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ECONOMIC FACTORS AND SOVIET ARMS CONTROL POLICY

The Economic Burden of the Soviet
Defense Policy

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PREFACE

In the hope of providing grounds for reasonable speculation on the role of economic considerations in Soviet policy on arms control and disarmament, this paper seeks to analyze the effect of defense spending on Soviet economic performance. The central question involved is whether the Soviet leadership typically regards the payoffs from the arms race as worth its cost in terms of alternative economic objectives forgone. If we were to conclude on the basis of evidence available to us that Soviet leaders probably judge the arms race to be a fruitful investment, it would tend to support the proposition that they view arms limitations negotiations purely as a diplomatic tactic. But if the answer to this question appears to be negative, we can make the hypothesis that the Kremlin might be willing seriously to explore the possibility of arms control and disarmament as a means of achieving security. In this case the coincidence of objective pressures for and displayed interest in arms control measures would seem to constitute presumptive evidence that the interest is genuine. But given the political and ideological framework in which the Soviet leadership undoubtedly makes its calculations, questions as to costs and benefits of armaments should probably be phrased in terms of whether the leadership has at various times found the cost of its armament program to be an intolerable economic burden and therefore a threat to the internal stability of the regime.

In attempting to establish a reasonable quantitative measure of the Soviet defense effort over the past decade (Chapter I) the work of Western observers has been extensively employed for data other than published budgetary expenditures on defense. A great deal of reliance has been placed upon J. Godaire's work on the magnitude of the Soviet defense effort during the 1950's.¹ Although based on published Soviet sources, these data are admittedly less than firm; but, when related to other economic information, it is believed that they provide reasonable grounds for the conclusion advanced in this paper. Chapter II seeks to determine the effect of Soviet defense spending on the economy by examining the share of gross national product (GNP) allocated to military expenditures as well as the coincidence in time of changes in defense spending with changes in the rate of industrial growth, the rate of increase of industrial investment, and the allocation of resources to consumption and to agriculture.²

¹J. G. Godaire, "The Claim of the Soviet Military Establishment," United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington, 1962).

²Unless otherwise specified all data in this study refer to post-1961 rubles.

The conclusions of this study, presented in Chapter III, are shaped in a way that hopefully supplies answers to our question as to whether modern Soviet leaders have at various times regarded the arms race as profitable or unprofitable in terms of economic alternatives forgone. Such conclusions obviously go beyond the narrow boundaries of this particular paper and must be reconciled with other political and strategic data. While the material used herein is drawn from widely available open sources, we believe there may be value in bringing it into this particular focus.

Chapter I

SOVIET DEFENSE EXPENDITURES, 1950-1964

A. Difficulties and Complications

The real cost of defense is actually expressed in terms of the value of the next most attractive use of the resources, or, put differently, in terms of the allocation that was not made because defense needs were deemed to be more pressing. In practical terms it is all but impossible to determine what the Soviet Union has given up at any given moment of choice between defense and civilian allocation of resources. All that can be done is to give flesh to the obvious proposition that allocations to defense mean less for consumption and economic growth.

The purpose of this chapter is to form a rough estimate of the magnitude of the Soviet defense effort in current rubles over the past decade, primarily with a view toward determining both the points in time when increases and decreases occurred and the changing qualitative composition of the military claim on resources. Because of peculiarities in the Soviet pricing system, which invariably tends to understate the real cost of resources devoted to defense, clearly there are limitations to the validity of a ruble measure of this magnitude. If price eccentricities remain constant over time, however, a ruble measure can serve as a reasonable indicator of relative changes in the magnitude of resources claimed by defense. There are indications, for example, that in recent years, the prices of military goods relative to civilian goods have fallen artificially. If so, the published figures would tend further to understate the cost of armaments. Nancy Nimitz observes that "since the prices of military goods may have fallen significantly (unlike the prices of civilian goods and services, which were comparatively stable), real defense outlays probably increased more than money outlays [in the late 1950's]."¹ It seems reasonable on the basis of our political and strategic knowledge to assume that these price changes involved weapons procurement rather than the pay and subsistence of manpower.

Because we have no data on the magnitude and timing of such price changes as may have been made we must proceed on the assumption that price relationships have not changed materially. This assumption necessarily further qualifies the validity of the ruble measures which we here derive.

¹Nancy Nimitz, Soviet National Income and Product, 1956-1958, RAND Memorandum RM-3112-PR (Santa Monica, 1962), p. v.

Another great difficulty in gauging real expenditures on defense is posed by Soviet accounting procedures, which, undoubtedly for reasons of secrecy, exclude large allocations to defense from the published defense budget. The bulk of Soviet research and development (R&D) costs of a military nature and some military procurement costs beyond R&D appear to be included in the budgetary categories labeled "social cultural measures" and "financing the national economy."¹

A further difficulty is that there is virtually no way to measure capital investments in the Soviet defense industry even though such investments constitute real defense costs and represent a choice as the use of resources. While some defense investment may be included in the official defense budget, for example that going to enterprises administered directly by the Minister of Defense, the amounts are probably very small and, since the industrial reorganization of 1957, perhaps non-existent. The bulk of budgeted investment in defense industries appears to be included in the budget category "financing the national economy," with additional investment funds coming perhaps from the "internal resources" of the defense industries (a common source of investment funds in civilian industry).²

B. The Published Defense Budget

The official Soviet defense budget is a component of the consolidated State budget of the USSR. Despite its deficiencies as a measure of real defense costs it must be taken as the starting point for our analysis. Table 1 shows planned defense expenditures as announced at the beginning of the year, planned defense expenditures as a percentage of total planned expenditures, and actual or realized budgeted defense expenditures as reported at the end of the fiscal year.

As suggested earlier, the published defense budget is a poor quantitative measure of the Soviet defense effort. It includes the pay and subsistence of military manpower, training costs, expenditures for repair of military equipment, some procurement costs, and some military construction. But as also indicated,

¹J. G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington, 1962), pp. 35 ff.

²Abram Bergson, The Real National Income of Soviet Russia since 1928 (Cambridge, Mass.: Harvard University Press, 1961), pp. 362-363.

Table 1

OFFICIAL SOVIET DEFENSE BUDGET, 1950-1964

	<u>Defense Expenditures Planned at Beginning of Year (Billion Rubles)</u>	<u>Planned Defense Budget as Per Cent of Planned Total Budget (Per Cent)</u>	<u>Reported Actual Defense Expenditures (Billion Rubles)</u>
1950	7.9	18.5	8.3
1951	9.6	21.3	9.3
1952	11.4	23.9	10.9
1953	11.0	20.8	10.5
1954	10.0	17.8	10.0
1955	11.2	20.0	10.7
1956	10.3	18.0	9.7
1957	9.7	16.0	9.1
1958	9.6	15.3	9.4
1959	9.6	13.6	9.4
1960	9.6	12.9	9.3
1961	9.3 ^a	11.9	11.6
1962	13.4	16.7	12.7
1963	13.9	16.7	--
1964	13.6	14.6	--

^aIn July 1961 it was announced that the planned defense budget for that year had been increased to 12.4 billion rubles. Pravda, July 9, 1961.

Sources: Ekonomicheskaja zhizn' SSSR (Moscow, 1961), pp. 494, 504, 514, 527, 544, 558, 573, 608, 627, 668, and 712; Pravda, December 31, 1960, December 14, 1962; J. G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington, 1962), p. 37. The series for actual expenditures can be found in Narodnoe khoziaistvo SSSR for successive years in the section "Finansy i Kredit."

there is considerable doubt as to whether the procurement of advanced weapons systems is completely accounted for in the published budget. It is certain that some of the R&D costs for such systems, which are properly part of over-all costs, are not included in the defense budget; other costs related to the installation of advanced systems

may also be excluded.¹ It is likely that the only category of weapons procurement that is completely accounted for in the official budget is conventional weapons systems and materiel.

Another consideration that leads one to believe that the official budget understates the real cost of the defense effort in recent years is the possibility of changes in the pricing of military goods.

The figures in Table 1 indicate that reported actual defense expenditures fall short of planned expenditures in most years, in some cases by as much as 700 or 800 million rubles. The exceptions to this apparent norm of budgetary underfulfillment occur in 1950 and 1961, when initially planned expenditures were exceeded, and in 1954, when planned and actual expenditures were reported to have been equal. Initially planned expenditures were exceeded in 1950 and in 1961 undoubtedly because external pressures impelled the Soviet government to increase its defense effort in an explicit manner. The 1950 increase was a Soviet reaction to the Korean War; the 1961 increase was announced by Premier Khrushchev in July of that year in a speech to the graduates of a Soviet military academy as a response to the sharp rise in American defense spending provided for in President Kennedy's first budget.

According to Khrushchev, Soviet defense spending for the year 1961 was to amount to 12.4 billion rubles, or 33 per cent over the budget originally planned.² Reported actual defense expenditures for 1961 were only 11.6 billion rubles, or 25 per cent over the initially planned and previous year's reported actual spending; this nevertheless represented a significant increase in explicit defense spending. The fact that the level announced by Khrushchev in July was not met should not be construed to mean that the gesture was merely a bluff, although it was undoubtedly intended in part for external consumption. As we have shown, underfulfillment of the planned budget has been the norm, and 1961 was no exception with respect to the July figures. It is significant that the 1961 increase was apparently not taken out of budgetary residuals, but was subtracted from other allocations.³ It should

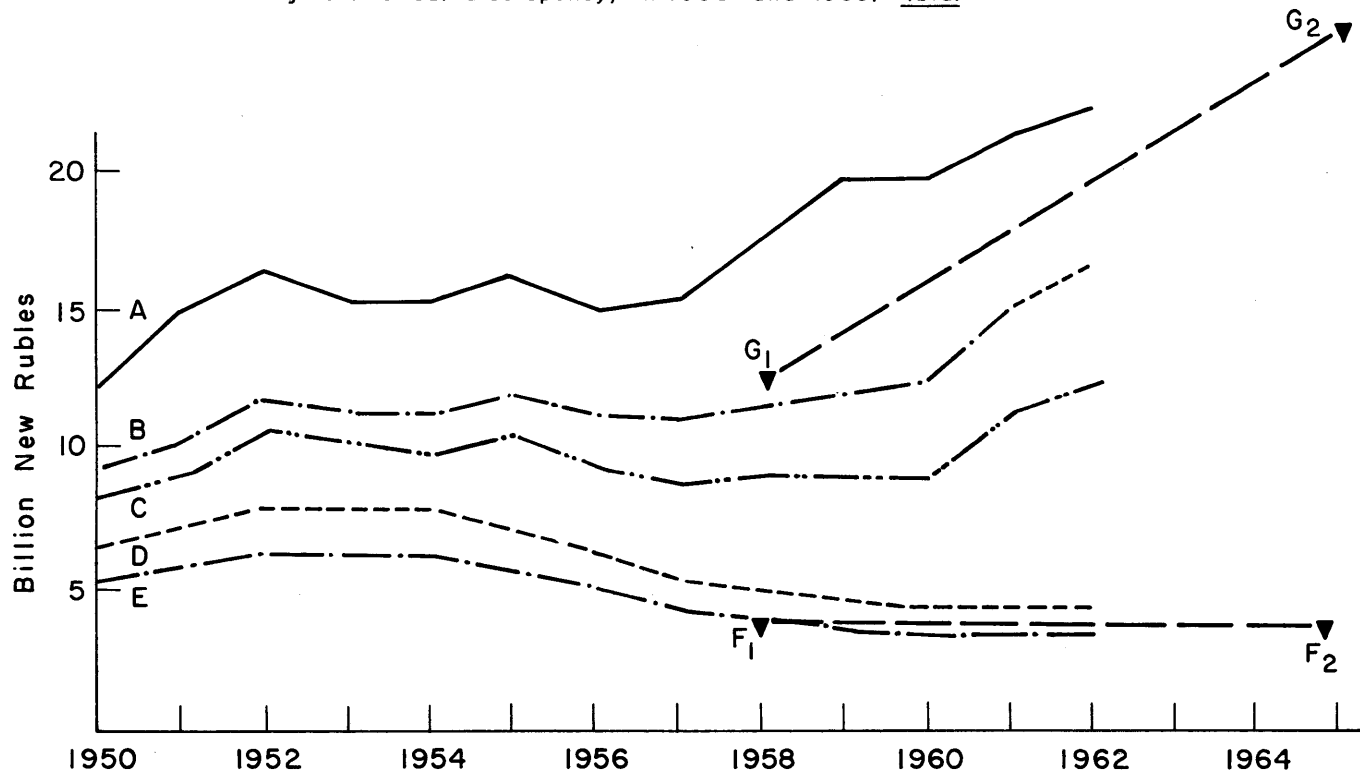
¹See Godaire, op. cit., pp. 36 ff.; also, Nancy Nimits, Soviet Expenditures on Scientific Research, RAND Memorandum RM-3384-PR (Santa Monica, 1963), p. 12.

