Defense and the Macroeconomy in the Soviet Union

Charles Wolf, Jr.

October 1990
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SUMMARY

This Note addresses the relationship between defense and the macroeconomy in the Soviet Union. Although the subject has received substantial and sustained attention by U.S. government analysts, the effort has not yielded accurate measurements or valid predictions.

SOVIET ECONOMIC PERFORMANCE

In contrast to estimates and forecasts made in the 1970s and early 1980s, the actual state of the Soviet economy is bleak:

- Official statistics are biased upward and generally unreliable, and much of the reported growth in capital investment in the 1970s and early 1980s did not occur.
- Inflation has been widespread, much of it hidden through fictitious improvements in product quality or concealment of quality deterioration.
- Real growth has been much less than officially reported and somewhat less than generally estimated in the West, with near-stagnation since the mid-1970s.
- Conditions affecting the Soviet standard of living are deplorable, and degradation of the environment has contributed to an environmental crisis as well as to deterioration in the quality of life and health of the Soviet populace.

The basic errors in Western estimates and forecasts have arisen from the acceptance of unreliable physical production data published by official Soviet statistical sources. Estimates derived by Ericson from Soviet economists Selyunin and Khanin\(^1\) suggest that these errors have really been quite extraordinary as shown in Table S.1: about 85 percent for the 1970s and nearly 240 percent for the first half of the 1980s!

Table S.1

SOVIET ECONOMIC GROWTH ESTIMATES, 1970–1985
(Average annual rate in percent)

<table>
<thead>
<tr>
<th>Period</th>
<th>Official Soviet</th>
<th>CIA/ Western</th>
<th>Khanin/ Ericson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970–1980</td>
<td>5.3</td>
<td>3.7</td>
<td>2.0</td>
</tr>
<tr>
<td>1981–1985</td>
<td>3.2</td>
<td>2.0</td>
<td>0.59</td>
</tr>
</tbody>
</table>

MEASUREMENT OF GROSS NATIONAL PRODUCT (GNP) AND THE DEFENSE BURDEN

CIA estimates of the Soviet defense burden have risen almost monotonically over the past two decades from 6 percent of the GNP in the early 1970s to between 15 and 17 percent more recently. While these changes reflect real growth in the cost of defense and empire relative to GNP, they also result from improved methodology and wider though still incomplete data coverage.

The defense sector’s relatively large share of the economy relates to the fundamental character of the Soviet system and more generally to a tendency toward significantly higher levels of military spending, higher numbers of people in the armed forces, and higher levels of military than civilian technology. Several hypotheses may explain this tendency: For example, communist systems may have a comparative advantage in producing military rather than nonmilitary output, or their leaderships may tend to accord a higher value to military than to civilian output.

Gorbachev has announced that military spending and procurement will be cut by 14.2 and 19.5 percent, respectively, but the base to which these cuts apply is unclear. Published Soviet estimates of military spending are only about half those made by the CIA and DIA (Defense Intelligence Agency), and even the latter can be faulted on grounds of the limited scope of their coverage. An accurate estimate of military-related spending should include, for example, outlays for Aeroflot, the merchant marine, etc., because of their dual civilian-military use; outlays for Soviet merchant ships that serve as naval auxiliaries; and costs of civil defense and the Soviet empire. These and other pertinent data are omitted from standard accounts. When allowance is made for this
broader coverage, the defense burden estimate for the Soviet Union rises to a figure between 22 and 28 percent of GNP.

How does this share compare with that of the United States? For the United States, a broad definition amounted in fiscal year 1989 to about 6.5 percent of the U.S. GNP.

Which estimate of military spending to use, broad or narrow, depends on the question at issue. If the question concerns a comparison of the costs of fielding the American versus the Soviet military, then the narrow definition is probably appropriate. If the question concerns the cost of maintaining the Soviet position of power in the world, then a broad definition is more pertinent. In light of the Soviet Union's current economic crisis, the broad definition seems more relevant. The focus by Western analysts on the narrow definition has failed to convey the full weight of the military-and-empire burden that the Soviet leadership must recognize and the public must feel.

TECHNICAL PROBLEMS IN ANALYZING THE DEFENSE BURDEN

Most of the basic empirical work on the size and growth of the Soviet economy has used the adjusted factor cost (AFC) method. This method has shortcomings, but ways exist to improve future estimates. Furthermore, special data problems characteristic of the Soviet Union and resulting from incentives for enterprises and other reporting channels should and can be resolved.

MODELING CENTRALLY PLANNED ECONOMIES (CPEs) AND THEIR DEFENSE SECTORS

Many, if not most, CPE characteristics are typically excluded from large, input-output, "mirror-imaging" Western models. These characteristics include: preferential treatment of security-related sectors; pervasive disequilibria; repressed inflation; declining product quality; use of valued inputs to produce valueless output; and uneven patterns of income distribution.

Some, although certainly not all, of these characteristics are more accurately reflected in smaller scale, partial, and more transparent models developed recently. One example is Ericson's dualistic structure of the Soviet economy, with partial interaction
and asymmetrical penetration by the military sector into nonmilitary sectors. Another is Hildebrandt's model focusing on the military's partial lexicographic command over resources available in the economy.

SOVIET ECONOMIC REFORM AND THE MILITARY'S ROLE

In considering the economic benefits that may ensue from reductions in defense spending, one needs to consider the extent to which the serious Soviet plight is attributable to the large size of the defense sector and the extent to which it is attributable to the shortcomings of the system itself.

Suppose Soviet defense-sector spending was reduced, but no other changes were made in the system. What effect would a large military cut have on consumption and economic growth? Illustrative calculations suggest that the effect would be modest: Aggregate consumption would rise about 2.25 percent annually and per-capita consumption about 1.25 percent; from an initial consumption base of about $3,000 per capita (or about 25 percent of the U.S. level—about equal to that of Turkey or Mexico), the annual increase in per-capita consumption would be about $42 a year, accumulating to about $168 over the four-year period.

