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Soviet and US Defense Activities, 1970-79: A Dollar Cost Comparison

A Research Paper

*SR 80-10005
January 1980*

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*Information available as of 31 December 1979
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Soviet and US Defense Activities, 1970-79: A Dollar Cost Comparison

Introduction

The military establishments of the USSR and the United States are difficult to compare because they differ so much in missions, structure, and characteristics. Any common denominator used for comparative sizing is imperfect, and its limitations must be understood in interpreting such comparisons. The approach taken here is to compare the defense activities of the two countries using the familiar common denominator of dollar cost.

This paper presents estimates of what it would cost to produce and man in the United States a military force of the same size and with the same weapons inventory as that of the USSR and to operate that force as the Soviets do. It then compares these estimates with known US defense outlays. This approach provides a general appreciation of the relative magnitudes of the defense activities of the two countries. Dollar cost data also provide a means of aggregating elements of each country's military program into comparable categories and thus can show trends and relationships between the two defense establishments that are difficult to discern and measure in other ways.

Definitions

The defense activities used in this comparison encompass the following:

- National security programs that in the United States would be funded by the Department of Defense.
- Defense-related nuclear programs such as those funded in the United States by the Department of Energy.
- Selective Service activities.
- The defense-related activities of the US Coast Guard and the Soviet Border Guards.

The following activities are not included in this comparison:

- Military retirement pay, which reflects the cost of past rather than current military activities.
- Space activities that in the United States would be funded by the National Aeronautics and Space Administration.
- Civil defense, foreign military sales, and military assistance programs, except for the pay and allowances of uniformed personnel engaged in such programs.
- Veterans' programs.
- Soviet Internal Security Troops who perform police functions and Soviet railroad and construction troops who are not directly involved in national security matters.

US Data

US data are derived from the US budget and *The Five Year Defense Program* issued by the Department of Defense in September 1979. The US data have been converted to calendar year outlays, and defense-related activities of the Department of Energy and the Coast Guard have been added. All data are expressed in constant prices to eliminate the effects of inflation. The US figures in this report, therefore, do not match actual defense budget authorizations or appropriations.

Estimates of Soviet Defense Activities

The dollar costs of Soviet defense activities are developed on the basis of a detailed identification and listing of Soviet forces and their supporting elements. The components that make up these forces and their support are multiplied by estimates of what they would cost in the United States in dollars. The results are then aggregated by military mission and by resource category.

The reliability of the estimates depends on the precision and accuracy of our estimates of the Soviet activities and the cost factors applied to that data base. In sum, we believe that our dollar cost estimate for total defense activities is unlikely to be in error by more than 10 percent in the current period or by more than 15 percent early in the decade. This judgment, while aided by the use of statistical techniques, nonetheless contains a large subjective element. Moreover, the margin of error can be much wider for some of the individual items and categories. We are more confident in the higher levels of aggregation than in the lower ones, and within the lower levels our confidence varies from category to category.

We place our highest confidence in the estimate of the pay and allowances for uniformed personnel. These costs represent about 35 percent of the total estimated dollar cost of Soviet defense activities for the 1970-79 period. We obtain these manpower costs by applying US factors for pay and allowances to our estimates of Soviet military manpower. Soviet military personnel performing duties similar to those of US counterparts are assigned the same rates of pay as their counterparts.

We also have substantial confidence in our estimate of total military investment, which represents about 30 percent of the estimated total dollar cost. The investment category includes the procurement of weapons and equipment and the construction of facilities. These dollar costs are based primarily on detailed estimates of Soviet weapons production rates and characteristics which can be ascertained with confidence through intelligence methods.

Although we have continued to make improvements in our estimates of operation and maintenance (O&M) costs, which are about 20 percent of the total dollar estimate, we remain somewhat less confident in these estimates than in those for investment.

The estimated dollar costs for Soviet research, development, testing, and evaluation (RDT&E), which are derived in the aggregate using a less certain methodology, should be regarded as significantly less reliable than those for either investment or operating. The level and trend of these estimates, however, are consistent with the judgment, made with high confidence, that

the Soviet military RDT&E effort is large and growing.

Dollar Costs and Military Capabilities

US defense expenditures and our estimates of the dollar costs of Soviet defense activities are measures of the annual flows of resources devoted to defense. Such measures can be used to compare the overall magnitudes and trends of the defense activities of the two countries in terms of resource inputs. They have an important advantage over many of the other input measures—such as the numbers and types of weapons—in that they are a common denominator which permits aggregative comparisons. Dollar cost valuations, for example, take into account differences in the technical characteristics of military hardware, the number and mix of weapons procured, manpower strengths, and the operating and training levels of the forces.

But dollar valuations still measure input rather than output and should not be used alone as a definitive measure of the relative effectiveness of US and Soviet forces. Assessments of capability must also take into account strategic doctrine and battle scenarios; the tactical proficiency, readiness, and morale of forces; the numbers and effectiveness of weapons; logistic factors; and a host of other considerations. As with other input measures, dollar valuations are probably more instructive as general indicators of changes in the military capabilities of the two nations' forces over time than as indicators of the comparative capabilities of the forces.