²Pravda, July 9, 1961.

³See Godaire, op. cit., p. 37, and Line A in Chart 1.

Chart 1
Soviet Defense Expenditures, 1950-1965

- A. Godaire's total possible defense and space expenditures. J.G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington: U.S. Government Printing Office, 1962), pp. 39-40.
- B. C plus science outlays. See Table 2.
- C. Official reported defense spending. See Table 1.
- D. Godaire's cost of military manpower. See Table 3.
- E. "Becker's" cost of military manpower. See Table 3.
- $F_1 - F_2$ Becker's military manpower costs in 1958 and 1965. Abraham Becker, Soviet National Income and Product in 1965: The Goals of the Seven Year Plan, RAND Memorandum RM-3520-PR (Santa Monica, 1963), p.19.
- $G_1 - G_2$ Becker's military manpower costs, plus other defense (budget), plus science, plus remainder, including statistical discrepancy, in 1958 and 1965. Ibid.



also be noted that the budgetary underfulfillment in 1961, with respect to the new goal, was not larger in percentage terms than in previous years.

The only year in which planned levels of spending were very nearly met was 1954. (Rounding off of figures on Table 1 hides underfulfillment of about 30 million rubles.) That was the year in which then Premier Malenkov cut the planned military budget by 9.5 per cent, presumably in connection with the end of the Korean War and the so-called "New Course" in the economy. But as later reported, actual spending dropped only 4.5 per cent below the previous year; furthermore, Malenkov spent all he initially planned. The next year the new Khrushchev-Bulganin collective leadership increased the planned military budget by 12 per cent after having criticized the deposed Malenkov for neglecting defense. Perhaps it was a gesture to curry military favor; however, reported actual spending increased by only 7 per cent, suggesting that the power struggle had a tendency to exaggerate the real policy shifts that attended it.

Manpower cuts are usually ratified by the same Supreme Soviet session that approves the military budget, which surely takes account of reduced manpower costs for the coming year.

A reasonable speculation would be that the underfulfillment occurs in the area of weapons procurement. Specifically, it probably involves the most advanced systems, the procurement of which is unrelated to the overall size of the ground forces, and the production of which has not been routinized by long experience (as with tanks, artillery, small arms, transport equipment, and the like). American experience indicates that the delivery schedules of advanced weapons systems are extraordinarily difficult to meet, and there is no reason to assume that this is not also the case in the Soviet Union. If the observed discrepancy between official planned and official realized defense expenditures is to be ascribed to the constant failure of defense industries to meet the procurement schedules of advanced systems, one must assume of course that such systems are partially accounted for in the published budget, albeit at prices that do not represent real development costs.

It can hardly be disputed, then, that the published Soviet defense budget falls considerably short of representing current money outlays on defense, much less the real cost of the military effort to the economy. The fact that reported defense expenditures remained constant from 1957 through 1960, when the Soviet Union was supposedly developing its first ICBM systems, gives ample grounds for suspicion even when savings from manpower cuts are considered. A significant portion of the total defense effort,

particularly military R&D, is hidden elsewhere in the budget, and some defense outlays may not get into the union budget at all.¹

C. The "Real" Soviet Defense Budget

In an effort to reconstruct the actual Soviet defense budget J. G. Godaire has derived a rough estimate of possible total defense and space spending that is comprised of official reported expenditures, plus budgetary allocations to science, plus an unexplained residual in the allocations to the national economy, plus an unexplained residual in the total budget, the latter two components adjusted downward arbitrarily to bring them within "reasonable" limits.² The exact numerical result for any given year is not particularly meaningful, but the general magnitude of this sum and its variation over time turn out to be quite interesting. (See Line A in Chart 1.)

A more conservative approach toward estimating total Soviet defense spending would be to rely upon Soviet allocations to science as an indicator of trends in military R&D expenditures, adding this budget category to the official defense budget. Godaire and Nimitz have developed very similar series for Soviet outlays on science.³ The Godaire series has been employed here because it covers the early 1950's, whereas Miss Nimitz's figures do not. It is shown on Table 2 and added to the published defense budget (yielding Line B in Chart 1).

Table 2

SOVIET EXPENDITURES ON SCIENCE
(Billion Rubles)

<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
0.9	0.9 ^a	1.0 ^a	1.1	1.3 ^a	1.5 ^a	1.7	2.1 ^a	2.4	2.8	3.3	3.8	4.4

^aEstimated by interpolation; these estimates are very similar to those of Miss Nimitz.

Source: J. G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington, 1962), p. 37.

¹The Union budget equals the sum of national, republic, and local budgets.

²Godaire, op. cit., pp. 37 ff.

³Ibid., p. 37; Nimitz, Soviet Expenditures on Scientific Research, op. cit., p. vii.

The rate of increase of outlays for science indicated on Table 2 is quite rapid, on the average about 11.4 per cent annually between 1950 and 1962. Yet there is reason to believe that these figures severely understate real Soviet expenditures on scientific research and thus give an excessively conservative impression of trends in military R&D. If the Nimitz and Godaire series (which, incidentally, are both identical to Soviet figures for expenditures on science "from the state budget and other sources")¹ are compared with Miss Nimitz's estimates of the level of employment in Soviet R&D, one finds that the reported expenditures are very nearly a linear function of manpower.² It is inconceivable that the Soviet Union has managed to keep its costs per scientist at a constant level as its research effort has expanded. Both American experience and Soviet complaints about the rising cost of research strongly suggest that outlays per scientist have increased sharply in recent years. It is therefore highly probable that the figures in Table 2 exclude a rapidly rising level of current outlays for scientific equipment, facilities, material supplies, and power consumption, much of which is considered by Soviet planners to be capital investment. What we would like to have is a series showing all outlays on military R&D; what we do have shows a portion of the outlays on all R&D--in effect, neither fish nor fowl. The figures are offered, however, for want of better data.

D. The Cost of Military Manpower

In order to gauge the impact of the Soviet defense effort on the economy, it is necessary to derive an estimate of the changing level of procurement of military goods from industry, particularly the level of expenditures on advanced weapons systems. A widely accepted approach to such an estimate appears to be to derive a measure of manpower costs -- roughly, military pay and subsistence -- subtract it from the total military budget, and regard the remainder more or less as military procurement beyond the subsistence component. Needless to say, results based on open sources are likely to be little better than guesswork.

Table 3 presents military manpower data pertinent to estimating costs, and two estimates of military manpower costs in current rubles. The manpower series derived by Godaire seems reasonably reliable, although manpower levels for 1961, 1962, and

¹Narodnoe Khoziaistvo SSSR v 1961 g. (Moscow, 1962), p. 764. This volume is one of the annual statistical abstracts published by the Soviet government since 1956. This and other volumes of the series are hereafter cited as Narkhoz 19--.

²Nimitz, Soviet Expenditures on Scientific Research, op. cit., p. vi.

Table 3

ESTIMATES OF SOVIET MILITARY MANPOWER
AND MANPOWER COSTS, 1950-1962

	<u>Military Manpower, Million Men at Be- ginning of Year</u>	<u>Million Man-Years</u>	<u>Godaire's Manpower Costs (Billion Rubles)</u>	<u>"Becker's" Manpower Costs (Billion Rubles)</u>
1950	4.3	4.7	6.5	5.1
1951	5.0	5.4	7.4	5.9
1952	5.8	5.8	8.0	6.3
1953	5.8	5.8	8.0	6.3
1954	5.8	5.8	8.0	6.3
1955	5.8	5.4	7.4	5.9
1956	5.1	4.8	6.6	5.2
1957	4.5	4.2	5.8	4.6
1958	3.9	3.8	5.2	4.1
1959	3.6	3.6	5.0	3.9
1960	3.6	3.3 ^a	4.5	3.6
1961	3.0	3.3 ^a	4.5	3.6
1962	3.0 ⁺	3.3 ^a	4.5	3.6

^aMan-year levels have been continued arbitrarily since man-
power levels for these years are not available.

Sources: Manpower, man-years, and Godaire's cost estimates are from J. G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington, 1962), p. 43. "Becker's" manpower costs are derived from Abraham Becker, Soviet National Income and Product in 1965: The Goals of the Seven Year Plan, RAND Memorandum RM-3520-PR (Santa Monica, 1963), p. 139. See text for explanation of method.

the years before 1955 are rough estimates. The Institute for Strategic Studies (London) contends that the Soviet armed forces stood at about 3.8 million men at the end of 1961 and 3.6 million men at the end of 1962.¹ Except for the last two years of the series Godaire's man-year figures are an average of the increase or decrease of manpower over a given year.

¹The Institute for Strategic Studies, The Communist Bloc and the Western Alliances: the Military Balance, 1962-1963 (London, 1962), p. 2.

A number of strenuous objections can be raised against Godaire's manpower cost estimates if, as he seems to imply, they are intended to encompass only military pay and subsistence. His series is a product of man-years times a cost factor of 1,375 rubles per man-year. The cost factor was derived from Khrushchev's January 1960 statement that the projected cut of 1.2 million men from the armed forces would yield savings of 1.6-1.7 billion rubles. "It is assumed," Godaire asserts, "that the reference was to the personnel-related costs of these men, including pay, food, clothing, and other services."¹ Godaire's assumption is probably erroneous; it is highly likely that Khrushchev included cuts in the procurement of materiel and perhaps the retirement of military facilities in his estimate of savings that the manpower reduction would produce. Thus Godaire's cost series would seem to include a significant margin of materiel procurement closely related to the size of the ground forces, such as small arms and ammunition, transport, and perhaps armor and artillery. A compelling reason why Godaire's cost estimates can not be taken as simply military pay and subsistence is the fact that they imply an average annual income for the Soviet soldier much higher than that of the average civilian worker, who received roughly 1,000 rubles per year in 1960.

The "Becker" manpower cost series in Table 3 appears to approximate actual outlays for military pay and subsistence somewhat more closely than Godaire's figures. It is a product of Godaire's calculations of man-years times 1,090 rubles, which is Becker's and Nimitz's estimate of the average pay and subsistence of the Soviet soldier in 1958.² This latter figure is the sum of an average yearly pay of 690 rubles and an average yearly subsistence of 400 rubles. Neither Becker nor Miss Nimitz discusses in detail how these figures were secured. Miss Nimitz does indicate that the average military pay figure accounts for an average pay for officers of 2,400 rubles a year and an average pay for enlisted men of 150 rubles a year, with officers making up 24 per cent of the total military manpower in 1958. While 1,090 rubles is surely closer to the average pay and subsistence of Soviet military personnel in 1958 than the 1,375 rubles figure, the Becker-Nimitz estimate still seems rather high; even considering the special treatment accorded Soviet officers, it seems unlikely that the average income of Soviet military personnel equals or exceeds that of civilian workers.

¹Godaire, op. cit., p. 43.

²Abraham Becker, Soviet National Income and Product in 1965: the Goals of the Seven Year Plan, RAND Memorandum RM 3520-PR (Santa Monica, 1963), p. 139; Nimitz, Soviet National Income and Product, 1956-1958, op. cit., pp. 33-34.

The most serious deficiency of these estimates of military manpower costs is not that they are based on an inaccurate per-man cost factor, but that no constant factor applies over time. The standard of living of the Soviet soldier, while it remains appreciably lower than that of his American counterpart, has certainly increased somewhat over the past decade. Reductions in the size of the Soviet armed forces and progress in mechanization have increased the proportion of such higher-paid cadres as officers and technicians. Thus average pay and subsistence levels have probably increased, and total outlays on pay have not decreased in direct proportion to manpower levels. In fact total outlays may not have decreased at all, as suggested by Miss Nimitz's calculations of the defense component of the Soviet GNP for the years 1949-1958, which take into consideration the changing composition of the armed forces.¹ (See Chart 2.) Unfortunately, since Miss Nimitz's estimates are in adjusted rubles and do not extend beyond 1958, it has been necessary to rely on the "Becker" series presented in Table 3 as the best estimate of outlays on military pay and subsistence despite the conservative bias of the series in later years.