On the other hand, what would be the effects from fundamental changes in Soviet economic institutions, assuming only minor changes in the size of the Soviet defense sector? Such systemic changes would transform the economy, but the maintenance of a huge military sector would surely slow the process.

Of course, the policy options open to the Soviet leadership are not this sharply drawn. The Soviet leadership will probably pursue various combinations of reduced defense, increased imports, and gradual systemic reform rather than rely on only one of these options. And if military reductions and reallocations are wisely combined with pervasive reform, the effects of each may be enhanced.

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I. INTRODUCTION

In the past two decades, the U.S. government has probably devoted more time, effort, and money to analyzing centrally planned economies (CPEs), principally that of the Soviet Union, and their defense sectors than to analyzing any other foreign economy or group of foreign economies and defense sectors.

Notwithstanding the scale of this effort, knowledge and understanding of the subject have been elusive and sometimes spurious. I make this judgment on the basis of two criteria: accuracy of measurement and validation of predictions. On both counts, the returns from this effort have not been commensurate with the resources devoted to it.1

These measurement issues bear on the general question of the overall size of the Soviet economy. The relevant estimation method, pioneered by Kravis and his associates and applied to countries at widely different development levels,2 measures purchasing-power parity. Although this technique carries with it considerable uncertainty—especially when applied to nonmarket economies—it is a useful device for comparisons of economic size across countries.

A widely quoted CIA estimate puts the Soviet gross national product (GNP) in 1985 at around 55 percent of that of the United States and about 47 percent of the U.S. level per capita.3 Robert Campbell estimated a much lower ratio, around 37 percent per capita (with a wide range of uncertainty), for 1980.4 Anders Aslund puts it still lower, at about 30 percent of U.S. per-capita GNP for the late 1980s.5 And even this estimate might be too high.

One might ask what difference it makes if the Soviet GNP is a third instead of half that of the United States or the European Community, or whether it matters that Soviet aggregate output grew little if any after the late 1970s instead of at a rate of 2 to 3 percent annually. These are not trivial differences. First, a 2 percent difference in annual growth rates amounts to a 35 percent difference over 15 years and 100 percent over 36 years. Second, no growth per capita over time—if that is indeed the case—together with no realistic prospect for future improvement provide a plausible explanation for some of the extraordinary events (political as well as economic) that have occurred in recent months in the Soviet Union, as well as a plausible impetus for radical change in the future. Third, given that we have independent evidence of the scale of the Soviet military effort, a substantially smaller Soviet economy implies that the share of resources taken by the military is larger than we believed. This finding suggests the importance of reassessing the Soviet Union's ability to sustain its military competition with the West; the finding also provides the most compelling explanation for the Soviet Union's evident and remarkable motivation in recent months to reduce its military burden and change its foreign policy. Gorbachev's "new thinking," both at home and abroad, surely has a substantial, perhaps decisive, economic impetus behind it.

These issues are of central concern in the collaborative work that The Hoover Institution and The RAND Corporation have engaged in, with generous support from the Pew Charitable Trusts as well as the Department of Defense, over the past three years.6

II. SOVIET ECONOMIC PERFORMANCE

Throughout much of Soviet history, criticisms of economic methods, and debates over the quality of Soviet statistical calculations, were stifled by repressive controls. For many years, an almost private discussion was carried on within the statistical community, with little if any influence on the practices of central organs.

While some daring Soviet economists, including Val’tukh, Khanin, Krasovskii, and Fal’tsman, published technical, albeit less broadly critical, articles at variance with official positions, their debate was for the most part limited to intellectual discussion and did not influence reporting by the Central Statistical Administration (TsSU). Moreover, such underlying doubt and criticism were rarely reflected in Western analysis of the Soviet economy.

As the mandates of glasnost began to take hold and were reinforced within the Soviet statistical establishment by the leadership’s concern with the dilapidated state of the economy, more articles appeared in the Soviet press exposing the failures of Soviet statistical methods.

In 1987 the attack by economists on official Soviet statistics was dramatically escalated by an article in Novy Mir by Selyunin and Khanin. They asserted that Soviet national income statistics since 1928 grossly overstated the economy’s actual performance and, in fact, have little relationship to the real state of the economy.\(^1\) Furthermore, they argue that because a false set of statistics was established and continues to provide unreliable information in measuring economic growth and productivity, the falsification itself may be viewed as one of the causes of (1) the continued economic decline over the past 30 years and (2) the failure to seek earlier remedies.

In their article, Selyunin and Khanin call for an overhaul of current statistical methods as well as of the statistics themselves from earlier periods as a necessary component of any meaningful economic reform and for perestroika’s success.

Richard Ericson has observed that Selyunin and Khanin's alternative accounting shows that:

Much of the claimed achievements of Soviet socialism are fictitious, are the consequence of a "game" of exaggeration played by subordinates and superiors whose outcomes are validated by the faulty methodology of aggregation and measurement of the central statistical authorities. . . . Not only the size but also the structure of the economy are quite different from what the official statistics indicate. . . . If Khanin and Selyunin are anywhere near being correct, then we can no longer believe in the "command economy" as an effective mobilizer of resources or instrument for change over any but the shortest period of time.  

While the Selyunin and Khanin article received tremendous attention both in the Soviet Union and in the West, the outspoken criticisms by many others, including Shmelev, Abalkin, Bogomolov, Zaitchenko, Aganbegyan, and Orlov, have combined to exert noticeable pressure on the leadership to address the problem.

Even Gorbachev's own advisers have become involved in the dialogue of criticism. Aganbegyan, probably the most visible Soviet economist today in the West, acknowledged in a 1987 article that:

The statistical data concerned with the increase in national income and the gross output do not sufficiently account for the real increase of prices. . . . Therefore, the [official] rates of increase in the national income . . . of the 10th and 11th Five Year Plans are too high. In reality, for a number of years, particularly 1979–1982, the real growth of the national economy came to a halt and there was stagnation.

