Directorate of
Intelligence

A Conference Report

The Impact of Gorbachev's Policies on Soviet Economic Statistics

SOV 88-10049
July 1988

Erratum

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Preface

This report includes a summary of a conference on the impact of General Secretary Mikhail Gorbachev's policies on Soviet economic statistics sponsored by CIA's Office of Soviet Analysis and the texts of the papers presented at the conference. The papers have been lightly edited to standardize their formats and eliminate instances of overlapping coverage. The views expressed by the non-CIA participants reflect the speakers' own judgments and do not necessarily reflect the views of the CIA or those of other US Government agencies.

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The Impact of Gorbachev's Policies on Soviet Economic Statistics

Overview

On 11 December 1987, the CIA's Office of Soviet Analysis hosted an unclassified conference in Langley, Virginia on the impact of General Secretary Mikhail Gorbachev's policies on Soviet economic statistics. The participants in the conference—CIA analysts and distinguished experts on the Soviet economy from US universities and private research institutes (see list of participants on next page)—focused on four questions:

- Have the revelations occasioned by Gorbachev's *glasnost* policy increased our understanding of the nature or the severity of the failings of official Soviet economic statistics, particularly the degree to which these statistics overstate real economic growth?
- Has *glasnost* substantially increased the availability of the types of statistics required for better assessments of Soviet economic performance?
- Have *glasnost* and the anticorruption and discipline campaigns improved the quality of recent Soviet economic statistics or corrected past falsifications or distortions of economic data?
- What are the implications of *glasnost* for Western—especially CIA—estimates of Soviet economic growth and trends in resource allocation?

Glasnost and the Failings of Official Statistics

[redacted] began the conference with a paper on the criticisms that Soviet economists have recently made of the statistics on economic growth published by their central statistical authorities. In particular, [redacted] concentrated on the criticisms made by Vasiliy Selyunin and Grigoriy Khanin in an article that has aroused great interest among Western Sovietologists because of its muckraking tone and its assertion that Soviet economic growth has been much lower than claimed by the authorities.[1]

[redacted] concurred with Selyunin and Khanin's contention that the overpricing of new products—a technique employed by enterprise managers and economic ministers to ease the task of plan fulfillment—has historically resulted in the inflation of official claims of real growth. Western students of the Soviet economy, [redacted] noted, long have identified such hidden inflation as a major flaw of official Soviet data, and other Soviet economists have expressed similar skepticism about the reliability of the official growth statistics.

[redacted]

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[redacted] however, also criticized some aspects of the Selyunin-Khanin study. He noted, for example, that when using the methods and sources described in earlier articles by Khanin, he obtained results that, for the most part, were about the same or higher than the officially reported industrial growth figures. (Khanin was unable to publish specific estimates of industrial growth, but indicated that application of his methods yielded much lower estimates of growth than those of the Soviet statistical authorities.) While acknowledging that his inability to reproduce the estimates in Selyunin and Khanin's study need not imply that they were incorrect, [redacted] maintained that "reproducibility" is a reasonable criterion by which to judge their reliability. In addition, he noted that the methods described by Khanin generally rested on assumptions that would be difficult to defend—for example, that the ratio of industrial growth to electricity consumption in the Soviet Union would be the same as in the United States. Finally, he argued that the methods of Selyunin and Khanin and other Soviet critics of official statistics, which often use physical measures such as tons and kilowatt hours in place of official ruble value series, completely ignore qualitative change and that this is a mistaken approach. As a result, while he is broadly in agreement with Selyunin and Khanin, [redacted] concluded that their estimates, rather than being accepted as accurate measures of Soviet growth, should be viewed as a

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lower bound. He believes real growth probably lies somewhere between them and the official figures released by the Soviet statistical authorities.

