP, and its allocation among the various end uses—consumption, investment, and government expenditures, including defense.

The studies contained in this volume are the culmination of a large research effort over many years carried out by CIA's Directorate for Intelligence. The estimates of GNP and its components, which are included, are virtually the only independent Western estimates of these important measures of economic performance in the Soviet Union. Earlier results of this work have appeared in various Joint Economic Committee studies of the Soviet economy and CIA's annual *Handbook of Economic Statistics*. This publication is the first time that the concepts, methodologies, and data have been fully explained and documented in a comprehensive and up-to-date form.

The studies include separate sections devoted to agriculture and industry—the major components of the originating sectors in the GNP, and to consumption—the principal end-use sector. Part I discusses the overall estimates of Soviet GNP by sector of origin and end use. Each of the remaining three studies analyzes in detail a major component of GNP. Part II contains an index of industrial production. Part III is an index of agricultural production. And the final part is an index of consumption. Indices for all other sectors are included in Part I.

Each study includes detailed compilations of the data used, their sources, and the methodologies used to combine the data into the aggregate measures. The goals of this publication are to achieve a wider understanding of how the synthetic measures of Soviet economic performance are derived, to encourage their broader use in analyses of Soviet economic performance, and to stimulate discussion of ways to improve these measures and our general understanding of the Soviet economy.

Necessity To Calculate Independent Measures

There are several reasons for the calculation of independent measures of Soviet economic performance. The deficiencies of official Soviet measures of economic activity are well documented. Official Soviet measures are often conceptually different from the measures used in the West, are not published in sufficient detail, are sometimes published in noncomparable series, and tend to inflate real growth rates.

The official Soviet measure of economic growth, referred to as net material product, includes only the value added in the production of goods, and a few services. The value added in the rest of the service sector and all depreciation

income is excluded. Thus, Soviet net material product omits about one-fourth of the resources used to produce goods and services in the USSR. In addition, there is an upward bias in official measures of activity. The result is that Soviet statistics on net material product provide an incomplete and distorted view of the size and growth of the Soviet economy.

The need for independent measures of economic performance is heightened by the sparseness of official data and their inconsistencies. The official data tend to be published in insufficient detail, the price base of some series are periodically changed, and the product coverage may be altered without notice.

For example, because the official measure of consumption referred to as "real incomes of the population," is not described adequately, its validity or usefulness cannot be fully assessed. The official series shows a higher growth rate than does the synthetically constructed index of consumption, in part because of the failure of the official series to take inflation into account.

The Soviet indices of industrial and agricultural production are based on gross output rather than value added. As a consequence, double counting of materials used in production is incorporated in the indices. There is considerable evidence that the official index for industrial production has serious short-comings due to the treatment of price and quality changes. There is much evidence that prices assigned to new industrial products are too high relative to prices for older products in view of the changes in technology and quality taking place.

In the consumer sector, there is considerable evidence that new, high-priced but only slightly altered products are deliberately substituted for equivalent, low-priced products to syphon-off consumer purchasing power. The official data treat such changes as if there were no real price increases, thus incorporating hidden inflation.

The General Approach

The value of GNP can be calculated in two ways. One way is to derive GNP as the sum of the various end uses of the goods and services—consumption, investment, and government (both military and civilian). GNP can also be computed as the sum of value added in the several production sectors—industry, agriculture, and the like.

The intent of these studies is to replicate as far as possible, on both the sector of origin and end use sides of the accounts, the methodologies developed by the U.S. Department of Commerce and the OECD for the construction of Western economic accounts. Precise conformity is not possible, primarily because the organization of the Soviet economy and the limited amount of data published by the Soviet Union require modifications and simplifications of the Western accounting framework. Defense expenditures are the most conspicuous example. Total defense is not identified separately in the Soviet GNP accounts contained in this volume because other GNP components, primarily investment and research and development expenditures, are thought to include substantial amounts of defense expenditures. As a separate exercise, the CIA estimates total defense expenditures directly from a detailed description of their defense programs and activities. The defense estimates have been explained and discussed in the Joint Economic Committee's annual hearings on the "Allocation of Resources in the Soviet Union and China."

Despite the limitations, it is believed that the measures developed—both the configuration of trends and absolute size—are reasonably accurate representations of Soviet economic performance, can be compared with confidence with similar measures for Western economies, and are far more acceptable indicators of economic performance than the corresponding measures published by the USSR.

Gross national product is defined as the market value of the final goods and services produced by a given country. As applied to the Soviet economy, this

definition raises theoretical problems. The most important is that the Soviet Union does not have market determined prices. Instead, it uses, for the most part, centrally fixed prices which may be quite far removed from the values that would obtain in a market-oriented economy. Market prices reflecting real resource costs of each product are needed to derive theoretically correct inferences about the real growth and distribution of GNP. An important segment of Part I is devoted to computing a set of alternative, factor-cost prices used to replace Soviet prices. The latter are seriously distorted by taxes and subsidies and by their failure to incorporate accurately the costs of land and reproducible fixed assets. The factor-cost prices are intended to represent more accurately the actual cost of resources used to produce each category of goods and services.