In his book, The Economic Challenge of Perestroika, Aganbegyan confirms that "in the period 1981–85 there was practically no economic growth," and that "during the period 1979–82 . . . production of 40 percent of all industrial goods actually fell" and "agriculture declined."

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The picture that emerges of the Soviet economic state is bleak:

- Official statistics are biased upward and generally unreliable. Moreover, the biases have increased over time, resulting in exaggerated estimates of the economy's growth as well as its size.\(^5\)

- Inflation in the investment sector has been substantial, and much of the growth reported in capital investment in the 1970s and early 1980s did not occur.

- Inflation has been widespread throughout the economy, much of it hidden through the manipulation of fictitious improvements in product quality, the concealment of quality deterioration, the involuntary accumulation of rubles, and the increased waiting time in queues for buying fixed-price commodities. Particularly among manufactured goods, prices have soared as products are recategorized, allowing for repricing of the virtually identical "new" products, while quality declined for products with unchanged prices.\(^6\)

Although no inflation was recorded in the 1989 Soviet statistical handbook, Bogomolov estimated that prices rose during 1988 by 5 to 9 percent.\(^7\)

- Real growth has been much less than officially reported and somewhat less than generally estimated in the West, with near-stagnation since the mid-1970s.\(^8\)

- While the 1989 Soviet statistical handbook indicates that there was a 200 million ruble surplus in the state budget in 1988, one Soviet academic predicted that the state would run up approximately a 100 billion ruble budget.

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\(^5\) The upward bias is a function of the number of reporting units in the economy. As the Soviet economy has become more complex—in the sense of the proliferation of sectors and industries—the number of reporting nodes in the statistical system has increased over time, and the resulting upward bias has accordingly increased.

\(^6\) Also, as the result of severe shortages of food in state stores, the prices of meat and produce sold at collective farm markets have risen approximately 20 percent since 1985. CIA and DIA (Defense Intelligence Agency), *The Soviet Economy in 1988: Gorbachev Changes Course*, report prepared for the U.S. Congress, Joint Economic Committee, April 14, 1989, p. 11.


deficit during 1989. In an interesting twist, Goskomstat (the USSR State Committee on Statistics) issued a press release in July 1989 after the publication of the handbook, in which for the first time it revealed a more realistic assessment of the size of the deficit, placing it at 90 billion rubles for 1988, or over 10 percent of the published size of the Soviet GNP (866 billion rubles for 1988).\textsuperscript{9}

- Conditions affecting the Soviet standard of living are deplorable: As of the beginning of 1988, the official number of Soviet urban families and individuals entitled to and awaiting improved housing rose to 13 million; the average infant mortality rate in 1986 was 25.4 deaths per 1000 live births, with a shocking republic average of 58.2 deaths per 1000 live births in Turkmenistan (where infectious disease is responsible for quadrupling the number of deaths for infants under the age of one); and life expectancy has decreased, while alcoholism has substantially increased.\textsuperscript{10}

- Finally, the degradation of the environment has led not only to a severe environmental crisis but also to deterioration in the quality of life and health of the Soviet population. According to the chairman of the USSR State Committee for Environmental Protection, approximately 50 million Soviet citizens living in 102 cities endure pollution levels exceeding by tenfold internationally acceptable standards.\textsuperscript{11}

Although the foregoing points relate directly to the performance of the Soviet economy, they apply broadly and generally, if not uniformly, to virtually all of the centrally planned economies in Eastern Europe, China (until its market-oriented reforms got under way at the end of the 1970s), North Korea, Vietnam, and Cuba.

The severity and pervasiveness of the Soviet Union's economic predicament were not accurately described, nor were its manifold contributing causes properly illuminated, by most Western analysts. Instead, their estimates continue to show appreciable positive,
if declining, rates of real economic growth. Table 1 shows the sharp contrast among growth estimates of official Soviet sources, CIA and other analysts in the United States and Western Europe, and Khanin.

The Khanin estimates derived by Ericson are more realistic than the CIA/Western estimates. The former may themselves be somewhat on the high side, but they receive general if impressionist corroboration from such diverse sources as Gorbachev, Aganbegyan, and private conversations with a number of other Soviet economists.\footnote{Mikhail Gorbachev, Perestroika: New Thinking for Our Country and the World, Harper & Row Publishers, New York, 1987; and Abel Aganbegyan, Inside Perestroika: The Future of the Soviet Economy, Harper & Row Publishers, New York, 1989.}

The basic errors in Western estimates arise from their general acceptance of the physical production data in official Soviet statistical sources. Assuming that the Khanin figures are "in the ballpark," errors in the Western estimates have been really quite extraordinary: about 85 percent for the 1970s and nearly 240 percent for the first half of the 1980s!

Moreover, since the total Soviet population grew by something over 1 percent per annum during the past two decades, another significant difference emerges between the Western and Khanin estimates: The CIA/Western estimates would represent an appreciable, if declining, rate of growth in per-capita GNP, while the more realistic estimates derived from Khanin imply near-stagnant per-capita GNP in the 1970s and appreciably negative growth in per-capita GNP in the 1980s.

A similar pattern emerges with respect to forecasts by Western analysts. These forecasts have over the years generally tended to be close to the subsequent estimates by

<table>
<thead>
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<th>Table 1</th>
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<tbody>
<tr>
<td><strong>SOVIET ECONOMIC GROWTH ESTIMATES, 1970–1985</strong></td>
</tr>
<tr>
<td>(Average annual rate in percent)</td>
</tr>
<tr>
<td>Period</td>
</tr>
<tr>
<td>1970–1980</td>
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<tr>
<td>1981–1985</td>
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</table>
the same analysts of outcomes and performance—again, arising from Western acceptance of Soviet physical production data.\textsuperscript{13}

As already noted, these observations about economic performance as well as Western analysis have focused predominantly on the Soviet Union. However, the general tenor of the comments applies more broadly to the CPEs as a group—including Eastern Europe, Cuba, Vietnam, Ethiopia, Angola, North Korea, and China—prior to the late 1970s and since July 1989. Forecasts and ex post performance estimates for the CPEs typically err on the high side, for reasons relating to the structure of incentives and institutions characteristic of these Soviet-type economies.