E. Trends in Soviet Defense Spending

The data described in the foregoing pages provide a basis for analyzing trends in the Soviet defense effort through the Khrushchev era and include the following elements: (1) the official Soviet defense budget in terms of reported expenditures; (2) the sum of the official defense budget plus a conservative estimate of outlays on science, which include a substantial allocation to military R&D; (3) a rough upper limit of total possible defense and space spending; and (4) a somewhat distorted estimate of outlays on military pay and subsistence. These data are graphed in an arithmetic scale in Chart 1 so as to give a visual impression of possible changes in the level of Soviet defense expenditures over time.

At both ends of the time period under examination sharp increases in total defense spending are indicated, largely as a product of explicit budgetary increases, marked historically by the Korean War, and the accelerated American defense effort in 1961. The budget and budget-plus-science lines (Chart 1, Lines B and C) register quite a dramatic increase in 1961; the acceleration of the line showing total possible defense and space expenditures is relatively less imposing.

¹Ibid., pp. 16-17 and 33-34.

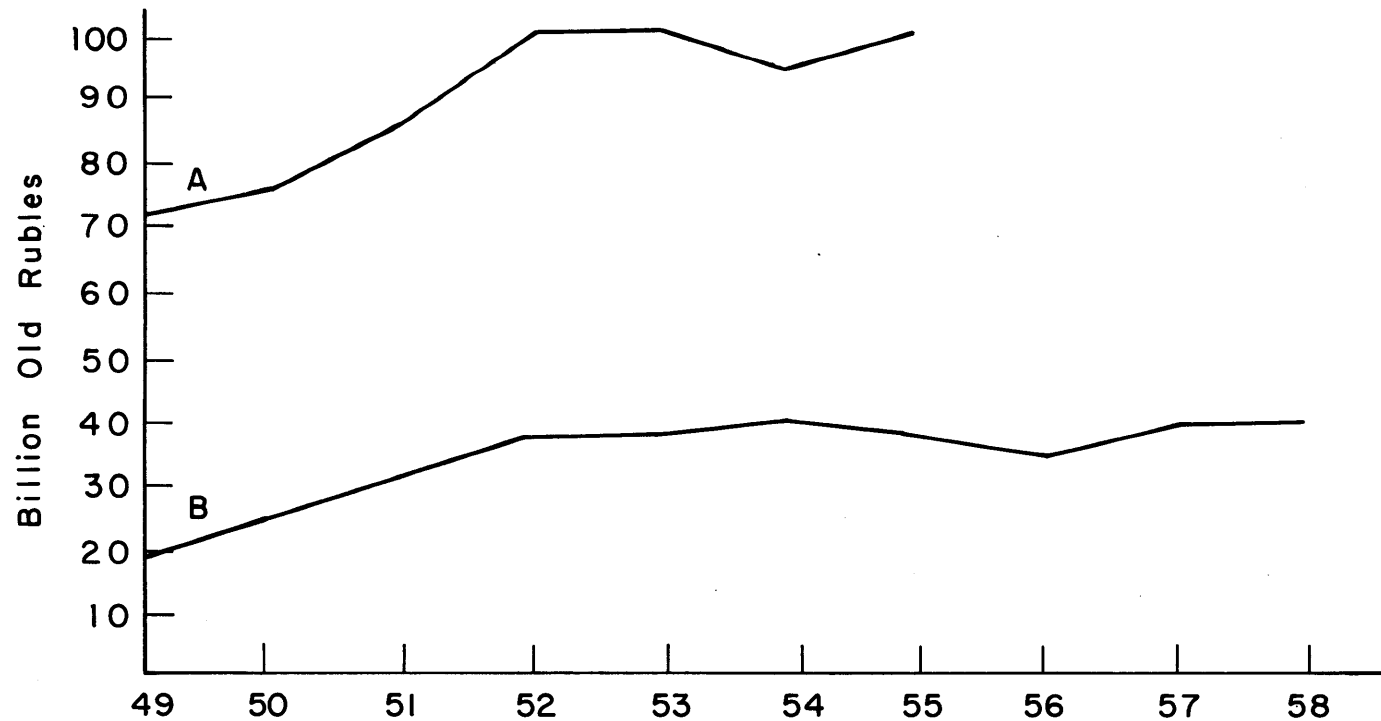
Chart 2

Nimitz' Estimate of Soviet Defense Budget and Military Pay and Subsistence, 1949 - 1958
(In Adjusted Rubles)

A - Nimitz Defense Budget (official)

B - Estimated Military Pay and Subsistence

Source: Nancy Nimitz, Soviet National Income and Product, 1956-1958,
RAND Memorandum RM-3112-PR (Santa Monica, 1962), pp. 16-17.



The most significant ambiguities occur in the 1952-1960 period, especially 1955-1960. Here we see the official budget shrinking except for a small but noticeable increase in 1955. When science outlays are added to the official defense budget, expenditures on the average seem to hold steady after 1952 until a moderate rise is registered in 1958. But contrary to these impressions, Godaire's upper limit estimates suggest a very sharp increase in defense and space spending in 1958 and 1959. This indication would tend to confirm the contention that the Soviet Union in those years began a substantial developmental effort to exploit the scientific achievements of 1957. The component of Godaire's upper limit that accounts for the increase in 1958 and 1959 is the residual in the budget category "Financing the National Economy." It cannot be incontrovertibly proven that this rapidly growing residual was actually going to defense purposes. Yet the coincidence of this rapid growth with a relatively certain acceleration in the development of missile technology constitutes strong presumptive evidence for increased spending. The coverage of the portion of the residuals that was allocated to defense is not subject to determination, but it is likely that it included a great deal of research and development as well as investments and current outlays for production of advanced missile systems.

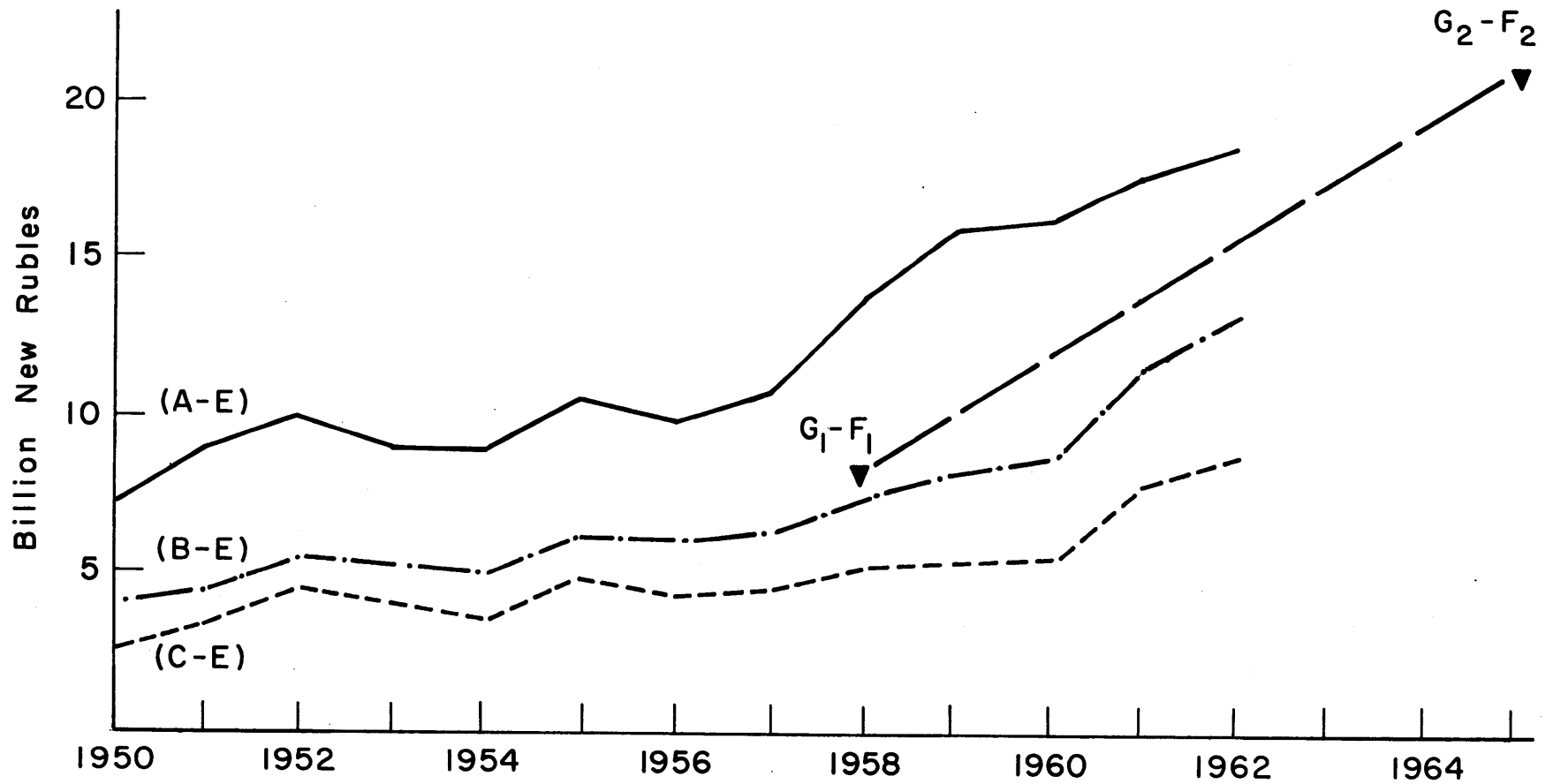
A common characteristic of all three "measures" of total defense spending is the distinct dip registered in 1956, which continued into 1957 in the lines reflecting the official defense budget and the budget-plus-science expenditures. It may seem strange that total defense spending could decline so sharply at just the moment when a crash effort must have been under way in the basic R&D of long-range missilery. But this peculiarity of the budget lines may provide a valuable clue to the nature of the Soviet weapons development strategy during the past decade.

It was suggested above that weapons procurement can be considered to equal approximately the total defense budget minus military pay and subsistence. Inadequacies of the military-pay-and-subsistence measure presented in Table 3 and in Chart 2, Lines D and E, detract from the validity of the remainder of the defense budget as an accurate indicator of Soviet weapons and space systems development and procurement (WSSDP). The basic per-man-year cost factor is probably somewhat high even for the year in which it was originally applied (1958) by Becker and Nimitz, and total manpower costs have probably not dropped so rapidly as indicated. The WSSDP series, derived by subtracting the "Becker" manpower cost series from various measures of total defense spending, is probably rather conservative in the early years, and the increase of WSSDP over time is exaggerated, all other things being equal. However, Miss Nimitz's suggestion that the real cost of Soviet weapons procurement may be understated in recent years by reason

Chart 3

Soviet Weapons and Space Systems Development and Procurement

(Letter notations refer to graph lines in Chart 1.)



of declining prices gives some grounds to hope that the two distortions cancel one another out and that the WSSDP cost series graphed on Chart 3 gives an approximately accurate picture of the real outlays. Chart 3 shows possible outlays on WSSDP as the remainder of the official defense budget, the official budget plus science, and the Godaire total possible level of expenditures respectively after subtracting the "Becker" manpower series.

All three measures of possible WSSDP expenditures indicate a substantial increase over the past decade, especially between 1954 and 1962, when expenditures appear to have about doubled. The weakness of the data discourages any more specific observations but some tentative speculations may be offered. Three readily apparent accelerations are to be noted that may indicate the contours of the Soviet weapons development effort in the post-Korean War period. A small but noticeable spurt is to be seen in 1955, with expenditures holding relatively steady for the next two years. This acceleration was undoubtedly related to the decision to proceed with ICBM research and development on a crash basis, and it probably also reflects the introduction of IRBM's and advanced aircraft into the operational arms inventory. The relatively moderate size of the increase in 1955 and the stability of expenditures immediately thereafter tend to support the contention that the initial phase of Soviet ICBM development was concentrated on the production of a few prototypes and that a broadly based effort to develop operational systems was not begun until later.