Dollar Costs and Soviet Perceptions

Estimated dollar costs do not measure actual Soviet defense expenditures or their burden on the Soviet economy. These questions are addressed by different analytical techniques that yield estimates of the ruble costs of Soviet military programs.

Similarly, dollar cost analysis does not reflect the Soviets' view of the distribution of their defense effort. Neither the system of accounts nor the structuring of expenditures by military mission is the same for the Soviet Ministry of Defense and the US Department of Defense. In addition, the sharp differences between relative prices of various defense activities in the United States and the USSR affect the distribution of

defense expenditures significantly. How the Soviets view their own defense effort is best inferred from estimates made in terms of rubles, not dollars.

Price Base

The data presented here are expressed in constant dollars so that trends in cost estimates will reflect real changes in military forces and activities rather than the effects of inflation. This paper uses prices that represent the purchasing power of the dollar for defense goods and services at midyear 1979.

Dollar Cost Comparisons

Aggregate Defense Costs

For the 1970-79 decade, the cumulative estimated dollar costs of Soviet defense activities exceeded US outlays by almost 30 percent. The trends of the defense activities of the two countries, moreover, differed markedly. Estimated in constant dollars, Soviet defense activities increased at an average annual rate of 3 percent.¹ While growth rates fluctuated somewhat from year to year—reflecting primarily the phasing of major procurement programs for missiles, aircraft, and ships—the pattern was one of continuous growth throughout the decade. Evidence on weapon systems currently in production and development, continuing capital construction at major defense industries plants, and the increasing costs of modern weapons indicate that this long-term trend in Soviet defense activities will continue into the 1980s at about the same rate of growth.

In contrast, the trend in US outlays was downward for most of the period. US outlays fell from the beginning of the decade until 1976. Since then they have grown somewhat, as increases in procurement, RDT&E, and O&M offset continuing declines in military personnel costs and in construction.

As a result of these diverging trends, the estimated dollar costs of Soviet defense activities caught up with US defense outlays in 1971 and exceeded them by a widening margin through 1979. In 1979 the Soviet total was about \$165 billion, approximately 50 percent higher than the US total of \$108 billion.

¹ When valued in rubles, this growth rate is 4-5 percent, reflecting the different pricing structure in the Soviet Union.

If uniformed personnel costs (which are based on US pay rates) are excluded from both sides, the estimated dollar costs of Soviet defense activities exceed US outlays in 1979 by 40 percent and are 15 percent greater for the entire decade. If RDT&E costs (estimates for which are considerably less reliable than those for other activities) are excluded from both sides, the estimated Soviet dollar cost total exceeds the US total in 1979 by about 45 percent and is 25 percent greater for the decade.

The Index Number Problem

Evaluating the defense activities of both countries in dollar terms introduces a basic measurement problem common to all international economic comparisons and known to economists as the index number problem. Because of this problem, a comparison will yield different results depending on which country's prices are used. Given different resource endowments and technologies, countries tend to use more of the resources that are relatively cheap—and less of those that are relatively expensive—for a given purpose. A comparison drawn in terms of the prices of one country thus tends to overstate the relative value of the activities of the other. This tendency is more pronounced the greater the disparity between the two countries' resource endowments and technologies.

The degree of overstatement of Soviet defense activities relative to those of the United States inherent in the dollar cost comparison cannot be measured precisely. We can obtain an appreciation of its magnitude, however, by the reverse calculation—that is, by computing the ratio of Soviet to US defense activities measured in ruble cost terms, which overstates US activities relative to Soviet. Whereas our dollar cost comparison shows the total cost of Soviet defense activities in 1979 to be approximately 50 percent higher than the US total, a ruble cost comparison shows it to be about 30 percent higher.