\textsuperscript{13}See Ericson, "The Soviet Economic Predicament."
III. MEASUREMENT OF GNP AND THE DEFENSE BURDEN

Analyzing the defense sector's role in the Soviet economy entails both specific technical issues and broader security and policy questions relating to system structure. At the narrower, technical level, analysis of the defense sector's role involves measurement of its size, including the militarily relevant activities usually left out of Western estimates and also the cost of maintaining the Soviet empire. Here we are interested principally in the Soviet national security system broadly defined, the size of the Soviet economy as a whole, and the ratio between them—the so-called "defense burden."

Estimating accurately both the numerator—the cost of the defense sector and the Soviet empire—and the denominator—the Soviet GNP—presents formidable problems that apply to the CPEs generically. Because arbitrary values are set on many major inputs and products of the defense sector, large discrepancies often exist between the cost of an item for the military and the cost of the same item to another buyer. For example, Kuznetsov, deputy director of the United States desk at the Soviet Foreign Ministry, in urging adoption of a new accounting system, observed that "under the old system, a truck could cost many times less for the military than for a collective farm" due to the arbitrary nature of pricing and the distribution of goods to priority sectors. Such arbitrary pricing plagues the evaluation of both civilian and military output as well as the relations between them.

The conclusion that Harry Rowen and I have reached is that the numerator has generally been underestimated and the denominator overestimated in most previous work. Consequently, the burden of the defense sector on the Soviet economy has been and is probably appreciably higher than has been estimated by most Western analysts.²

It is both interesting and significant that the CIA's published estimates of the Soviet defense burden have risen almost monotonically over the past two decades: from 6 percent of the GNP in the early 1970s to 9 percent in the mid-1970s, to 11–12 percent.

²See Rowen and Wolf, The Impoverished Superpower, pp. 1–12.
in the early 1980s, and to between 15 and 17 percent more recently. While some of these notable changes reflect real relative growth of the numerator, much of the changes result from improved methodology and wider though still incomplete coverage of the full range of military activities.

At the broader policy level, the defense sector’s relatively large share of the economy relates to the fundamental character of the Soviet system and more generally to a strong and frequent tendency in other CPEs that have emulated it. For example, RAND studies comparing communist and noncommunist systems suggest that the former are characterized by significantly higher levels of military spending, more people in the armed forces, and a higher level of military than civilian technology.

At least two hypotheses can be advanced as explanations: communist systems have a comparative advantage in producing military rather than nonmilitary output, or their leaderships have generally placed a higher value or preference on military than on civilian output. Whatever the explanation, Marxist-Leninist systems have clearly shown a marked tendency to accord their military establishments high priority and favored treatment compared with priority and treatment granted by other political systems.

Resource allocations for the military and for Soviet activities abroad have typically received top priority in the economy, and the influence of glasnost has begun to be felt only recently in discussions of the levels and prospective cuts in the military budget and production. Past official Soviet response to questions about spending levels has been that the leadership is uncertain about the exact size of the defense budget. Members from the party and military elite, including former Chief of the General Staff Akhromevev and Deputy Minister of Foreign Affairs Petrovski, have confirmed this. In part, this relates to the point noted earlier that the ruble’s “value” in the defense and nondefense sectors is not the same, and hence accurate financial accounting is nearly impossible.

The influence of glasnost has prompted speculation about military spending levels and has allowed some useful data to surface, particularly regarding the degree of

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inclusiveness in the published military budget. For example, earlier Soviet confirmation that the budget excluded research and development (R&D) and military procurement is significant and useful to analysts, because the bulk of military spending falls within these excluded categories. Recently published data on military spending, to be discussed below, purport to include these categories of outlays. While these data appreciably raise previous Soviet estimates, strong reasons exist for believing that the new figures, too, cover only a part of the total.

There have also been public statements that military spending needs to be curtailed. Concurrently, senior military officers' statements have supplied indirect evidence on the allegedly disastrous effects of Khrushchev's unilateral cuts in the late 1950s; these statements are clearly intended as warnings to Gorbachev against invoking a similar policy. Articles have also appeared expressing support for a professional and smaller military establishment. Clearly an intense internal debate has been under way.

One outcome of this internal process was Gorbachev's announcement at the United Nations at the end of 1988 that the Soviet Union would reduce its existing military manpower by approximately 10 percent (500,000 service personnel), including ten tank divisions, half of which would be withdrawn from Eastern Europe. The announcement does not make clear exactly how much of this reduction would be in the form of active military service personnel and how much would represent a reduction of authorized but unfilled manpower slots. Later Gorbachev stipulated that military spending and weapons production would be cut by 14.2 and 19.5 percent, respectively—although he left unclear the precise levels to which these cuts would apply.

During his speech before the Congress of People's Deputies in May 1989, Gorbachev announced that Soviet defense spending totaled 77.3 billion rubles, equivalent to approximately 9 percent of the Soviet GNP according to Western calculations. This is slightly more than half the 15 to 17 percent share of GNP estimated by U.S. intelligence agencies (in 1982 rubles). Interestingly, on the heels of Gorbachev's remarks, Chief of the General Staff Moiseyev announced that the Soviet Union plans to reduce its defense expenditures by 1995 "by a factor of 1.5 to 2"—presumably implying reductions between one-third and one-half. As with several other Soviet statements previously cited, Moiseyev's leave unclear the precise base to which these cuts would apply.