The indices of the growth of GNP and its three major components are computed as weighted averages of subcomponent indices. The weights are 1970 expenditures or value added as derived in the 1970 GNP accounts (Part I, Appendix D). The subcomponent indices are developed from physical production or consumption data. The index of industrial production is computed from production data on over 300 products. These are grouped first into 10 branches of industry and then into an aggregate index. The index of agricultural production, computed by combining production data for 42 types of crops or livestock products, represents the value of all output less that used by agriculture itself—primarily feed and seed. The index of consumption is divided into three major categories of goods and eight categories of services. Each category is further divided into individual products or services. The index of GNP by sector of origin is formed by combining the indices of industrial and agricultural production with similar indices for the remaining production sectors—transportation, communications, domestic trade, and services. Similarly, GNP by end use is computed by adding indices of investment and other government expenditures, including most of defense outlays.

Major Problems Encountered

The construction of the independent measures encountered numerous problems. Some are universal to all aggregate measures of economic performance and some are peculiar to the Soviet case. The treatment of quality change, for example, is a universal problem. Most elements of the industrial index are expressed in physical units such as tons or number of items. This procedure may understate quality improvements over time, especially in machinery products. On the other hand, official data, expressed in rubles or as index numbers, are used where physical production data are not available. As indicated above, these data clearly overstate growth. Because the biases in official and physical data are offsetting, however, their use in combination should provide a truer measure of real growth. Similarly, the index of housing services in the consumption index is based on the number of square meters of housing without a quality adjustment. In this case, all evidence points to remarkably little improvement in the quality of Soviet housing and there is likely not a serious bias in the housing index.

Compiling consistent data for the period 1950–80 presented a challenge. Many of the official data series are incomplete or published in differing formats, requiring many interpolations and strong assumptions about relative prices. Other data are not published at all or not on a regular basis. Instead, they have to be culled from the specialized monograph and journal literature. For example, data on the amount of waste included in the gross output data of agricultural products are not published regularly or in a consistent framework.

Uses of the Studies

Just as aggregate measures of Western economic performance are used in many different applications, so the results of these studies can be employed

in many ways. Foremost is their use in making assessments of the Soviet economy by analyzing the interplay of the disposition of resources for consumption, defense, and future growth. Insights into the regime's policies and priorities can be obtained by assessing the "burden" of defense and the pattern of allocating the "growth dividend." In addition to being a measure of the size and growth of the economy, GNP also provides a standard against which other economic variables can be measured, such as the amount of energy used per unit of GNP.

The GNP data base forms the foundation for forecasting, either by using large econometric models or other means. Such forecasts not only concern the future growth rate of total GNP, but also can be employed to assess other important variables, such as the domestic demand for oil.

The GNP estimates can be used to compare the size of the Soviet economy with the United States or other countries, and the relative priorities each country assigns to the uses of its national product. Such international comparisons depend, of course, on the domestic value of GNP or one of its components. For example, an earlier publication in this series estimated the value of Soviet consumption relative to other countries.[1]

Despite the limitations of the estimates, the work expended on the CIA independent measures represents a valuable contribution to economic analysis of the USSR. The results shown in this volume present a picture of Soviet economic growth different from that given by the official measures. Each of the four studies presents comparative results in detail. By way of summary, the following tabulation compares average annual growth rates for the four aggregate indices and their closest Soviet official counterparts for 1951–80:

Average annual rate of growth in the years 1951–80

[Percent]

	CIA measure	Soviet measure
GNP [1]	4.7	7.4
Industrial production	6.8	8.7
Agriculture production [2]	2.8	3.1
Per capita consumption	3.5	5.0

[1] The CIA measure for the same coverage as the Soviet measure (see text) is 5.3 percent per year

[2] The measure shown represents "net output," or gross output less products used by agriculture (seed and feed). This is the concept of output closest in coverage to the official Soviet measure of farm output. As a contributing sector to GNP the appropriate measure for agriculture output is value added (net output less material purchases from other sectors) which over this period grew at 2.0 percent per year.

It is clear that, except for agriculture, the growth rate differences are large and, over a 30-year period, indicate a significantly different picture of economic growth than that provided by official Soviet statistics.

[1] "Consumption in the USSR: An International Comparison," U.S. Congress, Joint Economic Committee, August 1981.

Appendix

Soviet GNP Data: Methodology and Reliability

For the purpose of GNP accounting, we divide the Soviet economy into two sectors—household and public—and compile detailed accounts of incomes and outlays for each. These accounts are shown in tables 11 through 14.

In the household sector, incomes should equal outlays, but outlays that we have been able to identify consistently exceed incomes in all years. In order to balance the accounts, therefore, we have added an income item in table 11 for unidentified money income and a statistical discrepancy.

In the public sector, we do not estimate defense expenditures separately, and, therefore, incomes always exceed outlays. The difference, shown in table 14 as outlays n.e.c., is taken to be defense expenditures and others (for example, changes in strategic reserves) not included with any of the identified expenditures. As discussed on page 3, the outlays n.e.c. category does not include all defense expenditures. Other elements of defense expenditures are believed to be included in investment and R&D—and possibly in administration, health, and education. Some estimates of these other elements for 1970 indicate that the independently derived estimate of total defense expenditures is consistent with the GNP data presented here.