Economic Impact of Defense Activities

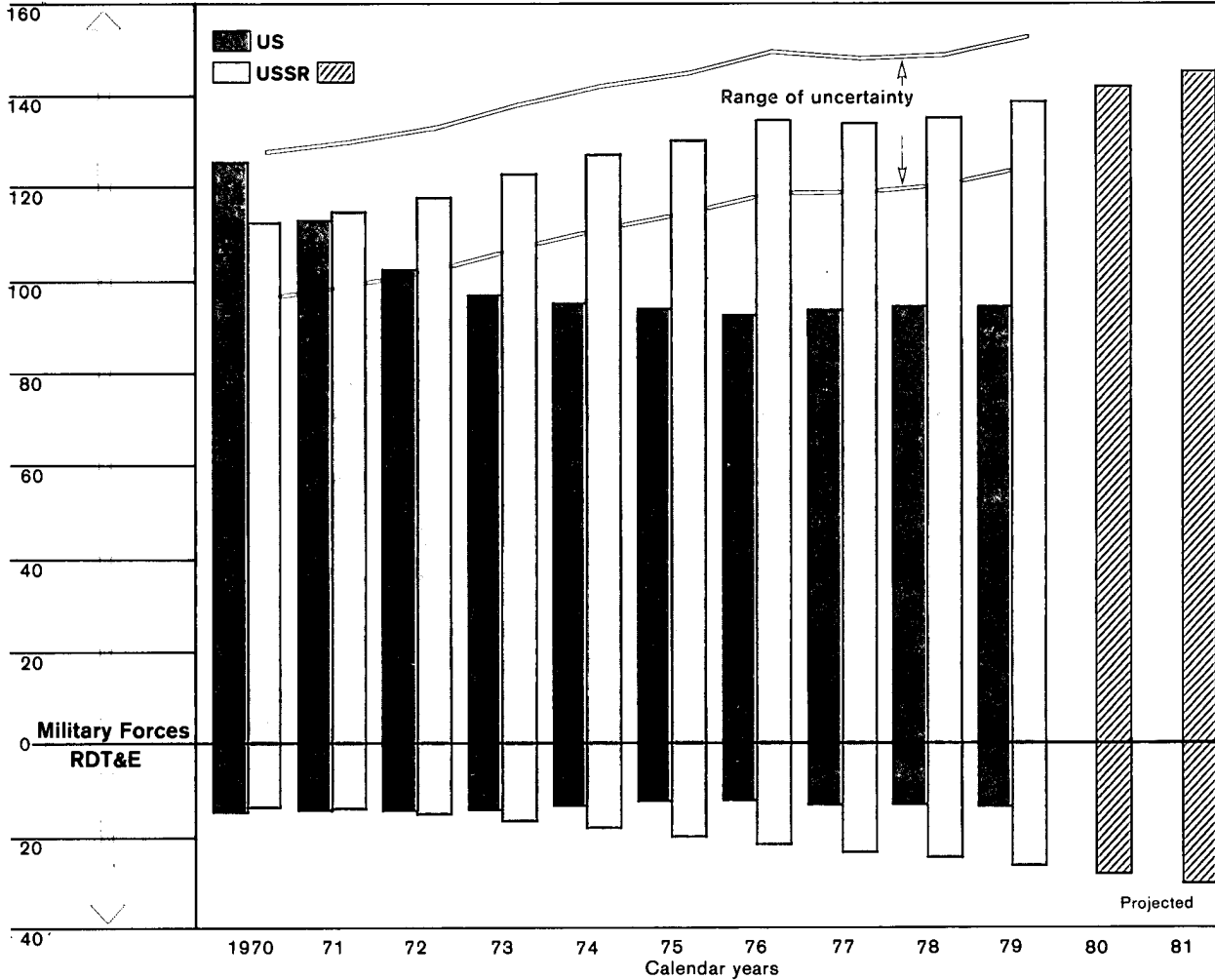
Although no single measure accurately describes the economic impact or burden of defense activities, defense spending as a share of GNP is often used for this purpose. This measure uses each country's own prices to reflect relative scarcities and efficiencies in production. Measured in 1970 rubles and calculated at factor cost, the Soviet defense activities as defined in

Total US and Soviet Defense Activities

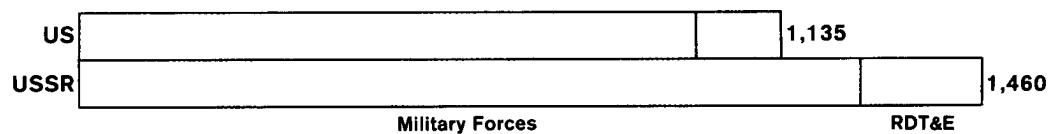
Figure 1

A comparison of US outlays with estimated dollar costs of Soviet activities if duplicated in the United States

Billion 1979 dollars



Cumulative Costs, 1970-79



The dollar cost estimates reflect the cost of producing and manning in the US a military force of the same size and weapons inventory as the Soviet force and of operating that force as the Soviets do. The costs shown for military forces are investment and operating costs excluding pensions; they are best estimates, with possible error margins displayed. The costs shown for Soviet RDT&E are estimates derived in the aggregate, using a less certain methodology; because they provide only rough measures, they are shown separately from the dollar costs of military forces. The US defense costs are in terms of outlays based primarily on the Department of Defense Total Obligational Authority (TOA) in *The Five-Year Defense Program*, September 1979. The estimated dollar costs of projected Soviet defense activities for 1980 and 1981 are preliminary assessments and are subject to greater uncertainty than those for earlier years. Comparable US data were not available.

this report accounted for some 11 to 12 percent of Soviet GNP throughout the decade of the seventies. Defense activities in the United States accounted for approximately 8 percent of US GNP in 1970 and 5 percent in 1979.

Resource Comparisons

Soviet and US defense activities can be compared in terms of the major resource categories—military investment, operating, and RDT&E costs:

- The investment category covers the dollar cost of the procurement of equipment (including major spare parts) and the construction of facilities. Investment costs represent the flow of equipment and facilities into the defense establishment. They are not an indication of the size of the force in any given year.
- The operating category covers the costs associated with maintaining current forces (including personnel costs). They are directly related to the size of the forces and to the level of their activity.
- The RDT&E category covers a variety of activities including exploring new technologies, developing advanced weapon systems, and improving existing systems.