In the group discussion that followed [ ] conference participants applauded [ ] analysis of the Selyunin-Khanin study, but there was some disagreement with [ ] conclusions. [ ] [ ] disputed the suggestion that the Selyunin-Khanin estimates should be accepted as lower bounds for Soviet economic growth, arguing that, until their underlying methods and evidence had been clarified and evaluated, the estimates could not be regarded as more than interesting speculation. [ ] offered a different opinion, arguing that [ ] inability to reproduce Selyunin and Khanin's estimates could be more [ ] problem than theirs, and that until more is known about their underlying evidence it would be inappropriate to dismiss them. Implicit in [ ] point was the belief that the Selyunin-Khanin estimates, as statements of a pro-Gorbachev position, enjoyed at least a semiofficial status that makes them deserving of consideration as alternatives to the official figures.

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[ ] also took issue with [ ] point that Selyunin and Khanin failed to take improvements in product quality into account. Specifically, [ ] argued that, although [ ] criticism was valid for the 1960s and most of the 1970s, even official Soviet data indicated that the degree of product improvement was negligible in the late 1970s and early 1980s. [ ] opined that the discussion of whether product quality was improving or deteriorating might be beside the point. Specifically, he argued that, regardless of whether a new product is better or worse than its predecessor, it is proper to give the new product a higher price if its manufacture requires more inputs than the product it replaces. Viewed in this light, [ ] argued, new product pricing may be less a source of inflation than many have argued.

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Glasnost and the Availability of Economic Statistics

[ ] the Office of Soviet Analysis began the second session of the conference with a paper on the impact of Gorbachev's *glasnost* policy on the availability of economic statistics. After reviewing the history of Soviet policy on the disclosure of economic data since the 1950s, she described the changes in the quantity of economic statistics included in the economic yearbooks published since Gorbachev came to power and, more briefly, discussed the changes that have occurred in other

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Soviet statistical compendia. Her conclusion was that, on balance, Gorbachev's policies have had a positive impact on the availability of Soviet statistics, as the Soviets have resumed publication of data series previously withdrawn from their economic yearbooks and provided some types of information never published previously. The Soviets' announcement of plans to publish several major statistical compendia on economic sectors of critical importance to Gorbachev's program and their unprecedented efforts to market their data in the West, in her view, also bode well for the future availability of data of interest to Western Sovietologists.

At the same time, [redacted] cautioned that significant gaps in Soviet reporting remain—for example, in the area of defense expenditures, in which the Soviets have pledged to publish comprehensive spending figures but only in a few years following the completion of a major price reform. In addition, she noted that Gorbachev is not the first general secretary to increase the availability of economic data in the early years of his tenure. During the Khrushchev and Brezhnev periods, the more "liberal" information disclosure policies of the general secretaries' first years in power gave way to greater secretiveness as their economic programs faltered. STAT

In the group discussion that followed [redacted] presentation, most participants in the conference echoed her modest optimism about the prospects for Soviet publication of additional types of data. Some noted, however, that troubling gaps and discontinuities in the statistics on monthly, quarterly, and annual economic performance were occurring that hampered the construction of production indexes based on physical measures such as Khanin and the CIA use. [redacted] also argued that it may be a mistake to regard newly released data series as the "tip of an iceberg" because the Soviets themselves may lack much of the data that Western economists fault them for withholding. STAT STAT

Changes in the Quality of Economic Statistics

[redacted] opened the third session of the conference with a paper addressing whether Gorbachev's policies are resulting in the release of more—or less—reliable statistics. This question is especially important to an assessment of Soviet economic performance under Gorbachev. If, for example, the crackdown on the overreporting of output and the overpricing of new products are reducing the degree of inflation in official growth statistics, then, in comparison with earlier years, the economy's performance would be better than the official data suggest. If, however, the STAT

crackdown on overreporting and overpricing is offset by the crackdown on underperforming—that is, if enterprise managers "cheat" more to realize their demanding plan targets—then the growth statistics released under Gorbachev would exaggerate the success of his economic policies.