6Pravda, June 11, 1989, p. 5.
So a serious problem for Western leaders is that they do not know the base from which Soviet defense reductions will occur. Western governments, especially the United States, can estimate the physical components of Soviet forces, presumably with fair reliability; the difficulty comes in estimating the cost of these forces. Various methods have been applied: the CIA's "direct costing" method; Lee's attribution of the residual from the output of machinery ministries (after the deduction of known civilian goods) to weapons production; and Steinberg's conclusion that value added in the defense production sector is excluded from Soviet national income accounts. Some analysts, most notably Lee and Rosefielde, have concluded that Soviet military spending has been underestimated, while others, including Holtzman, claim that it has been overestimated.  

David Epstein, of the Defense Department, has taken a different approach, addressing the scope of coverage of such estimates to provide estimates for relevant categories omitted from the usual accounting. Specifically, Epstein has assessed the relative drains on and contributions provided to the Soviet economy by military activities that do not fall within traditional estimates. This includes, among other things, expenditures for civilian transportation services (Aeroflot, trucking, the merchant marine, the railroads) that have dual civilian-military use; civil defense programs and military education; the maintenance of stocks of materials and machinery ("mobilization kits") at nonmilitary industrial sites that theoretically allow for immediate conversion to defense production in the event of war; and related costs of maintaining Soviet influence abroad.  

Epstein's analysis has been based on the need for a broader accounting scope that has been advocated, over the past several years, by Andrew Marshall, Director of Net Assessment of the Defense Department. For example, Marshall argues that Soviet merchant ships also serve as naval auxiliaries, at additional costs in construction and operation; that Aeroflot is a branch of the VTA (Voenno-Transportnaia Abiatsiia), the Soviet military airlift fleet; that civil defense and the heavy costs of the "deep underground" program for leadership protection are omitted from the standard accounts; and much more. In general, the military receives preference in the Soviet shortage
economy. To be sure, partly offsetting influences exist in the form of military help with harvests and military work on dual-use projects (the Baikal-Amur Mainline railroad, for example), but the net effect is, according to Epstein’s estimates, a heavy burden on the economy.

Another relevant category of defense spending is the cost of maintaining the Soviet empire abroad. The costs of supporting Cuba, Vietnam, Ethiopia, and Angola are borne principally to extend and protect Soviet power. So too are the costs of overseas KGB operations. These costs have been estimated in RAND studies at about 3 percent of Soviet GNP in the mid-1980s.9

Epstein concludes that the share of Soviet GNP spent on security, using a broad definition, is 22 to 28 percent, a range that incorporates the 1987 CIA and DIA estimate of military spending, narrowly defined, of 15 to 17 percent of GNP. Such a high level is extraordinary, usually observable only in nations at war.

Which definition to use, broad or narrow, depends on the question at issue. If the question concerns a comparison of the costs of fielding the American versus the Soviet military using some common metric—say, dollars—then the narrow definition is probably appropriate. If, in contrast, the question concerns the cost of maintaining the Soviet position of power in the world—that is, what resources are diverted from consumption, investment, education, health, housing, etc., to support the Soviet Army, the four other military services, Cuban troops in Angola, communist Vietnam, and what Gorbachev refers to as the “old thinking” in Soviet foreign policy—then a broad definition is more pertinent. Given the Soviet Union’s economic crisis, the broad definition seems more relevant; the West’s focus on the narrow definition has failed to convey the weight of the military-empire burden that the Soviet leadership must recognize and the public must feel.

How does this share of spending compare with that of the United States? For the United States, a broad definition—including Department of Energy expenditures on nuclear weapons, security assistance, intelligence activities, the U.S. Information Agency, and other international security-related programs—in fiscal year 1989 came to around $330 billion, about 6.5 percent of GNP. Similarly, our NATO allies and Japan spend between 1.5 and 5 percent of their GNPs on defense activities. The differences between these ratios and that of the Soviet Union are large.

IV. TECHNICAL PROBLEMS IN ANALYZING THE DEFENSE BURDEN IN CPEs

WESTERN ESTIMATING METHODS AND SUGGESTIONS FOR IMPROVEMENT

Most of the basic empirical efforts to estimate the size and growth of the Soviet economy have used the adjusted factor cost (AFC) method developed by Bergson and his followers in the 1950s and 1960s and further refined since then.¹ The AFC method subtracts from each sector's product the sum of enterprise profits and "lump-sum taxes" paid to the state and then redistributes this sum over all sectors of the economy in accordance with their estimated respective capital stocks. This "adjustment" does not principally affect the size of the aggregate product estimate but rather its relative distribution across economic sectors. Thus, the AFC method does not account for the substantial differences between the reported costs of production factors and their "real" economic or opportunity costs. Nor does it account for the indirect and largely hidden costs imposed by the high priority accorded some sectors, notably the military, and the low priority accorded others, such as health care. These two groups of sectors have typically received, respectively, higher- and lower-quality inputs than indicated by their attributed factor costs.

The U.S. government estimates of the size of the Soviet defense sector and their conversion into equivalent U.S. dollars have followed the building-block method, whose purpose is to evaluate various Soviet defense activities in dollar terms to facilitate a comparison to similar activities in the American defense sector. With the application of "constant dollar costs chosen for Soviet goods and services . . . based on average prices and wages prevailing in the United States in the basic year," it is possible to compare, financially, various components of Soviet and American defense programs.²

In addition, Soviet activities are measured in "constant rubles," which indicate the impact of various activities on the economy as a whole, as well as the influence of


changing priorities among Soviet defense activities. While this method is meticulous and valuable as far as it goes, it suffers from serious shortcomings: for example, the questionable assumption that official Soviet statistics on net material product reflect, in the aggregate, the economic cost of production factors involved in generating the product.  