A second sharp increase in WSSDP spending is suggested by Godaire's total possible spending line, and an increase is at least perceptible in the other two measures (Chart 3, Lines B-E, C-E) in the years 1958 and 1959. To speculate as to which measure on Chart 3 approximates reality is hazardous, but the behavior of certain industrial indexes during this period, particularly the output of civilian machinery,¹ leads one to believe that a marked acceleration of arms spending took place after 1957, the object of which was the further expansion of IRBM forces and the translation of prototype ICBM development into operational systems. The third distinct acceleration in weapons spending occurred in the 1961-1962 period when revised American intelligence estimates erased the "missile gap" and its political advantages for the Soviet Union, and increasing American arms spending portended a prolongation of Soviet strategic inferiority.

¹See the annual rates of growth of civilian machinery output from the Greenslade-Wallace index, Table 5.

It is quite possible of course that the three weapons spending discontinuities described above are the artificial product of statistical happenstance. But assuming that the cost picture shown in Chart 3 is roughly approximate to reality, one may make tentative hypotheses as to how the Kremlin viewed the course of the arms race at various points. In the years 1956 and 1957 the prognosis was probably very optimistic. Spending on weapons development and procurement was as high as or perhaps higher than the level during the Korean War period but was being "paid for" by substantial cuts in military manpower. The prospects were good for a dramatic technological breakthrough that would have strong military and political repercussions favorable to the Soviet Union. In short, the Soviet leadership was probably confident that a short cut to strategic superiority had been found. In the following two-year period the picture seems to have darkened somewhat. Total arms spending appears to have continued to increase, perhaps at a very rapid pace, with savings from manpower reductions probably dwindling. Soviet decision makers were probably disappointed to discover that the distance between ICBM prototypes and an operational intercontinental capability was greater than had originally been anticipated. But the achievement of strategic superiority within a number of years was still a distinct possibility provided the United States defense effort was not materially increased, and in any event the current political payoff in the sense of the "missile gap" myth was heartening.

A revealing insight into Soviet anticipation of the future course of the arms race in 1958-1959 is provided by Becker's analysis of the implications of the Seven-Year Plan, launched in 1959, for Soviet GNP by end use (that is, as allocated to consumption, defense and other sectors) in 1965. Becker's calculations of Soviet GNP by end use in 1958 include a component that is the sum of the defense budget, outlays on science, a small remainder, and a statistical discrepancy; this component, which may be assumed to represent a conservative measure of Soviet defense outlays, totaled 12.6 billion rubles or 8.2 per cent of GNP in 1958. By 1965, according to the implications of the Seven-Year Plan, this component was to have grown to 25.6 billion rubles or 10.3 per cent of GNP. (See Chart 1, points G_1 and G_2 .) Thus, Soviet planners in 1958 seem to have expected their defense budget to double over the next seven years and to increase materially as a component of GNP. Moreover the weapons and space systems development and procurement component of the defense effort, which Becker implies in 1958 to have accounted for about 65 per cent of total defense outlays, would increase to 85 per cent, or increase absolutely by more than 150 per cent.¹ (See Chart 3, points G_1 minus P_1 .) If G_2 minus P_2

¹Becker, op. cit., p. 19.

Soviet leaders saw any prospect of the defense burden easing, they certainly did not base their economic planning on it in 1958.

By 1961 and 1962 Moscow's confidence that it could guide the arms race to a decisive and favorable shift in the balance of military power must have been severely shaken. There can be no doubt that by this time defense expenditures were rising rapidly as ICBM systems became operational. Soviet technical achievements notwithstanding, the United States was clearly ahead in the arms race and perhaps gaining in the realm of intercontinental missile delivery capability. Soviet hopes for a technological short cut to strategic superiority were dim, and the psychological leverage of the "missile gap" had largely been expended. A viable posture of minimum deterrence was still achievable but only at considerable short-run expense. Pessimism with regard to immediate Soviet prospects in the arms race surely played a key role in the Kremlin's decision to place strategic weapons in Cuba in 1962. Success in that venture would have revolutionized the military and political balance of power and perhaps have allowed the Soviet Union to ease its military effort in the short run.

There is very little ground for speculating on the level of Soviet defense expenditures in late 1964. The planned defense budget rose slightly in 1963 and fell somewhat in 1964. This would suggest that current budgeted expenditures were running at approximately the same level as in 1962, or about 40 per cent above the officially reported 1957-1960 level.

Chapter II

THE ECONOMIC IMPACT OF THE SOVIET DEFENSE EFFORT

A. Defense as a Component of GNP

Because so little can be gleaned from open sources about the actual inputs of the Soviet defense effort, it is very difficult to say with any precision what the impact of this effort is on the economy as a whole, specifically what the Soviet Union must give up in terms of growth and welfare in order to arm. It may be argued with some justification that over the course of Soviet history the need to arm has promoted growth, and that military considerations are the root motivation of the great industrialization process under way since 1928. Yet, motivation aside, the resources that a nation can muster at a given moment and the rate at which the fund of resources can be expanded over time have finite if hypothetical limits. Thus the maintenance of a military effort involves the sacrifice of possible investment and possible consumption. The magnitude of this sacrifice constitutes the real burden of defense.

The measure of this real burden would require an omniscient analyst who could envisage all the possible ways of employing a given set of resources. Since an omniscient analyst is not readily available, measurement of the burden of defense on the Soviet economy must be less than precise. The basic approaches followed here have been (1) to consider the weight of defense as a component of GNP over time, (2) to explore relationships over time between the changing level of defense expenditures and the growth rate of industry, and (3) to examine growth trends and allocation policies in consumption and agriculture.

The measures of defense as a percentage of GNP shown in Table 4 are not conceptually and methodologically consistent. The Soviet concept of national income excludes services as "non-productive" activity while the GNP calculations of the Western economists cited does include them; thus Lines A and B show an apparently higher relative weight of defense. The notable characteristic of the series covering successive years is the indicated decline of the weight of defense as a component of national income or GNP. Even in those measures where an attempt was made to account for hidden expenditures by adding in the margin between the official budget and Godaire's total possible level of spending, the relative proportion of GNP devoted to defense appears to have decreased in spite of marked absolute increases in total arms expenditures. It would thus seem that the relative burden of defense on the Soviet economy has been nearly halved between 1952 and 1962.

Table 4

DEFENSE AS A COMPONENT OF SOVIET GNP AND NATIONAL INCOME
(Per cent)

	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
A.	15	15	16	14	12	12	10	8	8	7	7	7	8
B.	23	25	25	21	19	18	15	14	15	15	14	14	13
C.	10.9	11.6	12.6	11.9	10.3	10.3	8.5	7.3	6.6				
D.	16	19	19	18	16	16	13	12	13				
E.											10.2		
F.						11.2							
G.						13.2							

- A. Official defense budget/Soviet national income, Soviet concept, official derivation in 1961 prices. Narkhoz 1961, pp. 597-598.
- B. Godaire's total possible defense spending/Soviet national income (see Line A). J. G. Godaire, "The Claim of the Soviet Military Establishment," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington: U.S. Government Printing Office, 1962), pp. 39-40.
- C. Nimitz: Defense budget/Soviet GNP, adjusted prices. Nancy Nimitz, Soviet National Income and Product, RAND Memorandum, RM-3112-PR (Santa Monica, 1952), pp. 16-17.
- D. Nimitz: Defense budget X Godaire's total possible defense spending/official defense budget/Soviet GNP, adjusted prices. Ibid.
- E. Cohn: Defense/GNP, factor cost. Stanley H. Cohn, "The Gross National Product in the Soviet Union: Comparative Growth Rates," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power, op. cit., p. 72.
- F. Bornstein: Defense/GNP, established prices. Morris Bornstein, "A Comparison of Soviet and United States National Product," in United States Congress, Joint Economic Committee, Comparisons of United States and Soviet Economies (Washington: U.S. Government Printing Office, 1959), Pt. II, p. 381.
- G. Bornstein: Defense/GNP, adjusted prices. Ibid.

However, a number of qualifications to the contrary must be introduced. Trends since 1958, when the latest acceleration of Soviet arms spending seems to have begun, are inadequately represented in Table 4. Soviet claims for the growth of Soviet national income between 1958 and 1962 may be exaggerated, depressing the relative weight of defense in these years; it is distinctly possible that since 1958 the decline of the relative weight of defense has been arrested and perhaps even reversed. The nature of the current defense effort is such that the highest quality inputs must be diverted to arms production. Greenslade and Wallace observe with reference to the recent decline in the industrial growth rate: "Space and nuclear weapons and missiles...have introduced a quality aspect into the competition for resources that may be as important as the quantitative aspects."¹ Current ruble estimates of the defense effort may drastically understate the scarcity value of the resources employed, especially if, as Miss Nimitz suggests, the prices of military goods have been reduced in recent years.

B. Industrial Growth Trends

Maintenance of a rapid rate of growth in industry probably continues to be the Soviet Union's most urgent economic priority. The policy of concentrating resources on the growth-oriented branches of industry has remained substantially intact throughout the past decade in spite of variations in emphasis on the "heavy industry line." Examination of the industrial growth record with reference to the changing level of defense spending may prove informative in two respects. First, the performance of industry in a broad sense conditions the relative burden of alternative claims on resources such as defense, consumption, housing, and agriculture; if industrial growth slows, the claims of other sectors become relatively more burdensome in the light of industrial growth as an overriding priority. Second, the defense effort may exercise a direct retarding effect on industrial growth by cutting into the resources available for investment and, in the very short run, by diverting current material supplies and skilled labor away from civilian machinery output. It would be difficult to distinguish analytically between a situation where industrial growth slows because it cannot command an increased flow of resources from defense and other sectors and that where industry suffers from a positive diversion of resources to other sectors; one would require some means for differentiating between defense-industrial and civilian-industrial investments, labor inputs, and

¹Rush V. Greenslade and Phyllis Wallace, "Industrial Production in the USSR," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington: U.S. Government Printing Office, 1962), p. 124.

current materials inputs. But one can examine the performance of industry on the premise that the burden of defense as "felt" by Soviet decision makers is some inverse function of the industrial growth rate; one can at least enumerate the factors that influence this growth rate.

Table 5 shows the official Soviet and two independent Western estimates of the annual growth rates of Soviet industry over the past decade. The Soviet series, which must be viewed with the usual suspicion evoked by Soviet aggregative indexes, includes the production of military goods whereas both Western series do not.¹ Of the two Western series, the Greenslade-Wallace figures appear to be the more useful because they extend to recent years and their coverage is broader than those of Kaplan and Moorsteen. The weighting of the Greenslade-Wallace index, from which the growth rates in Table 5 were derived, is of a more recent year than that of Kaplan and Moorsteen.

Most indicators point convincingly to a gradual trend of deceleration in the growth rate of Soviet industry since the mid-1950's. Soviet claims show an average annual growth rate of 13 per cent for the years 1950-1955 and of slightly less than 10 per cent for 1955-1962. The Greenslade-Wallace series indicates an average annual growth rate of 10.1 per cent for the earlier period and 8.7 per cent for the years 1955-1961. Throughout the 1950's Western economists predicted that objective economic factors would induce some retardation in the growth rate of Soviet industry and of the economy as a whole. As the stock of capital has expanded, the burden of replacement has added additional strain on the investment resources of the economy. Sources of rapid increments to the urban working force have dried up, at least temporarily. While there are still large areas of Soviet industry where borrowed technology can be fruitfully applied, the possibilities for gaining sudden and rather effortless increases in productivity through technological borrowing are now more restricted than in the earlier stages of industrialization, and the burden of indigenous civilian industrial research has been increased. Of no mean importance has been the progressive inadequacy of Soviet planning and administrative formulas for meeting the multiple priorities and increasing diversification demanded by the leadership. For these and other reasons equal percentage increments to gross industrial output are not as easily achieved as formerly.

¹Norman M. Kaplan and Richard Moorsteen, "An Index of Soviet Industrial Output," *The American Economic Review*, Vol. 50, No. 3 (June 1960), p. 303.