[ ] presentation placed heavy emphasis on the political roots of *glasnost*, appropriately so in view of Gorbachev's use of this policy to discredit his predecessors and opponents and cast himself and his supporters in a more favorable light. While not dismissing the Selyunin-Khanin estimates of past economic growth or Abel Aganbegyan's statements that growth in the late Brezhnev years was lower than officially claimed, [ ] described these estimates as political actions designed as much to stimulate public support for Gorbachev's programs as to set the historical record straight. STAT STAT

[ ] acknowledged that there has been at least one major instance—the correction of historical statistics on cotton procurement in the Soviet economic yearbook for 1986—in which *glasnost* has resulted in "setting the record straight" in the area of economic statistics. Although the correction was belated and, in some respects, inevitable given Soviet press reports of gross falsification of cotton production and procurement statistics in Uzbekistan during the Brezhnev period, [ ] regarded it as a welcome move. He also suggested that a change in reported values in the national income section of the economic yearbook for 1986 (which is related to the acknowledgement of subsidies) represents a potentially important correction of a methodological nature. STAT STAT

On the other hand, [ ] noted that some Western analysts have seen a "dark side" to *glasnost*. This is illustrated most clearly by the official Soviet data on retail sales and national income for 1985 and 1986. In both years legal sales of alcohol were reduced substantially as a result of Gorbachev's antialcohol campaign. Because alcohol sales constitute a large share of retail trade, these reductions should have resulted in a drop in consumption and national income, but, in the official figures, an increase was reported. [ ] expressed the belief that the Soviets did not simply "doctor" the books and that methodological errors probably were at fault. Still, he regarded the Soviets' failure to explain what had been done as grossly inconsistent with their professed commitment to *glasnost*. STAT STAT

More important, [redacted] assessment was that "evidence of improved methodology or fundamentally revised time series" has been obviously and unfortunately absent from the economic yearbooks and statistical press releases issued under Gorbachev. Thus, while qualifying his judgment by observing that it may simply be too early to expect the Gorbachev regime to have made fundamental improvements in Soviet economic statistics, [redacted] overall conclusion was that the General Secretary's policies have not substantially increased the reliability of Moscow's official economic statistics. STAT STAT

In the group discussion that ensued, [redacted] STAT
[redacted] who was in the audience, noted that there had been additional STAT
moves to correct the historical record in the area of demographic statistics. He also noted, as had [redacted] that part of the credit for this development STAT
should go to Western Sovietologists whose analyses had embarrassed the Soviets into making changes. Other conference participants seconded [redacted] point that clarification of the underlying methodologies is essential STAT
if official Soviet statistics are to establish their claim to greater credibility. Despite Soviet press reports of arrests and prosecutions for falsifying statistics, conference participants were skeptical that fear of punishment for such offenses would outweigh the Soviet manager's fear of the penalties associated with failure to fulfill production plans. As a result, they anticipated continued overreporting and overpricing, with some arguing that these sources of inflation would grow even stronger under Gorbachev because of the demanding goals he has set.

Implications for Western Estimates of Soviet Economic Performance

In the last of the papers presented at the conference, [redacted] of the STAT
Office of Soviet Analysis assessed the implications of what is being learned from *glasnost* for Western, especially CIA, estimates of the size and growth of the Soviet economy and the allocation of Soviet resources. [redacted] STAT
explained that, in general, the revelations occasioned by *glasnost* have reinforced CIA's long-held views about the deficiencies of official Soviet economic statistics. Since the 1950s, for example, CIA has recognized that official statistics on aggregate industrial growth were inflated by the overpricing of new products. It has always constructed its own index of Soviet industrial production, based, for the most part, on disaggregated Soviet data on production measured in terms of physical units rather than rubles. In addition, CIA recognizes that the relative prices of Soviet products, which are set by the state rather than being determined by

Comparison of Soviet Statistics on and CIA Estimates of Soviet Economic Growth

Average annual rates of growth in percent

Soviet Measures of Economic Performance [a]

	National Income Produced	Industrial Production	Machine-Building Output
1966-70	7.8	8.5	11.7
1971-75	5.7	7.4	11.6
1976-80	4.3	4.4	8.2
1981-85	3.6	3.7	6.2
1986-87	3.2	4.3	5.9

CIA Measures of Soviet Economic Performance [b]