It is easier to criticize existing methods than to design practical improvements. However, one possibility is to use several different, reasonably independent measures of the Soviet national product as cross-checks. For example, one might begin with physical production estimates from official Soviet sources, since these are presumably more reliable than ruble estimates, which involve the further unreliability of ruble prices. The physical output of both defense and nondefense sectors might be evaluated by relating them to the market prices for these goods—or similar categories of goods—on foreign markets. For example, Soviet cars are sold in Belgium and India; Soviet tractors and earth-moving equipment and machinery appear in other markets (especially in developing countries); and Soviet military hardware trades on foreign markets at prices that can be ascertained by comparing the prices of Soviet and U.S. military equipment in various international arms-market journals. Independent estimates are made for some sectors, such as the production of Soviet weapons and Soviet grain, and extended comparisons of these estimates would facilitate a more accurate overall estimate of not only the defense sector but the economy as a whole.

One might use, along these lines, Grossman and Treml's estimates, in their pioneering work on the Soviet underground economy, of what they call "legitimate state income"—that is, income received and recorded in official Soviet statistics—to arrive at estimates of real consumption. Those estimates might then be supplemented by an independent estimate of grain production and other measures of per-capita diet and caloric intake. Such preliminary measures of the consumption component of the Soviet national product could then be supplemented by estimates of producers' durable-goods output, which might be obtained from such sources as engineers, Western businessmen, and information increasingly available in Soviet publications.

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3 Swain, "The Soviet Military Sector."

Another approach is to take the existing AFC estimate made by the intelligence community and adjust it with information from published reports of losses and waste, hidden inflation, and quality deterioration, a course followed by Kontorovich in connection with the investment-goods sector of the Soviet economy.

By pursuing several independent methods to estimate the Soviet product—or at least substantial components of it—we may be better able to check the estimates against one another and against official figures. Furthermore, if glasnost proceeds in conjunction with perestroika, data should become increasingly available for pursuing these various lines of inquiry and improving estimates of the role of the defense sector in the Soviet economy.

Our knowledge of the Soviet economy and its defense sector, although modestly improved, remains inadequate, posing a substantial barrier to improved economic relations on the one hand and to confidence in arms-control agreements on the other. The Soviet government needs to make progress on both these fronts and it is thus in the leadership's own interest to be more forthcoming with information. Moreover, unless and until such information emerges, the United States and the West should be properly skeptical of high-powered Soviet rhetoric that stresses "new thinking," intended military cuts, and defensive reconfiguration of military forces without decisive actions and evidence confirming these changes.

SPECIAL DATA PROBLEMS: REPORTING BIASES, HIDDEN INFLATION, WASTE

The technical problems involved in analyzing CPEs and their defense burdens are compounded by certain characteristics of these economies. These peculiarities have been especially prevalent in the Soviet Union, but they are more generally characteristic of CPEs.

The first problem is that economic statistics are often unreliable and tend to be systematically biased upward. This bias follows from the incentive structure of centrally planned economies that typically focus on quantitative production norms in evaluating the performance of producing units. Moreover, the bias increases as the complexity and
hence the number of reporting nodes in the system increase.\textsuperscript{5} Thus, the bias distorts estimates of growth as well as size of centrally planned economies.

A second problem is the extent to which hidden inflation is overlooked or underestimated by the usual procedures for deflating value data in current prices to arrive at estimates in constant prices. In an economic system based on administered prices, rather than market-based ones, hidden inflation can take the form of (1) diminished product quality for output evaluated at constant prices or (2) attribution of higher prices to products whose invoiced description involves fictitious rather than actual quality upgrading. Both types of hidden inflation have occurred frequently and extensively in the Soviet economy and other CPEs in recent years.\textsuperscript{6}

A third problem that arises in trying to size the Soviet economy and other CPEs concerns the production of tangible, but valueless, output as a result of incentives to enterprises to satisfy quantitative production norms. To meet these norms, enterprises may produce output that is delivered to other user enterprises but that the latter regard as worthless. Examples abound in accounts by Soviet as well as Western writers: bulldozers delivered to construction and mining enterprises whose managers know from prior experience that it is preferable to let the equipment stand idle than to risk the consequences of fragile blades and underpowered engines; consumer appliances that not only do not work, but are a safety hazard to their users; and so on.\textsuperscript{7} In effect, this is the ultimate stage of quality degradation.

These problems are still further aggravated and reinforced by the pervasive tendency in command systems to use data for political and propaganda purposes. It is not an exaggeration to observe that often the data generated in CPEs are intended to further a political purpose—either internal or international—rather than to describe economic reality.

\textsuperscript{5}See Ericson, "The Soviet Economic Predicament," especially pp. 105–110; and Aslund, Gorbachev's Struggle, pp. 8–9 ff. The upward bias and unreliability of Soviet statistics have been documented and elaborated by a number of other Soviet economists. See, for example, Selyunin and Khanin, "Cunning Figures"; and Anders Aslund, "How Small Is the Soviet National Income?" in Rowen and Wolf, The Impoverished Superpower.

\textsuperscript{6}See Philip Hanson, USSR: Puzzles in the 1985 Statistics, Radio Liberty Research, RL 439/86, November 1986; Aslund, Gorbachev's Struggle, p. 15; and Aganbegyan, Inside Perestroika.

\textsuperscript{7}See Aganbegyan, Inside Perestroika, pp. 33–36 ff.
V. MODELING CPEs AND THEIR DEFENSE SECTORS

As indicated above, some of the salient characteristics of CPEs include repressed inflation, declining product quality, and use of valued input to produce valueless output. Additionally, command economies typically exhibit preferential treatment of military and security-related sectors, pervasive disequilibria in both product and factor markets, and patterns of income distribution that are often highly unequal across regions (e.g., relatively low income in the Soviet Muslim republics) and individuals (e.g., occasionally relatively high income when appropriate allowance is made for perquisites and privileges) and that reflect position and power rather than productivity. These characteristics have been especially prevalent in the Soviet Union, but they have been evident in the other centrally planned economies, as well.