Military Investment. The trends in military investment in both countries followed those for the respective totals over the decade of the seventies. US investment fell sharply from 1970 to 1976 but then grew by more than 3 percent per year until the end of the period. Soviet investment showed an upward trend but displayed cycles in annual growth rates that were related to the phasing of major procurement programs—especially those for missiles and aircraft. The estimated dollar cost of Soviet investment programs rose throughout the decade. This growth rate is expected to continue in the early 1980s.

The estimated dollar cost of Soviet military investment exceeded comparable US spending by 80 percent in 1979. (The difference was as large as 95 percent in 1976.) Over the decade, the estimated dollar costs were 55 percent larger than comparable US outlays.

Operating Costs. Measured in dollar terms, operating costs made up the largest share of the total defense costs for both countries.² US outlays declined rapidly from 1970 to 1973, reflecting the scaling down and eventual termination of the Vietnam involvement. Since then, growth in O&M costs has partially offset the continuing decline in military personnel costs, slowing the decrease of total operating costs. Estimated Soviet dollar costs for operating, on the other hand, grew continuously during the period—reflecting growing force levels—and exceeded those of the United States by a widening margin after 1971. By 1979 they were 35 percent higher than comparable US outlays. Over the entire decade, they exceeded the US total by 15 percent.

RDT & E. Estimates of the dollar costs of Soviet RDT&E are derived in the aggregate using a less certain methodology than the other estimates in this assessment. Although we consider the estimates to be less precise, it is clear there is a substantial Soviet military RDT&E program. The available information on particular RDT&E projects and published Soviet statistics on science indicate that military RDT&E expenditures were both large and growing during the 1970-79 period. This assessment is reinforced by evidence on increases in the manpower and facilities devoted to Soviet military RDT&E programs. US outlays for RDT&E, on the other hand, declined steadily over the early years of the period, before turning up in 1977. As a result, the estimated dollar cost of Soviet RDT&E activities over the decade was approximately one and one-half times the US outlays.

Military Manpower

The Soviets historically have maintained a large standing force that has a broader range of responsibilities than does the US military. The uniformed personnel strength of Soviet forces in 1979 was estimated to be 4.3 million—about twice the US level. The Soviet figure includes the five armed services of the Ministry of Defense and the Soviet Border Guards,

² This results from the use of US pay rates in estimating dollar operating costs for the USSR. In ruble terms, investment (not operating costs) constitutes the largest share of estimated total Soviet defense costs.

US and Soviet Defense Activities

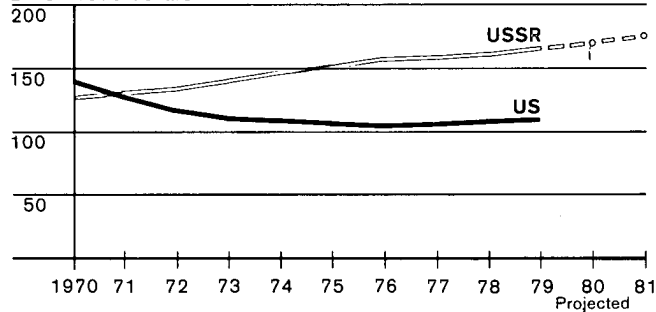
Figure 2

Dollar cost of Soviet activities
and US defense outlays

Total (with RDT&E)

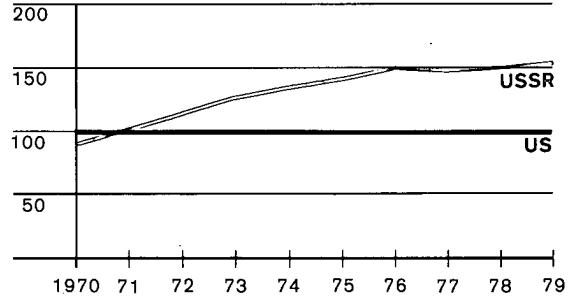
Note: Scales vary

Billion 1979 dollars



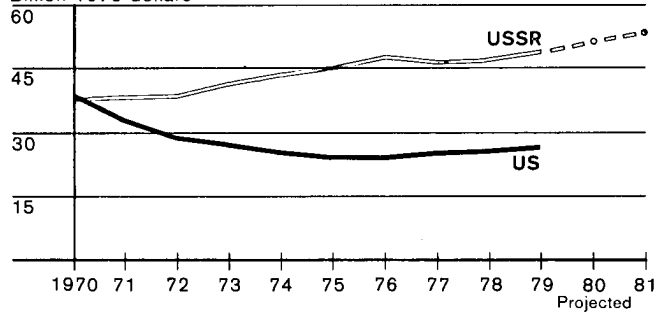
Dollar cost of Soviet activities
as a percent of US defense outlays