	GNP	Industrial Production	Machine-Building Output
1966-70	5.0	6.3	7.1
1971-75	3.1	5.4	6.6
1976-80	2.2	2.6	3.7
1981-85	1.8	1.8	1.3
1986-87	2.2	2.1	1.4

[a] Data were obtained from *Narodnoye khozyaystvo (Narkhoz) SSSR*, various issues; they are expressed in so-called "comparable" prices.
[b] 1982 prices at factor cost.

market forces, often fail to reflect the different amounts of inputs used in producing them. Therefore, CIA uses the adjusted factor cost standard developed by [redacted] to value Soviet output in terms that better reflect its resource costs. In applying these methods, CIA historically has produced estimates of Soviet economic growth substantially lower than those reported by the Soviet authorities (see table above). STAT

Nonetheless, as [redacted] acknowledged, in constructing its index of Soviet industrial production, CIA has been unable to completely dispense with officially published ruble measures of the growth of output or the STAT

allocation of resources to end uses. In the case of the machinery sector of industry, for example, about 40 percent of the sample used in CIA's index of production consists of ruble data, the growth of which is probably overstated as a result of the overpricing of new products. Similarly, CIA's index of the growth in the machinery and equipment portion of new fixed investment is based on official ruble value measures, which, although generally believed to be less inflated than the data on aggregate machinery production, probably do overstate the growth of this end use.

[ ] acknowledged that the inclusion of these ruble measures in CIA's sector-of-origin and end-use indexes would, by itself, result in some overstatement of growth in the sectors in question. He noted, however, that the impact of such overstatement decreases as one proceeds to higher and higher aggregations of CIA's estimates. In the case of the ruble data used in the machinery sample, for example, the upwardly biased data account for almost 40 percent of estimated machinery output but only about 10 percent of estimated industrial output and only about 3 percent of estimated GNP. Moreover, [ ] maintained, this upward bias is probably at least partially offset by downward bias in other parts of the sample. [ ] argued, for example, that the portions of the machinery index constructed on the basis of physical measures probably understate growth because they fail to reflect qualitative improvements in output. Similarly, referring to a recent Ph.D. dissertation done at the Massachussetts Institute of Technology by Professor Mark Prell, he stated that CIA estimates of growth in the Soviet service sector probably were on the low side.

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[ ] then presented the results of what he described as "a primitive round of sensitivity testing" which used available alternative estimates of the growth of those components of GNP that have been criticized for being biased up or down in place of current CIA estimates for the entire period, 1951-86. On the sector-of-origin side, the alternative estimates of the growth of GNP's components had a negligible impact on the growth of overall GNP. On the end-use side, however, the impact of using alternative indexes of the growth of key components was substantial by the period's end. In particular, the estimated share of consumer goods in GNP decreased by about 4 percentage points; the share of consumer services increased by about 6 percentage points; and the share of investment in GNP decreased by about 8 points. The estimated share of defense in GNP, however, was about the same as the current CIA estimate.

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In closing, [redacted] predicted that the assessment of Soviet economic growth is likely to become increasingly difficult in the next few years as a result of the often contradictory effects that Gorbachev's policies are likely to have on Soviet economic statistics. On the one hand, the crackdown on overreporting and the leadership's demands for greater methodological rigor on the part of the statistical authorities may lead to a reduction in the inflationary component of the official statistics. The simple pressure of having to publish more statistics may have a similar impact, if additional data actually are published and the statistical authorities are thereby forced to assure that the statistics disseminated are mutually consistent. On the other hand, the heightened pressure on Soviet managers to meet demanding plan targets and the decentralization of pricing authority may increase the managers' incentive and opportunity to overstate real growth. The encouragement of private economic activity may also prove to be a new source of inflation in the official statistics if it leads to the surfacing of activities that once went totally unreported because they were illegal or frowned upon.

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Group discussion of [redacted] presentation centered much more on his predictions of future difficulties in assessing Soviet economic performance than on his analysis of the likely sources of bias in CIA's estimates, which was generally accepted as accurate. Most of the participants who voiced opinions predicted that pressure to meet plan targets would offset the crackdown on overreporting and that, as a result, inflation of the official statistics would not only remain a problem but might even increase. Several participants concluded that the need for independent estimates of Soviet economic growth would increase correspondingly.