We compute GNP in two ways: as the sum of those incomes in the household and public sectors that are earned as a result of the current production of goods and services (see table 15) and as the sum of outlays by both sectors for goods and services (see table 16). The equality of incomes and outlays in the separate sector accounts ensures that total GNP is the same regardless of which method is used.

This two-sector structure of the Soviet economy is highly simplified and leaves much to be desired. For example, in the household sector (see tables 11 and 12) the production and consumption activities are combined in one account. In the public sector, the activities of the government, state production enterprises, and collective farms are all combined. The failure of the Soviet Union to publish more detailed data means that an effort to develop the information required for a more detailed accounting structure would enormously increase the difficulty of the project without greatly enhancing the value of the results.

The various types of income listed in table 16 are disaggregated in table 17 to show GNP by sector of origin. For example, total wages are divided into those wages earned in industry, construction, agriculture, and other sectors. The Soviet definitions of the various sectors are often different from those definitions we use for GNP calculations—requiring us to make many additional estimates.

In order to obtain the growth of GNP, we compute constant-price activity indexes for each sector of origin (see table 18). For the most part, these indexes show production in physical units (such as types of machinery, kilowatt-hours of electricity, and tons of oil) to which prices can be assigned.

Constant-price indexes of as many end uses of GNP as possible are also compiled, again mostly in physical units (see table 19). Constant-price indexes of net exports and inventory change have not been compiled, and these end uses of GNP are therefore combined with outlays n.e.c. to form the "other expenditures" category.

From the current-price GNP data in table 15 and the constant-price indexes in table 19, implicit rates of price changes of GNP can be computed for each end use (see table 20).

The primary source for most of the raw data used in this paper is the annual Soviet statistical handbook, *Narodnoye khozyaystvo SSSR v 19— godu*. Some data were acquired from other Soviet statistical publications, such as the handbooks for the 15 republics that make up the USSR and the budget handbook (published every five years).

These standard statistical sources left many gaps, however. Filling these gaps required a broad search of Soviet economic books and journals. The type and range of sources used is indicated by the detailed source notes to our earlier publication on GNP in 1970 prices, *USSR: Gross National Product Accounts, 1970,* Central Intelligence Agency, A(ER)75-76, November 1975. Further notes are available in *USSR: Measures of Economic Growth and Development, 1950-80,* US Congress, Joint Economic Committee, December 1982.

Reconciliation of Defense Expenditures With GNP

As explained on page 3, we estimate Soviet defense expenditures independently of the GNP accounts. This has to be done because the Soviets publish no useful data on their defense expenditures. The direct-cost methodology used to estimate total defense expenditures involves the identification and enumeration of physical elements of the defense effort over time and the application of cost factors (expressed in 1970 rubles) to each element.

An additional useful step is an attempt to determine whether the independent estimate of defense expenditures is consistent with our GNP data. If we have correctly constructed Soviet GNP by end use, then all purchases of goods and services for defense must be included in it somewhere—under either consumption, investment, or other government expenditures.

One part of other government expenditures is the residual element—outlays n.e.c. By its method of construction, this element should be made up almost completely of defense expenditures. In the GNP data discussed in this paper, the value of outlays n.e.c. for 1970 is 27.5 billion rubles—far short of our direct-cost estimate of total defense expenditures for 1970.

We have, therefore, reexamined the identified end uses of GNP—consumption, investment, government administrative services, and R&D—in light of the hypothesis that they might contain some defense expenditures. The Soviets have published some accounting rules they use in compiling their economic data, but these rules are skimpy in any regard and nonexistent regarding defense expenditures. Therefore, our judgments of where the Soviets may be counting their defense expenditures in the end use categories can only be hypotheses.

In examining the identified end uses of GNP, we considered only those reflecting public-sector outlays (see table 14). The following categories seem likely to include defense expenditures:

Communal services probably include defense expenditures for education, health, and physical culture.

Government administrative services probably include defense expenditures for administration.

Investment probably includes defense expenditures for (a) common-use durables (machinery and equipment that are similar in design and use to items that would be considered investment in a civilian sector), (b) construction of new facilities, and (c) capital repair of equipment and facilities.

Research and development probably includes defense expenditures for research and development.

Each of the physical elements of the defense effort (as listed in our direct-cost methodology) was then examined for types of expenditures that would fall into these categories.

Our estimates of the direct-cost defense expenditures that could be included in each end use of GNP is necessarily imprecise. Each step in its preparation (our listing of the physical elements of the Soviet defense effort, the estimate of the activity level of each, and the estimated 1970 unit price of each piece of equipment) is subject to substantial margins of error. We therefore use ranges for our estimates. When these estimates are added to outlays n.e.c. in our GNP data, the resulting range for total Soviet defense expenditures does not coincide exactly with our direct-cost estimate, but the two are broadly consistent. This general consistency gives us considerable confidence in our estimates of both defense expenditures and GNP.

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25X1

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