However, it is precisely these characteristics that were not reflected in the earlier theoretical models of CPEs developed by Lange and Lerner nor in the large-scale input-output models developed in the past 15 years. The principal examples I have in mind, in the Soviet case, include the Wharton SOVMOD model, the CIA’s SOVSIM model, DSA’s DYNEVAL, and RAND’s optimal-control model. Although each of them was designed for a different purpose, they share a common feature: a tendency to "mirror-image" standard Western-type markets or mixed economies. The interindustry matrices underlying these models are too much like their Western counterparts to reflect the realities of command economies. Consequently, the models typically ignore the salient characteristics referred to above, thereby concealing more than they reveal about CPEs.\(^1\) The misconstruction of these models has both reflected and contributed to inaccuracies in the measurement of economic size, evaluation of economic performance, and forecasts of the Soviet economy and other CPEs.

Some, although not all, of the distinguishing characteristics of CPEs are more accurately reflected in smaller-scale, partial, and more transparent models that have been developed more recently. One example is Ericson’s model of the dualistic structure of the Soviet economy—a structure with partial interaction and asymmetrical penetration by

\(^1\)For a critical exposition and analysis of these models, see Gregory G. Hildebrandt (ed.), *RAND Conference on Models of the Soviet Economy, October 11–12, 1984*, The RAND Corporation, R-3322, October 1985.
the military sector into the nonmilitary sectors. Another is Hildebrandt's model of the Soviet military sector, focusing on the military's partial lexicographic command over resources available in the rest of the economy. These models, though not invulnerable, approach relatively closely the reality of the CPEs and their defense sectors.²

Other recent RAND work has focused on some of the major reasons why mirror-imaging-type models of the CPEs should be drastically revised or discarded. For example, Lee Badgett has pointed out that CPEs "differ fundamentally from market-exchange economies in where [sic] effective decision making is made and, consequently, in the preferences or objectives that characterize the systems and the control mechanisms employed to realize those objectives."³ Furthermore, Badgett notes that consumption is not an appropriate maximand in models of the Soviet Union and other Soviet-type economies. A more appropriate representation would focus on national power or security, internal stability, and the national and international interests of the leadership and bureaucracy. Because of the priority given to these considerations and thus to the military as well as to internal security forces and the administrative apparatus, "models that assume an integrated flow of resources" without reflecting the "distinguishing advantages of the defense-industrial sector are likely to be misspecified." In sum, the Soviet system and CPEs in general probably have "more in common with nonmarket institutions than . . . with the market exchange systems" on which the standard mirror-imaging models are based.⁴

Other recent work at RAND provides some interesting and potentially useful guidance for further efforts to model CPEs based on a critical analysis and comparison between the economy of Sparta and that of the Soviet Union. This work, by a scholar of classical Greek history, Alvin Bernstein, suggests that command economies, such as those of Sparta and the Soviet Union, are characterized by a "sacrosanct defense enclave whose requirements . . . are satisfied" even if and as the civilian economy is "plundered.


as long as that does not cause the general economy to collapse.\textsuperscript{5} The result is that demand—in this case the leadership's preferences for the instruments to advance state power and endurance—creates its own supply.\textsuperscript{6}

Of course, these considerations may be changing dramatically and rapidly, as part of the political transformation under way in Eastern Europe and, to a lesser extent, in the Soviet Union. And the new conditions may possibly make the mirror-imaging models of the past more relevant for the future than they were for the period and the economies they were intended to represent. Thus, the economic systems that emerge from these dramatic changes, and the corresponding economic models, may approach the conditions of market economies rather than of command systems.

Nevertheless, Ericson, Hildebrandt, Badgett, and Bernstein may contribute some possibly valuable guidance for future CPE modeling, which is more than simply stipulating what the preferences of the planners or leadership are. The defining characteristics also affect the dynamics, the persistent disequilibria, the nonapplicability of the usual first- and second-order optimality conditions, and the long-term performance of the CPEs. The widespread prevalence of perverse incentives and the pervasiveness of what I have referred to elsewhere as "nonmarket failure" are ingredients that should be given much more attention in future modeling efforts relating specifically to CPEs.\textsuperscript{7}


\textsuperscript{6} Bernstein, \textit{Soviet Defense Spending}, p. 5.

VI. SOVIET ECONOMIC REFORM AND THE MILITARY'S ROLE

THE DILEMMA

It is important to emphasize that the content, progress, and prospects of Soviet economic restructuring (perestroika) confront a crucial dilemma. On the one hand, the cumulative shortcomings of state control, centralized decisionmaking, and administered prices that are characteristic of command economies create a compelling need for a more decentralized, market-oriented system. Indeed, few in the West have been as severe in deploping the existing system's shortcomings, or as convincing in their advocacy of decentralization, as Gorbachev and some of his top economic advisers.\(^1\)

On the other hand, strong pressures exist to retain or even increase the centralization of decisionmaking and resource allocation to resolve the immediate and sharply conflicting demands for scarce resources: to raise personal consumption as well as quasi-public consumption in health care, education, and housing; to maintain and improve Soviet transportation, communications, and distribution; to reverse the deterioration of air and water quality and the damage to the Soviet natural environment; to cut military spending while modernizing the armed forces; and to reduce expenditures on the extended, if diminishing, Soviet empire.\(^2\)

The dilemma is not adequately conveyed by the standard "guns versus butter" metaphor. It also involves such questions as the kinds of weapons to forgo, retain, or enhance—at what time and for what contingencies; the kinds of consumption and investment to expand, and for whom, for which republics, and with what delays; and the types and sizes of subventions to Eastern Europe, Cuba, Vietnam, Afghanistan, and elsewhere.