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New Challenges to Soviet Official Statistics: A Methodological Survey

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There are certain aspects of Soviet economic life that are not known to the Soviets themselves. Inflation is the most prominent. Denounced as a capitalist phenomenon, it has simply not been measured for the Soviet economy. Consequently, real Soviet economic growth remains a mystery. Fortunately, however, Gorbachev's policy of *glasnost* is removing a long-standing taboo from the subject. Some Soviet authors have already joined Western analysts in the quest for, as they put it, "the true figure." (The writings of some Soviet authors may even seem too radical to some of their Western colleagues.) Sovietology will definitely gain from the new alliance, and the field will become more exciting.

Novyy mir, a Soviet literary and journalistic magazine that has been famous for its liberal traditions since the 1960s, recently entered the new field of the Soviet economy. Among several economic articles published in the magazine in 1987 was one by Selyunin and Khanin,[1] which, while not challenging the Soviet socioeconomic order, presented findings on Soviet economic growth that made it an interesting subject for both domestic and overseas debate. The most sensational assertion made by Selyunin and Khanin was that Soviet national income did not grow 90 times in the 1928-85 period, as officially claimed, but only six to seven times.[2] In other words, according to the Selyunin-Khanin estimates, the Soviet growth rates, if measured by national income, were on average only about 7 percent of the officially reported growth rates. Without taking sides in the dispute, one's immediate response could be: How is such a difference possible? This is the chief question I will address in this paper.

[1] This and subsequent footnotes are at the end of the paper.

The Soviet authorities' willingness to allow the Selyunin-Khanin estimates to appear is unusual. Khanin's earlier publications reflected different official treatment.[3] In a 1981 article Khanin discussed his alternative indices of industrial growth in the 1961-70 period. The discussion, however, took a strange form: percentage differences among six sets of estimates were shown without the estimates themselves. Progress was made in Khanin's 1984 article. Although he did not show his estimates there either, he at least mentioned his findings concerning the nature of growth. He said there was a relatively slow growth of Soviet national income in the 1928-41 period. Fortunately, the new Selyunin-Khanin article appears to be written at the right place and at the right time.

In revising the whole picture of Soviet economic growth, Selyunin and Khanin have touched an especially sensitive period—the first three five-year plans. This period was for a long time a "sacred cow" for the Soviets. To be proud of Soviet socialism, one should believe that the period of building its foundation was not just full of Stalin's excesses. Rather, one must believe that it also was the time of great achievements when the country leaped from a backward to an industrialized society. The terror was the price for the gigantic progress. But if the Soviet economy grew not by the gigantic five times, as officially claimed, but only by a modest 1.5 times, as Selyunin and Khanin claim, how could the ideology justify the sacrifices?[4] Selyunin and Khanin are not the first ones who openly challenged the success of Stalin's industrialization. But the previous attempts were only publicized through *samizdat* channels.

Some other studies which I will discuss along with the Selyunin-Khanin article also suggest alternative estimates of Soviet real economic growth. Unlike Selyunin and Khanin, their authors are not concerned with the entire Soviet period, but only with the last several decades. From the methodological standpoint, this time is more interesting than the Stalin period. In analyzing the views of the authors, I will stress both the pros and the cons of their approaches. The comparisons with the prevailing Soviet methodology will be made, and the problems of the latter will also be given attention.

The second section of this paper describes the methodology of an alternative approach to estimating Soviet economic growth suggested by Khanin. In the cases when aggregate calculations for Soviet industry are possible, the estimates that I obtained on the basis of available information are also given. In the third section the estimates of the critics of the official Soviet statistics are analyzed. The arguments of the defenders of the Soviet statistics and the views of the officials are discussed in the fourth section. The conclusions are drawn in the last section.

The Methodology and Its Application

There is a significant difference between the elaborate discussion in the Selyunin-Khanin article and the description of methodology in Khanin's earlier publications. To explain his methods in detail, Khanin would have needed numerical examples which were not permissible at the time of his earlier publications. For this or other reasons, the explanations of his methods are not clear, and my analysis will be based in part on Khanin's words and in part on my interpretation of them.