Table 5
ANNUAL GROWTH RATES OF SELECTED INDEXES OF SOVIET INDUSTRIAL PRODUCTION
(Per Cent)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Soviet official ^a	16	12	12	13	12	11	10	10	11	10	9	9.5
Producer goods "A" ^b	17	12	12	14	15	11	11	11	12	11	10	11
Consumer goods "B" ^b	16	11	12	13	8	9	8	8	10	7	7	7
Greenslade and Wallace ^c												
Aggregate civilian industry..	12.0	6.5	9.5	12.0	11.0	10.5	10.5	9.0	8.6	6.3	6.7	7.2
Industrial materials.....	14.0	8.0	7.0	11.5	11.0	9.0	10.0	10.0	9.9	6.2	5.5	6.8
Civilian machinery.....	0.0	6.0	17.0	15.0	16.0	18.5	16.0	8.0	7.1	8.2	11.2	10.3
Kaplan and Moorsteen ^d												
Industry	11.5	6.5	9.5	10.0	10.0	8.5	9.5	7.5				
Civilian machinery.....	1.5	0.0	11.0	8.0	12.0	10.0	16.5	6.0				

^aNarkhoz, 1962, p. 119.

^bGroups "A" and "B" are Soviet designations that correspond roughly to heavy and light industry respectively; they are intended to convey the notion of producer goods and consumer goods industries respectively, but in fact do not do so. Group "A" includes, for example, passenger automobiles and military goods, obviously not investment or producer goods.

^cRush V. Greenslade and Phyllis Wallace, "Industrial Production in the USSR," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington: U.S. Government Printing Office, 1962), p. 120. Annual rates of growth are taken from an index and rounded to the nearest 0.5 through 1958; figures for 1959-1962 are from Annual Economic Indicators for the U.S.S.R., materials prepared for the United States Congress, Joint Economic Committee (Washington: U.S. Government Printing Office, 1964), p. 37.

^dNorman Kaplan and Richard Moorsteen, "An Index of Soviet Industrial Output," The American Economic Review, Vol. 50, No. 3 (June 1960), p. 296.

Soviet spokesmen have rejected as propaganda Western prognoses of an industrial slowdown. But long-range economic plans as well as official statistics show that the deceleration is clearly perceived. Successive long-range plans for industry give evidence of a declining anticipated rate of growth: the Fifth Five-Year Plan (1951-1955) called for an over-all industrial growth rate of 12 per cent per year; the Sixth Five-Year Plan (1956-1960, discarded in 1957) for 10.5 per cent; the Seven-Year Plan (1959-1965) for 8.6-8.8 per cent. According to Soviet claims, the Fifth Plan's goal was surpassed and the Sixth Plan's was just met during the year and a half it was in effect. Despite an actual decline in the industrial growth rate, the goals of the Seven-Year Plan for growth were surpassed through 1962,¹ an achievement that suggests that the industrial goals of the Seven-Year Plan for growth were deliberately set at a conservative level so as to introduce a certain amount of slack and flexibility into the plan.²

While it is possible that the observed decline in the growth rate of Soviet industry is partly a product of an absolute increase in the volume of resources allocated to defense in recent years, such a contention is difficult to prove. It is certain, however, that the Soviet leaders view the decline as undesirable because of its implications for the economic competition with capitalism, for future standards of consumption, and for future military potential. It is equally certain that resources commanded by other needs such as current defense, current consumption, and agriculture, that is, resources that could presumably be devoted to industrial growth, are correspondingly more "valuable."

The possibility of a direct depressing influence of higher defense outlays on the industrial growth rate is certainly worth some exploration, and a number of Western analysts draw attention to it.³ The Greenslade-Wallace and Kaplan-Moorsteen indexes are the most useful bases for analysis since they provide a means for observing the possible impact of arms spending on civilian industrial output.

¹See Table 5 and Abraham Becker, Soviet National Income and Product in 1965: The Goals of the Seven Year Plan, RAND Memorandum RM-3520-PR (Santa Monica, 1963), p. 107.

²See S. Strumilin in Literaturnaia gazeta, December 2, 1958.

³See, for example, Greenslade and Wallace, op. cit., pp. 122-124, and Martin J. Kohn, "The Soviet Economy in 1961: Plan, Performance, and Priorities," in Joint Economic Committee, Dimensions of Soviet Economic Power, op. cit., p. 230.

Correlations between defense spending and industrial performance observed during the Korean War period provide a valuable basis for comparison with later years (see Table 5 and Charts 1 and 3). Thus in 1950 the total Soviet defense budget, especially its weapons procurement portion, increased sharply and continued to rise until 1952. At the same time a distinct drop took place in civilian industrial output, which began visible recovery again in 1953 after arms procurement was reduced. Civilian machinery responded immediately to the arms increase, with output stagnating until 1953. The sensitivity of the civilian machinery index to sudden upward shifts in defense spending is due to the fact that current supplies for machine building are diverted to defense industries, or, perhaps more accurately, some civilian machine-building capacity is rapidly converted to arms production. Output of basic industrial materials, including metals, construction materials, and energy, also responds to the arms build up but somewhat more slowly; this is because investment plans in these branches, rather than current material supplies, are jeopardized, and the retarding impact is therefore delayed.¹ The combined effect of these trends is an over-all slowdown in the industrial growth rate, indicated even by the Soviet index despite the fact that it includes arms production.

After 1953, civilian industrial output, especially civilian machinery, resumed a rapid rate of growth. A turning point was reached in 1958 when the growth of civilian machinery output was sharply retarded and, simultaneously, total possible space and defense spending, according to Godaire's estimate, experienced an increase of 16 per cent. As in 1951-1953, a delayed deceleration in the growth rate of industrial materials output is observed from 1959 to 1961. These parallels with the period of the Korean War strongly suggest that increased diversion of resources to defense production has been at least partially responsible for the general decline in the industrial growth rate observed after 1957.

A retarded rate of industrial growth is not an immutable necessity in the presence of an arms buildup. In the short run of course, some retardation in the growth of civilian industrial production is bound to be observed as current inputs are diverted away from civilian machine building unless the increase in weapons manufacture is gradual over a protracted period. Shortfalls in machinery output then act to slow investment schedules, which

¹Unfortunately, Soviet investment by branch of industry is rather difficult to ferret out for this period; if it were not, causal relationships could be described and documented with greater accuracy.

depend increasingly upon the delivery of machinery and less on basic construction.¹ However, over a longer period of, say, several years, industry could be favored with resources at the expense of nonindustrial sectors of the economy, and a high industrial growth rate could be maintained.

Table 6

ANNUAL INCREASE OF INVESTMENT IN SOVIET INDUSTRY
(Per Cent)

<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
12.0	11.5	9.5	18.0	8.5	14.5	5.0	13.5	15.6	10.5	4.3	5.6

Sources: Rush V. Greenslade and Phyllis Wallace, "Industrial Production in the U.S.S.R.," in United States Congress, Joint Economic Committee, Dimensions of Soviet Economic Power (Washington: U.S. Government Printing Office, 1962), p. 136; Annual Economic Indicators for the U.S.S.R., materials prepared for the United States Congress, Joint Economic Committee (Washington: U.S. Government Printing Office, 1964), p. 42; Kapital'noe stroitel'stvo v SSSR (Moscow, 1961); Narkhoz 1961, pp. 542-543.

It appears from the figures in Table 6 that Soviet planners have not kept industrial investment growing at levels experienced during the mid-1950's; the average annual increase in industrial investment between 1951 and 1953 was about 11 per cent; between 1954 and 1958, 11.9 per cent; and between 1959 and 1962, 9.0 per cent. The wide fluctuations between 1954 and 1958 are not totally explicable but seem, at least temporally, to be related to official policies in agriculture and housing. The slowdowns at each end of the time spectrum are probably related in part to defense. It should be noted that Soviet investment data, from which the figures in Table 6 are derived, seem to include investment in defense industry. The high rates of increase of industrial investment in 1958 to 1960 may reflect the process of tooling up for the production of advanced weaponry. Such investment is not productive of growth in the long run since it does not result in an increased capacity to invest in later years. Investment in civilian industry probably began to decelerate earlier than the figures in Table 6 might suggest.

¹See Kapital'noe stroitel'stvo v SSSR (Moscow, 1961), p. 45. The share of total investment in the national economy going to "equipment, instrumentation, and tool inventory" as opposed to "construction-installation work" has been increasing since the war, except for two periods of decline, 1951-1953 and 1957-1960. Industry in particular probably participated in this trend.

C. Industrial Labor Resources

Historically one of the most vital assets attending the Soviet Union's industrialization drive has been the ability to draw upon a large reservoir of underemployed labor. In the post-Stalin period a number of both long-term and temporary developments have acted to make up this asset. Briefly, four factors should be mentioned: (1) The net contribution of rural areas to the urban labor force is not so great at the present time as it was in the 1930's. This is evidenced indirectly by the fact that in the past ten years the rural population of the Soviet Union has remained roughly constant while in the prewar decade it declined absolutely by about 10 million. Of course the rural population has continued to make a net contribution to nonagricultural employment; but this contribution has been reduced, and was even reversed during the first years of the Virgin Lands Program; the post-Stalin regime placed increased emphasis on raising total agricultural output but has been unable to undertake the massive investments necessary to increase agricultural labor productivity at a rapid enough pace to liberate rural labor for industry in the volume seen in the 1930's without sacrificing total output. (2) The enormous demographic impact of World War II sharply reduced the number of young persons entering the labor force in the 1958-1965 period. (3) It is no longer easy to draw large numbers of women into the working force since women already account for a relatively high percentage of total employment, and a rising standard of living creates some resistance among women to seek permanent employment. (4) Expanded educational opportunities and regularized pensioning procedures tend to cut into the labor force at each end of the age spectrum.

A number of official policies have been employed to augment the nonagricultural labor force against restrictive trends. The extensive educational reform of 1958 was undoubtedly motivated by the need to increase the flow of young skilled workers into the labor force at a time when the impact of the low wartime birth rate was beginning to be felt. Recent changes appear to have been made in pensioning regulations in order to allow senior workers to remain employed beyond the regular retirement date. A very interesting development has been the replacement with women of men in service, administrative, and agricultural employment, and, presumably, the transfer of the men thus freed to industrial and construction jobs. Lastly, of no mean importance has been the large reduction in the number of men under arms since 1955.

If these official policies have been directed toward counter-ing the labor trends just outlined, they have also been intended to compensate for one official policy that moves in a diametrically opposite direction--the policy of reducing working hours. Raymond Powell's data on labor inputs in industry, shown in Table 7, indicate a dramatic deceleration, especially after 1955.

Table 7

**LABOR INPUTS IN SOVIET INDUSTRY,
MAN-HOURS, ANNUAL RATE OF GROWTH, 1928-1958
(Per Cent)**

<u>1928- 1932</u>	<u>1932- 1937</u>	<u>1937- 1940</u>	<u>1940- 1945</u>	<u>1945- 1950</u>	<u>1950- 1955</u>	<u>1955- 1958</u>	<u>1928- 1940</u>	<u>1950- 1958</u>
10.1	4.2	6.0	0.7	5.8	5.1	1.7	6.6	3.8

Source: Raymond P. Powell, "Industrial Production," in Abram Bergson and Simon Kuznets, eds., Economic Trends in the Soviet Union (Cambridge, Mass.: Harvard University Press, 1963), p. 163.

Greenslade's data on nonagricultural employment and productivity, shown in Table 8, reveal that the Soviet Union was able to continue expansion of industrial employment at an appreciable rate during the 1950's and early 1960's. But the growth of man-hour inputs in nonagricultural sectors fell off after 1955; productivity per man-hour saw reduced growth as well, largely because investment tended to grow more slowly. These trends in labor inputs and productivity are clearly vital factors in explaining the reduced growth rate of Soviet industry.

Table 8

**NONAGRICULTURAL EMPLOYMENT AND PRODUCTIVITY,
ANNUAL RATES OF GROWTH
(Per Cent)**

	<u>1955/1950</u>	<u>1959/1955</u>	<u>1961/1959</u>	<u>1963/1961</u>
Employment	3.0	4.2	5.5	3.4
Productivity per man	4.5	3.7	0.8	2.4
Man-hours	3.0	2.0	1.8	3.4
Productivity per man- hour	4.5	6.0	4.4	2.4

Source: Rush V. Greenslade, "Soviet Economic Slowdown," paper delivered at a seminar at the Russian Research Center, Harvard University, March 25, 1964, p. 5.

It is likely in the future that labor inputs in industry and other nonagricultural sectors will grow at least at the rate suggested by Greenslade for the 1961-1963 period. In a few years the period of impact of the wartime birth rate will have been passed, and increased agricultural investments will tend to maintain the flow of rural workers to nonagricultural employment. Sharp reductions in working time are probably not to be expected.