Percent

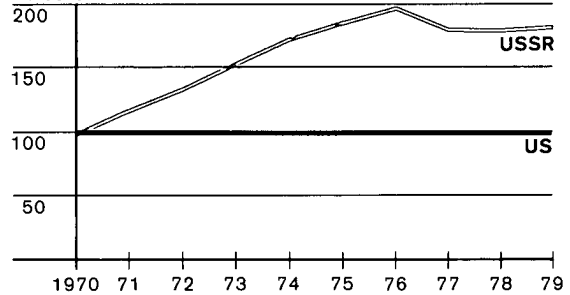


Investment

Billion 1979 dollars

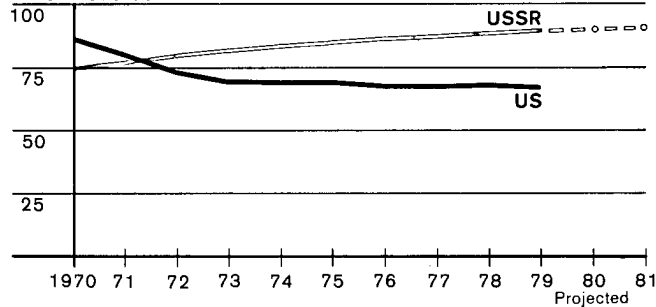


Percent

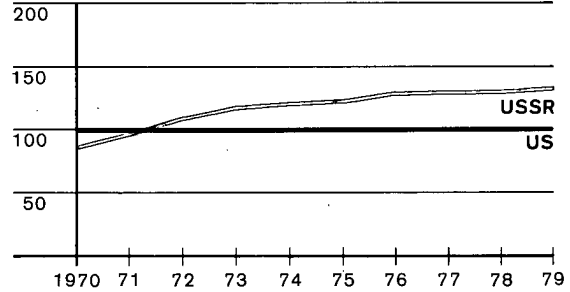


Operating

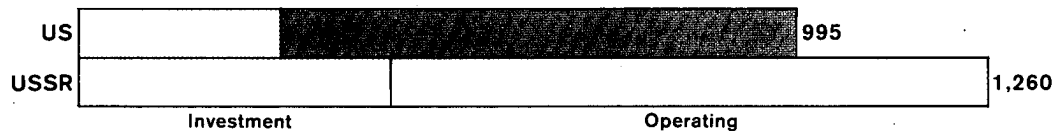
Billion 1979 dollars



Percent



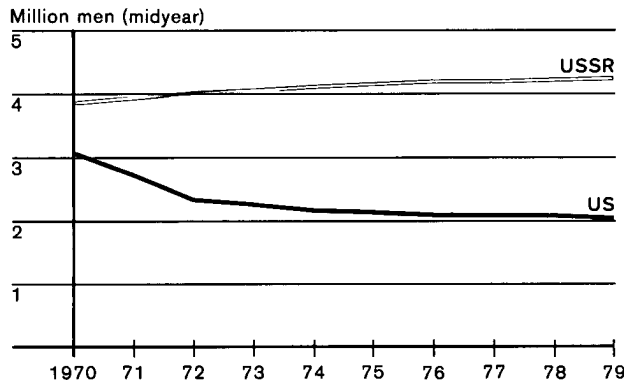
Cumulative Costs, 1970-79



Investment includes all costs for the procurement of military hardware and the construction of facilities; but excludes RDT&E. Operating includes all personnel-related costs (with the exception of pensions) and all costs associated with the operation and maintenance of weapon systems and facilities.

US and Estimated Soviet Active Military Manpower

Figure 3



The USSR line excludes Internal Security Troops and construction troops—well over half a million men—who do not fill what in the US would be considered national security roles.

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which are subordinate to the Committee for State Security but have some military responsibility. Well over a half million men in the internal security forces of the Ministry of Internal Affairs and in railroad and construction troop units are not included in the comparison, because they do not fill what in the United States would be considered national security roles.

Military manpower trends paralleled those for total costs in the two defense establishments. Estimated Soviet military manpower grew by more than 400,000 men between 1970 and 1979. The largest increase—200,000 men—occurred in the Ground Forces. In contrast, the level of US military manpower has fallen every year since the peak of the Vietnam buildup—from 3.1 million men in 1970 to 2.1 million in 1979.

Military Mission Comparisons

Comparisons of Soviet and US activities can also be made by US accounting definitions, which are used to array defense authorizations by the missions they are designed to support. The missions in this section follow the guidelines in the *Defense Planning and Programming Categories* (DPPC) issued by the Department of Defense in November 1979.

Strategic Forces. This mission includes all forces assigned to intercontinental attack, strategic defense, and strategic control and surveillance, plus the Soviet peripheral attack forces, but excludes RDT&E. The level of Soviet activity for strategic forces (excluding the Soviet peripheral attack forces, for which the United States has no counterpart), measured in dollars, was two and two-thirds times that of the United States over the 1970-79 period and nearly three times the US level in 1979. If Soviet peripheral attack forces are included, the estimated dollar costs of the Soviet forces were three times the comparable US outlays over the period.

Within the strategic forces mission, intercontinental attack forces accounted for about 35 percent of the total dollar cost estimate of Soviet strategic forces for the period. US outlays for intercontinental attack forces accounted for 65 percent of US strategic force outlays for the period.