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1 See, for example, Gorbachev, *Perestroika*; and Aganbegyan, *Inside Perestroika*. Aganbegyan notes the following: "Clearly the system of centralized supply ties an enterprise up with directives and leaves no room to manoeuvre. . . . It is virtually impossible to live and work under such an inflexible administrative system" (p. 32). See also Ericson, "The Soviet Economic Predicament," especially pp. 117–120, on the need (and poor prospects) for radical decentralization.

2 Aganbegyan inadvertently highlights this part of the dilemma by associating *perestroika* with "new spending in the social sphere, a breakaway in the provision of housing and socially necessary buildings, much greater expenditures on health and education, redoubled growth of food production, triple growth in the service sector, and vast capital and currency investments in the development of light industry" (*Inside Perestroika*, p. 113).
LOWER THE DEFENSE SHARE OR IMPROVE THE SYSTEM?

To understand the economic benefits that may ensue from a reduction in defense spending, or retrospectively, the economic retardation caused by the long military buildup under Brezhnev, one needs to consider (1) the extent to which the serious plight of the Soviet economy is due to the large defense share and (2) the extent to which it is attributable to the shortcomings of the system itself. Clearly, both elements are responsible; the issue is determining their relative influence.

The share directly attributable to the defense sector is complex. At issue is the relationship between the military and the structure of Soviet industry, infrastructure, and R&D, as well as the relationships among them over time. One does not need the existence of a huge military burden to explain poor economic performance: The latter is sufficiently explained by the debilitating effects of the CPE system on incentives, innovation, competition, and productivity, as illustrated by the sorry condition of the East European and Chinese economies despite their lower military-spending shares of GNP.

To convey a rough idea of these relationships, suppose the shares of the Soviet military and empire were to be reduced from, say, 25 percent of GNP to 15 percent, with the saved resources reallocated equally between consumption and investment, but with no other changes in the Soviet system. What effect would such a major reduction in the defense sector have on consumption and economic growth?

If one assumes, as suggested earlier, that the Soviet GNP is about one-third that of the United States (or about 1.7 trillion 1989 U.S. dollars), that Soviet consumption is about 55 percent of GNP, and that the Soviet population is 280 million and growing at a rate of about 1 percent per year, the effect of this relatively large resource reallocation would be modest. Soviet consumption per capita is currently about $3,000 or about 25 percent of the U.S. level and about equal to that of Turkey or Mexico. Transferring, for example, 5 percent of Soviet GNP to consumption would represent an increase in consumption of 9 percent. Assuming that the defense spending cuts and ensuing resource reallocations were spread over a four-year period, the resulting annual increase in aggregate consumption would be about 2.25 percent and in per-capita consumption about 1.25 percent. The annual increase in per-capita consumption would be about $42 a
year, accumulating to $168 over the four-year period. Moreover, this would represent a one-time boost in consumption, which would thereafter remain at the same level. Reallocating the remaining half of the 10 percent cut in military spending to investment and R&D—again assuming that the Soviet system otherwise remains unchanged—might add 1 percent to the annual rate of Soviet real economic growth. If this growth were sustained, consumer welfare would grow further as well.

While these are only rough approximations, they give an idea of the results of reallocating resources from military to nonmilitary uses without accompanying changes in the Soviet system itself. Altogether, they would give a small boost to the economy but would hardly transform it.

On the other hand, what would be the effects of fundamental changes in Soviet economic institutions through genuine price reform, enterprise reform, property ownership, monetary reform, and currency convertibility, assuming only minor changes in the size of the defense sector? In particular, what would be the economic effects, apart from political and social strains, that such drastic reform would set in motion? Would the burst of effort and energy released by the new environment propel the economy forward at a high and sustained rate, or would the still-massive size of the defense sector continue to exercise a severe braking effect on productivity and real economic growth? Such systemic changes would transform the economy, but the maintenance of a huge military sector would surely slow the process.

Of course, the policy options open to the Soviet leadership are not this sharply drawn. Some military reductions might be seen as early and critical contributors toward

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3 These calculations are based on the following simple model:

\[ S_e = \text{share of GNP reallocated from military to consumption uses} = 5\% \]
\[ S_i = \text{share of GNP reallocated from military to investment} = 5\% \]
\[ Y_e = \text{consumption share of GNP} = 55\% \]
\[ t = \text{number of years over which resource reallocations are equally spaced} = 4 \text{ years} \]
\[ C_t = \text{annual rate of increase in consumption resulting from transfers from military over t-period} \]
\[ p = \text{annual rate of population growth} = 1\% \]
\[ c_t = \text{annual rate of increase in per-capita consumption over t-period} \]
\[ C_t = \frac{S_e}{Y_e} = \frac{.05}{.55} = .0227 \]
\[ c_t = C_t - p = .0227 - .010 = .0127 \]
motivating cynical workers, while most systemic changes would take several years to be felt. And other options exist, such as importing more goods from the West.

The Soviet leadership will probably pursue various combinations of reduced defense, increased imports, and gradual systemic reform rather than rely on only one of these options. The possibilities are numerous and hard to predict. But several candidates exist, and while each seems unlikely to be adopted alone, the adoption of a combination seems moderately probable. For the time being, the economic outcome as well as the political consequences are somewhere between uncertain and unfathomable. Yet, potentially, the relations among the options are synergistic: If military reductions and reallocations are wisely combined with pervasive system reform, the effects of each may well be enhanced.

CONVERSION FROM MILITARY TO CIVILIAN PRODUCTION

The previous calculations relating to the Soviet Union generally assume that the microeconomics of macroeconomic reallocations will proceed more or less smoothly. In fact, conversion from defense to civilian production is much more likely to be impeded in CPEs than in market economies (MEs) by frictions, bottlenecks in some sectors, surpluses in others, and other planning errors. In MEs, the conversion process would be assisted and lubricated by flexible prices in factor and product markets, as well as by factor mobility and entrepreneurial activity in response to price signals. The absence of such elements in CPEs, or the miscuing to which substitute mechanisms are prone, will probably significantly impede their conversion process.

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