Labor requirements will probably continue to exert some pressure on the Soviet regime toward reducing military manpower. But the burden of defense on labor resources includes labor devoted to defense production as well as military manpower. Since the qualitative aspect of labor resources (increases in its importance for industrial growth) and in the light of the known fact that the Soviet defense industries command labor of high quality, it is reasonable to assume that the qualitative effects of military manpower cuts on the labor supply would be somewhat less than those of retrenchment of defense production. Nevertheless the uniformed services are a valuable reservoir of skills of potential use to industry.¹

As suggested above, the most crucial aspect of the competition for labor resources between defense and the nonmilitary economy is its qualitative rather than purely quantitative dimensions; defense needs monopolize many of the best workers who are sorely needed in civilian industry. Data of Alexander G. Korol indicate the contours of this competition in dramatic terms. According to his figures, total employment in Soviet R&D institutions, which are massively engaged in military work, increased by roughly 6 per cent per year from 1950 to 1955. Between July 1955 and December 1956, however, the increment to total R&D employment was 23 per cent and the average annual rate of increase thereafter was about 16 per cent.² Moreover the proportion of professional employees, that is, graduates of schools of higher education, among this total also tended to increase, especially the proportion of engineers.³

¹See A. Yepishev, "Education of the Citizen Soldier," Kommunist, 1964, No. 5, pp. 64 ff.

²See forthcoming Soviet Research and Development: Its Organization, Personnel, and Funds (Cambridge, Mass.: The Massachusetts Institute of Technology Press, 1964), p. 61.

³Ibid., pp. 69 ff.

It appears also that in order to achieve this massive increase in R&D employment after 1955 the Soviet Union was for a time compelled to reduce graduate enrollment sharply so as to increase the influx of current VUZ (technical college) graduates into the national economy rather than let them enroll for graduate study.¹ Current needs were in effect more urgent at this point than the long-term interests of the Soviet Union in expanding the supply of advanced degree holders.

The cited data on the R&D employment tend to suggest that 1955 was the key year in the Soviet research effort directed toward advanced weaponry. At the same time, they do not refute the implication of Godaire's estimates of total possible defense and space spending: that the most dramatic acceleration took place in 1958 and 1959, while a sharply increased military R&D effort probably took place in 1955 to 1957 within the context of stabilized or falling total defense outlays, as conventional weapons production was reduced and military manpower cut.

D. Defense and Industrial Technology

The need to achieve progress in industrial technology through the introduction of advanced machinery, automated processes, and refined production techniques has never been absent in the calculations of Soviet planners since the beginning of their industrialization drive. Yet this need has become increasingly urgent in recent years and has received added emphasis in the Sixth Five-Year Plan and the Seven-Year Plans. It is probably correct to say that in the past the Soviet industrial effort was directed along a limited array of technological vectors that were not characterized by efficient use of labor and material inputs. Today the achievement of further industrial growth, especially if it is to be at past rates, is technologically much more complicated; a wider variety of more challenging technological paths must be taken simultaneously.

Soviet industry as a whole is in need of far-reaching technical modernization. While some branches of industry are advanced by Western standards, others have been neglected; while some plants in an industry are modern, large numbers are backward; while many of the basic productive processes in a given industry are highly mechanized, subsidiary processes like loading and hauling rest on costly and inefficient hand labor. The growing burden of capital depreciation has raised the problem of replacing worn and out-dated machinery with modern equipment, and Soviet economists have been

¹Ibid., pp. 91-93; also Nicholas DeWitt, Education and Professional Employment in the USSR (Washington: National Science Foundation, 1961), p. 393.

confronted with the ideologically vexing question of the costs of obsolescence. Two prominent areas of underdevelopment that are now being "stormed" are petroleum as an energy source and chemistry as a source of synthetic materials for industry and the consumer and of fertilizers for agriculture. Both industries are technologically more difficult to develop than the coal-steel complex that has dominated Soviet industry in the past.

In earlier periods of industrialization blueprint or model borrowing was of significant assistance to the Soviet Union in advancing its industrial technology. Opportunities for technological borrowing are today by no means exhausted. But where in the past the Soviet factory had merely to tool up for the production of a tractor or a turret lathe designed in the West, the problem is now to set up an integrated and highly complicated chemical plant or automated assembly line. Although such borrowing may save the Soviet Union a great deal, it is obvious that the assimilation and administration of technology on this level involves an engineering effort of such magnitude that the term "technological borrowing" loses much of its piratical connotation. The Soviet Union must now also develop a great deal of original industrial technology to meet its own peculiar needs and must improve on and adjust to its own requirements the practices borrowed from other countries. When one adds to these considerations the fact that the mere maintenance of advanced industrial machinery has become a task more for the sophisticated engineer than the skilled worker, it is clear that the technological "load" that must be carried by the Soviet economy in order to ensure industrial progress has grown enormously.

In this short paper it is impossible to explore in any length the measurement of Soviet technological progress during the period under review. Greenslade's data on man-hour productivity growth (Table 8) may reflect qualitative trends in the introduction of advanced technology in industry, although quantitative trends in industrial investment are probably the dominant factor in the slowing growth of productivity after 1959. Powell has derived estimates on the contribution of new technology and efficiency to industrial output over the period of forced industrialization that, while apparently overstating this contribution somewhat, show an interesting trend in the 1950's. Employing 1950 prices and imputing an interest rate of 8 per cent, he concludes that the contribution of improved technology and efficiency in Soviet industry increased about 2.8 per cent a year from 1950 to 1955 and about 7.1 per cent a year from 1955 to 1958.¹ These figures suggest that improvements

¹Raymond P. Powell, "Industrial Production," in Abram Bergson and Simon Kuznets, eds., Economic Trends in the Soviet Union (Cambridge, Mass.: Harvard University Press, 1963), p. 172.

in technology and efficiency played a material role in the nonagricultural productivity growth shown by Greenslade for 1955-1959. If one assumes that the parallel continues beyond 1959, improvements in technology must have been registered at a slower rate, significantly at a time when an increased diversion of engineering and scientific resources to defense was taking place.

It is probably reasonable to assume that the diversion of technological resources, that is, scientists, engineers, and R&D facilities, to participation in a highly technological arms race has indeed impeded progress in civilian industrial technology, although firm evidence of this has escaped the present writer. However, a number of cautious speculations on the subject can be advanced. It is probable that the diversion of resources to defense has cost the Soviet Union more in terms of civilian technological progress than it has cost the United States. Both countries suffer from institutional characteristics that tend to inhibit the introduction of more productive technology into the civilian economy (for example, in the United States the patent system), and it is probably impossible to determine what the comparative level of technical innovation would be if the defense efforts of both countries were terminated. But the very fact that the top Soviet leadership would emphasize a maximum technological effort in the civilian economy in such circumstances whereas the American political leadership might be indifferent suggests that the real "loss" to the Soviet Union on this score is comparatively greater.

Another consideration concerns the civilian payoffs of defense technology. In the long run military R&D is bound to have some civilian payoffs for both participants in the arms race, but it is likely that the payoffs are comparatively less for the Soviet Union than for the United States. Soviet defense research appears to be an enterprise very much concentrated on specific prototype and weapons systems programs. The pressure for immediate and practical results is very great because the resources necessary for a broadly based, internally competitive R&D effort are in extremely short supply. Present Premier Kosygin's remarks of June 1961 on the high cost of R&D illustrate the pressure for concentration of effort on research in general, and they probably apply to defense R&D since it comprises such a large portion of the over-all scientific program:

Unfortunately, many scientific institutions do not achieve the proper effectiveness of research. They are considerably in arrears to the state. At the same time, we frequently hear statements to the effect that allocations to some scientific institutions are not sufficient.

It should be remembered that the size of allocations to various branches of the economy and for science is determined by the tasks that must be solved in the plan period. We cannot increase capital investments over and above the plan if the state does not receive additional income.¹

Because of the scarcity of resources, the Soviet Union cannot afford to explore blind alleys in military or civilian applied research. It is thus probable that the spill-over from military R&D to civilian industry is rather limited. It is also probable that a highly concentrated research strategy is not really efficient from the military point of view, first, because the chances of an accidental breakthrough are minimized and, second, because research gambles that do not pay off tend to set back the entire defense program.² A second consideration is that in the Soviet Union the qualitative gap between defense technology and the areas of industry most demanding of technological progress is greater than in the United States, where a more uniformly advanced industrial plant and a well-developed civilian electronics market imply a more immediate civilian applicability for the fruits of military R&D.

These assertions must be considered as speculative. If any positive statement can be made on this issue, it is that both the United States and the Soviet Union sacrifice a certain amount of civilian technological progress because of their respective arms burdens, and that the sacrifice is more injurious to the basic economic objectives of the Soviet Union than it is to those of the United States.

E. Alternative Demands for Resources: Agriculture and Consumption

Up to this point the principal preoccupation of this chapter has been the relationship between the Soviet defense effort and over-all industrial growth, concentrating in the latter on the growth of producer goods output. This theme is most central to the consideration of economic factors and Soviet arms policy because the trade-offs between arms spending and economic growth are

¹Pravda, June 15, 1961.

²See Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age (Cambridge, Mass.: Harvard University Press, 1961), pp. 243 ff.

according to our hypothesis a key determinant of Soviet behavior. Military security and industrial growth are unquestionably the dominant objectives of the Soviet regime and are likely to remain so indefinitely. However, the regime clearly entertains other domestic economic objectives that in the long run are served by industrial growth but are not in the least served by the defense effort. The most commanding of these goals are raising the Soviet standard of living and solving the seemingly interminable problems of agriculture. These two objectives are obviously related but must be separated for discussion.

Agriculture poses a more immediately pressing problem for the Soviet regime at present than the task of raising consumer standards, in part because the Khrushchev leadership staked its domestic and even international prestige on solving it, in part because consumer standards are languishing at a low but tolerable level while agriculture periodically experiences catastrophe.

Upon his death Stalin bequeathed to his successors an agricultural sector marked by virtually complete stagnation. The output of many commodities, particularly livestock products, had not yet recovered from the revolution, much less from collectivization and the war. While Malenkov had claimed at the Nineteenth Party Congress that the grain problem had been solved, largely as a result of a rather favorable harvest, it soon became apparent that significant efforts had to be taken to register any significant improvement in total output. In 1954, largely under Khrushchev's aegis, the regime undertook to plow up by 1956 some 30 million hectares of fallow land in western Siberia and Central Asia. While, in typically Soviet fashion, the output goals of the program were more utopian than merely optimistic, the Virgin Lands Program made a great deal of economic sense. The regime desired rapid increases in total grain production but was not equipped to make the investments necessary for thorough intensification of farming on already cultivated land. It was felt that returns on the kind of investment that was immediately possible, namely, machinery and basic construction, would be greater if an extensive strategy (that is, extension of sown area to increase total output at the expense of average yield per acre or hectare) were pursued. The program was indeed costly, with total state investments in agriculture rising by 82 per cent in 1954 and 26 per cent in 1955. In 1955 the state investment in agriculture amounted to about 12 per cent of total state investments in the national economy, considerably higher than the average proportion during the Fifth Five-Year Plan or any single year since. Largely as a result of the Virgin Lands Program, total grain output in 1956 was up approximately 40 per cent over that of 1953. Because agriculture as a whole, including the old lands in western regions, received attention as well, total group output and

total agricultural output, which includes livestock, increased about 35 per cent. A not unimportant role in this resurgence of agriculture was played by procurement price reforms and administrative changes that provided the peasant with greater incentives to produce. Investment, however, was the crucial factor.

After 1956, state policy toward agriculture was marked by budgetary conservatism until 1960. Agriculture was favored with a great deal of official attention, and institutional reforms were many. But state investment began to taper off and actually declined in 1958 and 1959. The major reason for state retrenchment in agriculture was the fact that harvests had been quite favorable in 1956 and 1957, and then 1958 delivered a bumper crop in all sectors. These developments produced the feeling that agriculture was now somehow "over the hump" and that a more leisurely approach to investments could be pursued. Significantly during this period, expansion of sown area in the east, which had been exclusively a state farm (sovkhos) enterprise, slowed to a halt. A second, perhaps more important, reason for the tapering off of state investments was the fact that increased procurement prices and a series of favorable harvests had dramatically augmented the income of the collective farm (kolkhoz) sector and hence its capacity to invest. By imposing a mandatory investment rate on the collective farms through the media of party control, the state could push the bulk of the agricultural investment burden onto the collective farms and, incidentally, reduce the pressure of an increased rural income on the supply of consumer goods. That this was indeed the regime's objective is suggested by the fact that, while state and collective farm investment had remained approximately equal in earlier years, even during the Virgin Lands Program, the control figures of the Seven-Year Plan, which was launched in 1959, called for a level of investment by the collective farms more than twice the share of the state.