Estimated dollar costs of Soviet intercontinental attack activities dipped in the early 1970s with the completion of third-generation ICBM deployment programs, then rose sharply in the mid-1970s with the deployment of fourth-generation systems. As the Soviets complete deployment of their fourth-generation ICBMs, the estimated dollar cost of intercontinental attack will dip again before rising sharply in the mid-1980s, when the Soviets are expected to deploy the new ICBM systems now in development.

Our cost estimates for intercontinental attack forces reflect a substantial difference in the mix of weapons in the Soviet and US forces. During the period, ICBM forces accounted for more than half of the estimated dollar cost of Soviet intercontinental attack forces, compared with only about one-fifth for the United States. On the other hand, bomber forces represented about one-third for the United States but less than 5 percent of the Soviet total.³ In every year of the decade, the dollar costs of Soviet programs for ICBMs and ballistic missile submarines exceeded those of the United States, but the dollar costs of Soviet bombers were lower than comparable US outlays.

³ Backfire aircraft assigned to Long Range Aviation are included in peripheral attack forces, and those assigned to the Navy are included in general purpose forces.

US and Soviet Major Missions

Figure 4

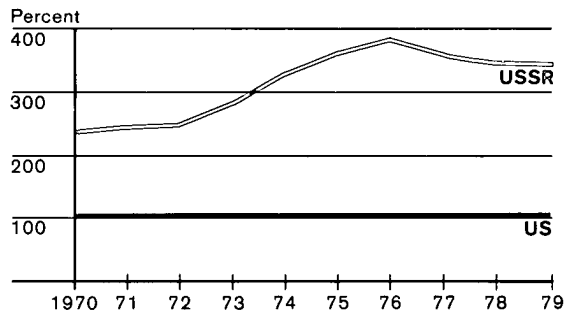
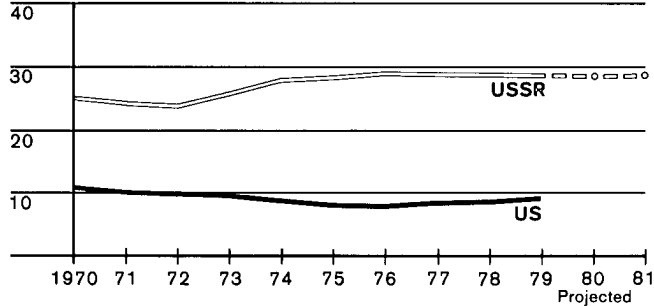
Dollar cost of Soviet activities
and US defense outlays

Dollar cost of Soviet activities
as a percent of US defense outlays

Strategic Forces

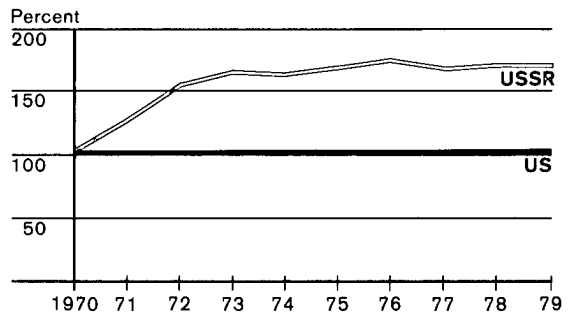
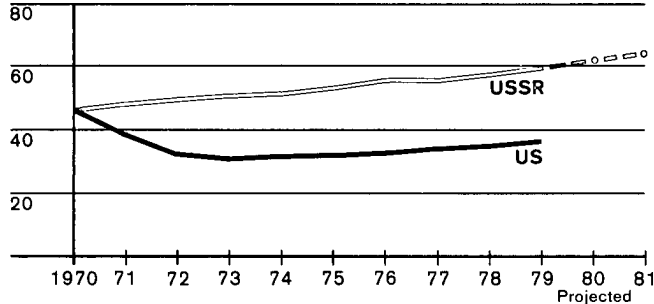
Note: Scales vary

Billion 1979 dollars



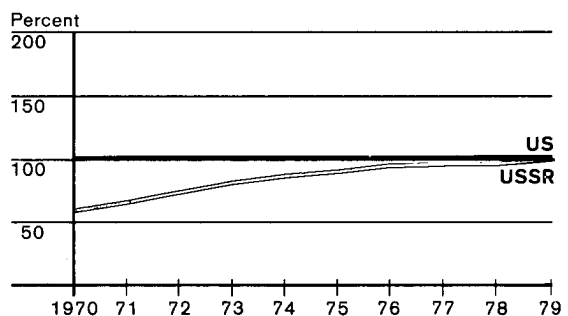
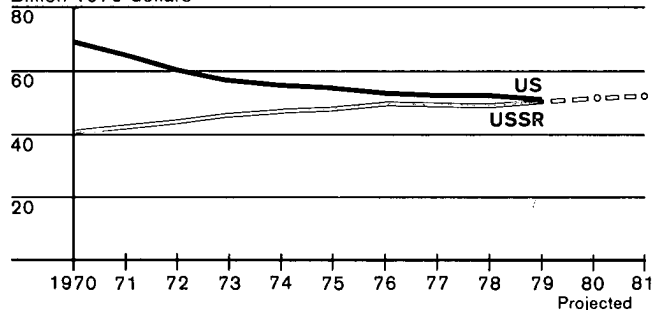
General Purpose Forces

Billion 1979 dollars

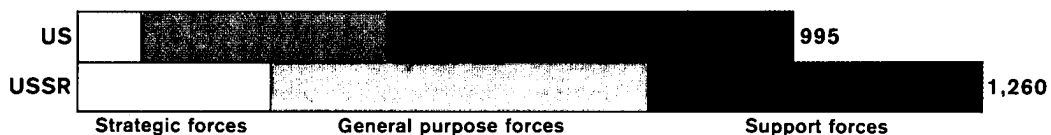


Support Forces

Billion 1979 dollars



Cumulative Costs, 1970-79



These comparisons use US Defense Planning and Programming Categories of November 1979, with minor adjustments made to attain comparability. Costs for pensions and RDT&E of both sides are excluded.

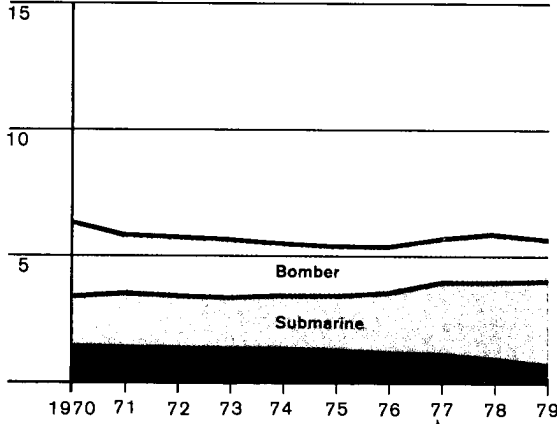
US and Soviet Forces for Intercontinental Attack

Figure 5

A comparison of US outlays with estimated dollar costs of Soviet activities if duplicated in the United States

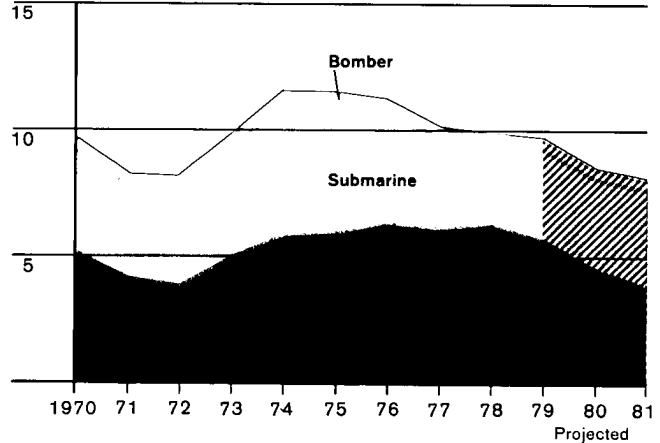
US

Billion 1979 dollars



USSR

Billion 1979 dollars



The intercontinental attack mission is defined according to the *US Defense Planning and Programming Categories* of November 1979, with minor adjustments made to attain comparability. Costs for pensions, nuclear materials for warheads, and RDT&E of both sides are excluded. The peripheral attack forces of the USSR are also excluded.

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Peripheral attack forces accounted for about 15 percent of the total dollar cost of the Soviet strategic mission. (Peripheral attack forces include medium- and intermediate-range ballistic missiles, medium bombers, and some older ballistic missile submarines. These forces are assigned strategic targets on the periphery of the Soviet Union.)

Estimated costs of Soviet forces for strategic defense accounted for roughly half of the dollar costs of the Soviet strategic mission during the decade. US outlays for strategic defense, on the other hand, accounted for only about 15 percent of US strategic mission outlays during the period. Soviet strategic defense activities during 1970-79 remained at a high level, while US strategic defense activities declined during the period. As a result, the dollar cost of Soviet strategic defense activities increased from five times US outlays in 1970 to 25 times US outlays in 1979. Soviet strategic defense activities will probably continue to grow in the early 1980s as the Soviets introduce a new generation of interceptor aircraft and surface-to-air missiles, in an attempt to further improve their air defenses.