In 1959 and 1960 total agricultural output was off somewhat from the 1958 level; 1961 saw an appreciable increase; but 1962 was another year of decline, and 1963 was a virtual disaster in all regions. Poor harvests severely crippled the ability of collective farms to carry their appointed investment burden, and it was clear that state efforts would again have to be increased drastically. From 1960 through 1962 state investment increased by 20 per cent a year, compared with an average annual increase of 2.5 per cent in the previous four years.

At the present moment, particularly in view of Khrushchev's replacement, the Soviet Union is at a crucial turning point in the evolution of its agricultural development strategy. At the February 1964 plenum of the Central Committee it was resolved that, while "extensification" of production through the application of the plow to new lands was the proper strategy for the past, the

course for the future must be that of intensifying production on the best lands. This means that although the Soviet Union must continue to make up for deficiencies in the supply of agricultural machinery, the commodity in principal demand is mineral fertilizer that only the chemical industry can provide.

At two points during the past decade, in the years 1953-1955 and in 1964, the Soviet Union had to mount an "investment offensive" against the agricultural problem. In both instances the concurrent military effort can be seen to have a direct bearing on the practicability of such an offensive. The Virgin Lands campaign could probably not have been undertaken in 1954 and 1955 if the Soviet defense effort had continued into those years at the same level and composition that had prevailed during the previous three years. Extension of sown area put great pressure on the supply of tractors and other agricultural machinery; as it was, machinery had to be borrowed from the old territories to bring in the first harvests in the new lands. Only a sharp increase in the production of agricultural machinery made the campaign at all possible. Much of this equipment had to come from plants that during the Korean War manufactured tanks and other war materiel. It is certain that only the retrenchment of defense procurement in 1953 and 1954 enabled the needed equipment to be produced; this is illustrated by figures on the output of tractors in 1950-1955, shown in Table 9.

Table 9

SOVIET TRACTOR PRODUCTION, 1950-1955
(Thousand Units)

<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
108.8	91.8	98.7	111.3	135.4	163.4

Source: Narkhoz, 1959, p. 217.

The conflict between agricultural goals and a high level of defense procurement is probably not so direct in the mid-1960's as it was in the early fifties, but is nevertheless probably as real. The development of an advanced chemical industry requires not only chemists, who are not likely to be completely monopolized by defense enterprises, but also a vast array of engineering skills and high-quality material inputs, including electronics, for which chemistry must definitely compete with defense. If the goal originally stated by Khrushchev of producing 35 million tons of mineral fertilizer by 1965 is still to be reached, output must increase by

about 32 per cent in 1964 as well as in 1965. Yet output has increased by only 10 to 15 per cent a year in the recent past, and total chemical output has been increasing at an average annual rate of about 10 per cent.

In much the same manner as agriculture the standard of living enjoyed by the Soviet consumer has received increased attention since Stalin's death because of the character of the post-Stalin regime and the extent of previous neglect. A few basic indicators serve to illustrate trends since 1950. Janet Chapman's research shows that by 1950 per capita consumption standards of 1928 had only just been exceeded. Very rapid gains had been made since 1944, at an average annual rate of about 10 per cent; but these improvements only made up for the absolute decline that occurred in the Soviet standard of living in the 1930's and during the war. After 1950 reasonably rapid progress continued. Miss Chapman finds that per capita consumption increased at an average annual rate of about 7 per cent, a figure that Rachel Golden confirms in her estimates of disposable personal income.¹

The gains made in 1950-1955 were in considerable measure due to the ostentatious gesture in 1953 and 1954 made by Malenkov in the direction of consumer welfare. The ambiguities of the New Course in the economy launched in August 1953 cannot be explored in detail here. Although there was a great deal of fanfare about raising the standard of consumption, there are no indications that a fundamental retreat from the priority of heavy industry was contemplated. However, a number of effective measures were taken to increase the flow of consumer goods to the Soviet people. First, funds were diverted to investment in industries producing consumer goods; the amounts were not large in comparison with total investment, which increased quite rapidly after 1953, but the relative impact on the consumer goods industries was reported to have matched that of group "A" (producer goods) in 1953 and even surpassed group "A" in the second half of 1953.² Investment in group "B" (roughly, consumer goods) in 1954 increased again by a sizable margin but declined as a component of total industrial investment. Although these investment increases were undoubtedly made possible by cuts in defense procurement, the main investment emphasis continued to be on the sectors of industry oriented toward growth rather than consumption. A second and crucial factor

¹Janet Chapman, "Consumption," in Bergson and Kuznets, Economic Trends in the Soviet Union, op. cit., p. 238; Rachel E. Golden, "Recent Trends in Soviet Personal Income and Consumption," in Joint Economic Committee, Dimensions of Soviet Economic Power, op. cit., p. 354.

²A. Vikentiev, Vestnik statistiki, 1954, No. 3, p. 52.

in achieving visible increases in consumption standards was the effort of the regime to move stocks of goods to the consumer at a more rapid pace, as indicated by the fact that inventories in trade declined considerably.¹ Third, the arms cut in 1953 and 1954 permitted the use of defense production capacity for the manufacture of consumer durables.²

Consumption has increased at materially slower rates since 1955. Per capita consumption, according to Miss Chapman, grew at an average annual rate of 4 per cent from 1955 through 1958. Miss Golden shows per capita personal disposable income increasing at an average annual rate of 5.4 per cent from 1956 through 1958 and at 4.4 per cent from 1959 through 1961. The output of consumer goods has increased more slowly than total industrial output, within the context of a general economic slowdown in recent years. After Khrushchev's trip to the United States in 1959 there occurred a spurt of attention to consumers' needs, and the consumption goals of the Seven-Year Plan were increased. The share of total industrial investment going to group "B" increased briefly in 1959 and 1960 but then decreased again in 1961 and 1962.³

Since 1955 the policy of the Soviet regime has been to allow consumption to increase with over-all economic growth but at a slower pace, at the same time providing that an ever-increasing component of national income be allocated to investment. As economic growth has slowed, however, improvements in consumption have virtually come to a halt.

F. Trends in the Growth of Soviet GNP

In all the sectors of Soviet economic activity previously discussed, with the notable exception of defense, a decline in the rate of growth has been observed since roughly 1957 or 1958. The rate of growth of Soviet GNP in recent years naturally reflects these trends. Figures released by the Joint Economic Committee of the United States Congress, shown in Table 10, indicate a dramatic retardation in over-all economic growth since 1958 even when arms production is considered. One of the most recent and controversial--but creditable--breakdowns of recent growth trends has

¹See Bergson, The Real National Income of Soviet Russia since 1928 (Cambridge, Mass.: Harvard University Press, 1961), p. 392.

²Speech by Mikoyan, Pravda, October 25, 1953.

³Kapstroi, pp. 56-57; Narkhoz, 1962, pp. 434-435.

Table 10

**ANNUAL AND AVERAGE ANNUAL RATES OF GROWTH OF SOVIET GNP
(Per Cent)**

<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962^a</u>	<u>1950-1958</u>	<u>1959-1962^b</u>
9.9	3.9	5.0	6.5	2.2	6.8	4.6

^aExcluding arms production. ^bIncluding arms production.

Source: Annual Economic Indicators for the U.S.S.R., materials prepared for the United States Congress, Joint Economic Committee (Washington: U.S. Government Printing Office, 1964), p. 95.

been provided by Rush Greenslade in material circulated privately at the Russian Reserach Center at Harvard University. His data (see Table 11) and some supporting remarks are cited here at length because they succinctly state the case that has emerged from the present writer's research:

What are the chief causes of the recent slowdown? Agriculture, of course, is primarily responsible for the very low growth of the last two years. However, the slowdown is not confined to agriculture, and it began earlier than 1962. Let us consider three periods: 1950-1955, 1955-1960, and 1960-1963, and look at the average annual rates of growth of GNP and its components in these periods. Not only agriculture but also Industry, Construction, Transportation and Communications have slowed down in the last three years. Overall non-agriculture production has slowed from around 8 per cent to less than 6 per cent.

We attribute this slowdown in non-agricultural production in large part to the reversal of trend in defense spending which declined from 1955 to 1958, but which rose rapidly from 1958 through 1963. The Soviet economy operates practically at full employment. Resources are not necessarily efficiently employed but they are employed. Consequently, any relative increase in one activity is likely to lead to a decrease in something else. So the acceleration of defense expenditures appears to be the leading causal factor in the slowdown in investment growth over the last four years. See Tables 6 and 12. Fixed investment in the mid 1950's was growing at 12-15 per cent a year. Since 1959 it has grown at 4-5 percent per year.

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Table 11
USSR: AVERAGE ANNUAL RATES OF GROWTH
(Per Cent)

	1957 Weight(%)	1955/50	1960/55	1963/60
1. Industry	30.3	9.9	8.4	7.2
2. Construction	8.8	12.6	13.6	1.8
3. Agriculture	36.2	5.0	4.2	0.1
4. Transportation and communication	5.9	11.3	12.5	6.5
5. Trade and services	18.8	3.0	3.2	4.8
6. GNP	100.0	6.6	6.6	3.9
7. Nonagricultural GNP		7.7	7.9	5.7

Source: Rush V. Greenslade, "Soviet Economic Slowdown," paper delivered at a seminar at the Russian Research Center, Harvard University, March 25, 1964.

What are the prospects for future Soviet growth? This, of course, depends on investment policies and defense spending to a considerable extent. In the short-run, however, agriculture will have a large impact. The chances are that agriculture output will improve from the low level of 1963. Since agriculture dragged down the GNP growth rate in 1963, if agriculture should merely hold its own in 1964, GNP growth would rise to 4 per cent. If agriculture returns to the 1962 level, GNP would grow by $5\frac{1}{2}$ per cent, and with good weather luck, agriculture output might grow even more than that. We do not see, however, any likelihood that GNP growth will return on a sustained basis to the rates of the 1950's.¹

If Greenslade's arguments and the correlations drawn earlier in this paper between industrial growth and the defense burden have any foundation in fact, the Soviet regime at present has an urgent economic interest in at least stabilizing defense expenditures. With the defense effort and levels of consumption held constant, investment could begin rapid increases again, and growth would be

¹Rush V. Greenslade, "Soviet Economic Slowdown," paper delivered at a seminar at the Russian Research Center, Harvard University, March 25, 1964, pp. 3-4.

Table 12

**ANNUAL GROWTH OF STATE, COOPERATIVE, AND COLLECTIVE FARM
INVESTMENT IN THE NATIONAL ECONOMY, 1951-1962**

<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
13.5	12.0	5.0	18.0	13.5	15.0	11.0	15.0	12.5	10.0	8.5	3.0

Sources: Kapstroi, p. 40; Narkhoz 1962, pp. 434-435.

spurred. Resumption of the growth rate seen in the mid 1950's, however, would surely require a substantial reduction of defense spending. If, on the other hand, the rising level of defense spending has not been an overwhelming causal factor in the declining growth rate of the Soviet economy, and other trends, such as planning and administrative friction and an increasing marginal capital-output ratio, are to be assigned the key causal roles, it is still true that a heavy defense burden has constrained the Soviet response to those trends by inhibiting the growth of civilian investment and labor productivity, and a strong economic interest in reducing or stabilizing defense outlays can be assumed to exist for the present.