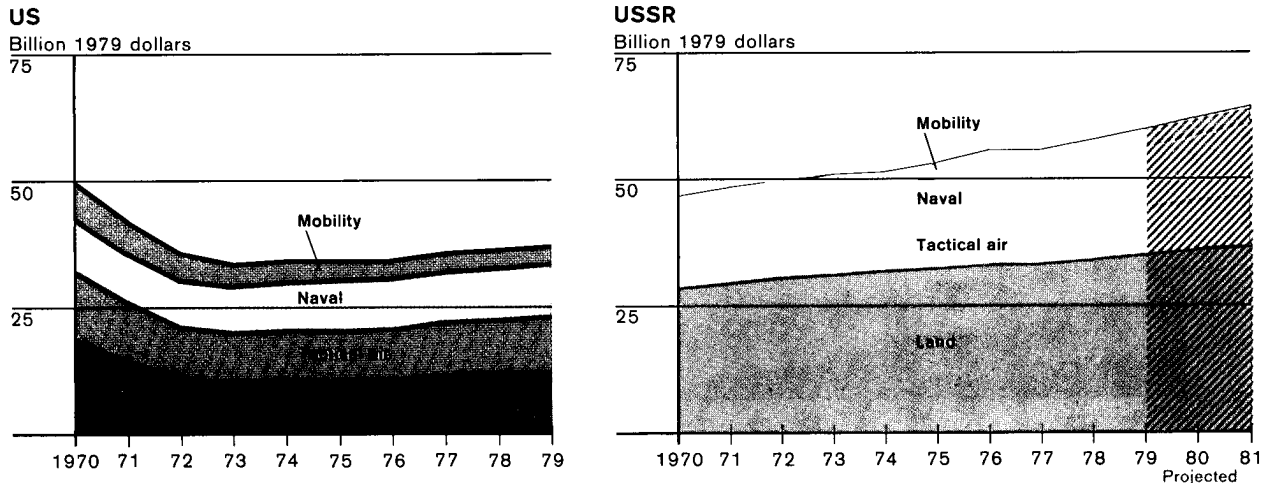
General Purpose Forces. This mission includes all land, tactical air, naval, and mobility (airlift and sealift) forces. Estimated dollar costs of Soviet activities for general purpose forces (exclusive of RDT&E) have exceeded comparable US outlays since 1970, although the absolute difference between them has remained relatively constant since 1973. For the decade, the Soviet total for this mission was about 55 percent higher than the US total.

Within both the Soviet and the US general purpose forces, land forces accounted for the largest share of the dollar cost. The estimated dollar cost of Soviet land forces increased steadily throughout the period. Outlays for US land forces continued to drop from the Vietnam-era high until 1973. Since 1973 they have grown at a moderate rate.

US and Soviet General Purpose Forces

Figure 6

A comparison of US outlays with estimated dollar costs of Soviet activities if duplicated in the United States



The general purpose mission is defined according to the *US Defense Planning and Programming Categories* of November 1979, with minor adjustments made to attain comparability. Costs for pensions, nuclear materials for warheads, and RDT&E of both sides are excluded.

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The dollar costs of the two countries' general purpose naval forces (excluding attack and multipurpose carriers and their associated aircraft, which by DoD DPPC definitions are included in tactical air forces) showed divergent trends. US outlays for this mission fell until 1973 and then were relatively constant for the rest of the decade. The estimated dollar costs of Soviet general purpose naval forces also declined until 1973 but then grew at a rapid rate for the rest of the decade. As a result of these trends, the estimated dollar costs of Soviet activities in 1979 were more than 15 percent higher than US outlays. Over the whole decade they were approximately equal to US outlays. (If the costs of the US carriers and their associated aircraft were included in general purpose naval forces, US outlays would be 20 percent more than the estimated dollar costs of Soviet forces in 1979 and 50 percent higher than the Soviet total for the entire period.)

US outlays for tactical air forces (including aircraft carriers and their associated aircraft) fell from 1970 to 1974 but have grown since then. The estimated dollar cost of the Soviet forces with a tactical air mission

showed a cyclical, but upward, growth pattern related to the procurement cycle for new aircraft. By the end of the decade, US outlays exceeded estimated Soviet dollar costs for tactical air forces by 20 percent—a considerable decrease since 1970. Over the decade, US outlays were about one-third more. (If the US carriers and their associated aircraft were excluded, estimated Soviet dollar costs would be 35 percent higher than US outlays in 1979 and 45 percent higher for the period as a whole.)

Support Forces. In addition to the training, maintenance, major headquarters and logistic activities normally considered support, this mission also includes military space programs. Over the decade, US outlays on support activities exceeded the estimated Soviet total by approximately 20 percent, but while the US level was two-thirds higher than the estimated Soviet level in 1970, the two were equal at the end of the decade. The estimated dollar cost of Soviet support forces grew steadily over the period to match the growth of the other major missions.

Forces Opposite China

Both countries structure their forces not only for a major East-West war but also for other possible conflicts. For example, between 10 and 15 percent of the estimated dollar cost of Soviet defense activities (excluding RDT&E) is for units that we believe have primary missions against China. Some of these forces also could be used to meet other contingencies.

Comparisons With Previous Estimates

Estimates of the dollar costs of Soviet defense activities are revised each year to take into account new information and new assessments of the size, composition, and technical characteristics of the Soviet forces and activities, as well as improvements in costing methodologies. The US data used for comparative purposes are similarly revised each year to take into account changes in *The Five Year Defense Program* and the *Defense Planning and Programming Categories*. Both the Soviet and the US data are updated annually to reflect the most recent price base.

This year's estimate of the dollar cost of Soviet defense activities for 1978 is about 9 percent higher than the estimate for that year in last year's publication. Almost all of the 9-percent difference is the result of changing from a 1978 to a 1979 price base. The refinements made since our last report in our assessments of Soviet defense activities and their costs for the year 1978 have resulted in no appreciable change in our estimate.

Readers making cumulative comparisons with previous versions of this report should be aware that this year we are covering a 10-year period—the decade of the 1970s—rather than an 11-year period, as was the case with the earlier reports.