Chapter III

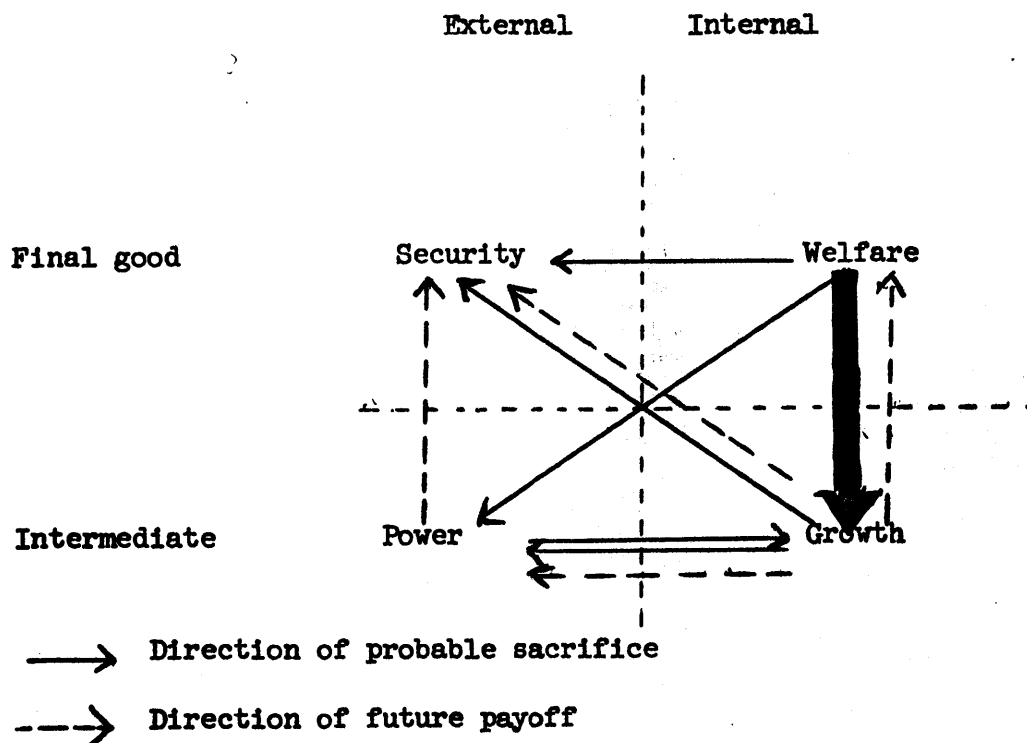
CONCLUSIONS

A. The Framework of Choice

Since all policy involves the application of resources to the pursuit of chosen objectives, all policy, therefore, involves economic decisions in the broadest sense. This is certainly true in the case of arms control and disarmament policy. Complete disarmament implies the shifting of resources from military to civilian purposes and, presumably, the renunciation of the future use of resources for arms. Arms control imposes qualitative and perhaps quantitative restrictions on the use of resources for military purposes. It is, of course, possible although not likely that a formal arms control agreement of considerable scope could involve an actual increase in the volume of resources devoted to arms.

The conventional usage of "economic," meaning pertaining to the economy, has up to now been adequate and convenient for our descriptive purposes. But for purposes of final judgment on the basic questions at issue in this study the larger frame of reference cannot be avoided. The problem is how to structure that frame of reference.

One could develop an abstract calculus that simulated the interplay of variables in the Soviet decision-making process; the following schematic model represents a possible simplified approach:



This model does not prove anything but merely represents the writer's opinion as to how the present Soviet regime--or indeed any state in a Hobbesian international environment--perceives its options and makes its choices. The model could be given greater precision by making it clear that welfare pays off to growth through incentives, health standards, and education; to security by contributing to internal stability; and to power by augmenting the international prestige of the regime. In my judgment these considerations are at present of marginal importance: Welfare is an ultimate good, valued for its own sake by the regime, although it has intermediate value as well. Power, which is meant here as the ability to impose a "compatible reality" on hostile adversaries (an offensive connotation) may also pay off to growth if the acquisition of resources is involved.

The key propositions illustrated by this model are (1) that security is not sacrificed to anything but is the sine qua non of everything, a quality that can hardly be represented in terms of payoff; (2) that growth is the source of all good things; and (3) that the value that bears the heaviest present burden of sacrifice is welfare. How would various forms of arms limitation affect the values that the Soviets attempt to maximize? An ironclad disarmament agreement would liberate resources for growth and welfare, which bear the sacrifices of defense. It would probably minimize external power, although some nonviolent forms of its exercise might be unrestricted. It would have to add to security or else it would not be accepted.

But these speculations merely beg the question posed at the beginning of this paper: would arms limitation contribute more to the values being maximized than continued participation in the arms race would contribute? The economic question impinging on Soviet policy toward arms control and disarmament is not merely how much the arms race costs but what the costs are able to buy in terms of security and power. Theoretically, if arms limitation will bring equal or greater security than the arms race at less cost, the Soviet Union, if it were to act rationally, would favor the measure.

Unfortunately the ambiguities of reality blur the precision of theory. A critical element in all Soviet arms policy is perception of an uncertain future. What will the future course and costs of the arms race be? What will the international environment look like in the future? What can one expect from a disarmed or arms-controlled world? To fathom the sources of Soviet policy on arms control and disarmament one should really determine how these questions have been answered by Soviet leaders at various points in time. It is highly likely that these questions are never conclusively answered in the minds of the leaders and that tentative policies are advanced on the basis of a more or less ordered uncertainty about the future.

Uncertainty gives rise to a second ambiguity that has plagued our analysis of Soviet policy. In almost any circumstances the pursuit of detente or the relaxation of East-West tensions reduces the urgency of choice that the Soviet regime, like any government faced with uncertainty, finds painful. A relaxed international atmosphere, for example, reduces the necessity of making clear choices and firm commitments among potential "allies" in the neutral world; it tends to inhibit the cohesion of the West in its anti-Soviet policies and thus postpones the point when the Soviet leadership must make a conclusive decision on such questions as what to do about the multilateral NATO nuclear force, or what posture to assume with regard to the evolution of a united Europe. Of course the Soviet government must always have a propaganda line that sets forth its general attitude on these issues. If a detente prevails between the great powers, however, there is less need to make a commitment to act diplomatically, economically, or militarily to prevent a disagreeable--or promote an agreeable--development. Since any decision to act involves risk, all policy-making elites have an interest in delaying or evading such decisions until a degree of certainty about the future emerges from events themselves. Detente may therefore be sought to relieve the pressure for decision in an uncertain environment. In the years immediately following the death of Stalin and the Cuban crisis this principle can be seen at work in the development of Soviet foreign policy.

The utility of detente as a means by which the Soviet Union may avoid painful decisions and relieve the pressure on its policies confronts the analyst with grave analytical difficulties. An expressed interest in arms control on the part of the Soviet Union, a reasonable negotiating position, and the presence of pressures that seem to enhance the value of arms control to the Soviet Union do not in themselves lay bare the nature of Soviet motives, for serious discussion about arms control and even limited agreements may be employed as means to pursue detente. The Soviet leadership may feel that comprehensive arms control or disarmament is practically and ideologically impossible, or it may view a disarmed world in the abstract as compatible with its international goals while entertaining prohibitive doubts about any conceivable transition to this state. But these attitudes would not necessarily prevent the Soviet Union from presenting an impressively sincere and constructive visage at the conference table.

The ambiguous implications of arms control policy impinge directly on any appraisal of the role economic and military factors play in conditioning such policy. As noted above, the Soviet Union might achieve genuine security and even a measure of external power through arms control arrangements, allowing it to concentrate its scarce resources on growth and welfare. Severe conflict between

power and security through arms on the one hand and growth and welfare on the other would seem to constitute a strong inducement to consider arms limitation. Yet relaxation of East-West tensions, sought in part through amicable arms-control discussion, tends to reduce the conflict between these values and lessens the need for painful choice. Detente provides a degree of temporary security by lessening the chances of conflict and easing the pressure on Soviet military posture. It thereby permits the Soviet government to neglect the augmentation of its present military strength through the development and procurement of immediately available weaponry and to concentrate its resources on systems that will yield increased strength in the future and perhaps even revolutionize the balance of power. Such concentration is very likely to permit reduction or at least stabilization of the total defense effort and increased allocations to civilian economic growth, which, it must be noted, itself constitutes potential future military strength.

It is entirely possible for the Soviet Union to be "sincere" about arms control while at the same time employing negotiations as a device for bolstering detente as a minimal objective. But the ambiguous relations and possible contradictions among the multiple objectives of Soviet arms control policy must be kept in mind in assessing the impact of economic factors on its evolution.

B. Policy in the Khrushchev Era

Surveying the past decade, one perceives two rather distinct periods in which Soviet leadership apparently felt that the payoffs of the arms race to security and power were not worth the sacrifices of growth and welfare involved. These periods are roughly the years 1953 through 1955 (or perhaps 1956) and the period since 1961.

In the years immediately preceding 1953 the Soviet Union had sharply increased its defense spending concurrently with the Korean War and increased tensions in Europe. This increase had detrimental effects on the growth rate of industry and the economy as a whole but did not materially improve the Soviet position in the balance of power since a great deal of military procurement during this period encompassed conventional materiel for the Soviet ground forces. While an intercontinental capability was in prospect as a result of Soviet development of nuclear weapons, it was not to be available for a number of years. By reducing the over-all military burden in 1953 and 1954 the Malenkov regime sought to accelerate the growth rate of the economy as a whole, especially industry, which would provide a more dependable basis for future choice. Economic growth would underwrite an improvement in the Soviet standard of living and a future defense effort. The flexibility of choice sought by

the regime at this time required at least the relaxation of tensions and a reduction in the possibility of conflict. Since the prospects for eventual strategic equality, not to mention superiority, did not appear excessively bright, arms control arrangements were probably considered seriously as a means to achieve security. Earnest participation in the disarmament dialogue contributed in any event to detente.

In 1955 and 1956 the picture began to change. Industrial growth had speeded up, consumer standards were rising, and agriculture was being brought out of the doldrums. This economic progress had resulted in large measure from the diversion of resources from military to civilian purposes. At the same time, however, Soviet research in missilery raised the possibility of overturning the balance of power. It was probably judged at this point that the costs of such an attempt would not be great. Meanwhile detente continued to be a large asset since it kept Western defense budgets down and prevented the need to procure existing weapons systems in quantity. Disarmament probably remained a possible approach to security, but the Soviet leadership was becoming increasingly willing to take its chances with the arms race.

In the 1957-1959 period defense outlays began to rise rapidly but were paying off with spectacular achievements. The prospects of a breakthrough to strategic superiority were brighter than at any other time, and the impact of the defense effort on economic growth was probably not expected to be great. The attractiveness of genuine arms limitations was probably low except where agreements would augment the Soviet pursuit of superiority, hopefully by outlawing foreign military bases.

By 1961 the picture was materially altered. The costs of the arms race were probably rising faster than had been expected, and its detrimental effects on the economy were now being felt. In a circular effect, the retardation of industrial growth tended to jeopardize the defense effort itself. Operational ICBM forces were coming on the scene at a somewhat slower pace than anticipated. Most important, the increased defense effort of the United States had transformed the pursuit of superiority into a race merely to keep the strategic gap from widening. The technology of modern arms, moreover, with its long lead-time factor, was forcing Soviet planners to make allocation decisions on the basis of increasingly uncertain future expectations. These considerations, undoubtedly augmented by the failure of the Cuban end run in 1962, led the Soviet Union by 1963 to strive energetically for a relaxation of tensions and an easing of its immediate burden of choice.

The Soviet strategic position is much more favorable in the mid-1960's than it was in 1955. But a posture of minimum deterrence does not provide a margin of security much larger than equality would provide in an arms-controlled environment. Arms-control agreements that tend to neutralize and minimize present Soviet inferiority could appear to be very attractive as immediate policy objectives. In addition, the prevailing atmosphere of detente makes it unlikely that the United States will take steps to widen the strategic gap. Short of a spectacular technological breakthrough, the Soviet leadership probably sees little hope at present of achieving military superiority in the 1960's.

In summary, it should be noted that throughout the past decade an ever-present conflict has existed between the civilian economic and the military power objectives of the Soviet Union imposed by the magnitude of these objectives and the scarcity of resources. This conflict seems to have been most intense in the years immediately preceding and following Stalin's death and after the drastic acceleration of the arms program in 1958. The presence of this conflict has been judged to provide an objective inducement to consider arms limitation only in inverse proportion to the promise of the arms effort to materially augment the power position of the Soviet Union. At the same time, however, the military and economic pressures for arms control can be eased in part by the achievement of East-West detente, which in turn reduces the urgency of comprehensive arms limitation to the Soviet Union.