Central to Khanin's approach are six alternative methods for estimating industrial growth.[5] (Not only is industry the most important sector of the Soviet economy, creating half of its national product, but most of price inflation takes place there.) Since Khanin realizes that each of the methods would have shortcomings, the thrust of his approach is to use as many methods as possible, check the consistency of the resultant estimates, and average them. Whenever building alternative indices, Khanin tries to avoid using prices or the value indicators that, he believes, are significantly affected by price increases.

In the first method, a representative sample of physical outputs is selected, and a quantity index of a conventional Laspeyres type is constructed. However, instead of base-year prices, coefficients of labor time required for the production of each good in the base period are used. As usual, the chief problem concerns new goods which were not manufactured in the base period. Khanin apparently manipulates the list of the new goods, and he takes into consideration only those for which he can find old goods that they replaced. The old good's labor coefficient in the base period is then used as an equal weight for each such pair. Even if an increase in the labor time for the new good can be justified, it is probably not taken into account. Hence, this Khanin index is equivalent to the conventional Laspeyres index in which the base-year prices of new goods are always the same as the base-year prices of old goods.

In the second method, the growth index is measured as the product of a labor productivity index and an employment index. The estimation of labor productivity is the key part of the method. Measured by TsSU (Central Statistical Administration) as an average product per worker, labor productivity can grow as a result of the increase of both real output and prices. As I understand it, in the absence of data on real output, Khanin substitutes industry's material expenditure (purchases from other firms) in the numerator of the labor productivity index. Actually, real, not total material, expenditure should have been related to real output, but data on real expenditures are harder to find. In making this substitution, two underlying assumptions are required: first, that the material expenditure-to-output ratio is constant over time, and, second, that there is no significant price inflation of material inputs. Despite the fact that material expenditure per ruble of industrial output officially fell by 4 percent in the 1971-84 period, however, the second assumption does not appear plausible.[6] Probably Khanin excluded certain unspecified components of material expenditure (e.g., purchases of finished parts) in order to reduce the influence of price increases.

Given the two assumptions, the computation of the index of labor productivity is based on the fact that material expenditure is the difference between production costs and wages. Using indices of cost, average wage per worker, and the proportion of wages in cost, Khanin finds the index of labor productivity. Since the formula explaining this computation is the only one in Khanin's article, it deserves special attention. The formula is erroneous. A correct formula consonant with Khanin's intent and in his notation is the following form:

$$IP_j = \frac{(1-KZ_j)\,IZ_j \times KZ_{j-1}}{(1-KZ_{j-1})\,KZ_j} \qquad (1)$$

where IP_j and IZ_j = index of labor productivity and index of average wage per worker in the jth period, respectively; KZ_j and KZ_{j-1} = the proportion of wages in production cost in the jth and (j-1)th period, respectively.

In this case Khanin obtained estimates consistent with those from other methods, so it is unlikely he actually used the wrong formula. I believe that his computation was correct from the standpoint of his methodology, but he failed to formalize it adequately in the text. Using the index of labor productivity IP_j from formula (1) and the index of employment IL_j, the index of production IQ_j is determined:

$$IQ_j = IP_j \times IL_j \qquad (2)$$

Since the computation in this method is performed at the aggregate level and the information is available for Soviet industry, I did my own computation for the 1971-75, 1976-80, and 1981-85 periods. The data are in table 1 and the computation is in table 2.

As the computation in table 2 illustrates, the idea of formula (1) is that: the greater the level of wages per worker and the lower the share of wages in production cost in the current compared to the base period, the greater is the level of material expenditure. This, in turn, means that, under the assumption of material expenditure rising along with real output, average product per worker also grows. The indices from table 2 are compared with the estimates from the two other methods, obtained below, and with the official Soviet indices in table 7. The results are apparently close to the official indices. This could be expected, given that cost is affected by the same forces as the value of production. Khanin assumed that material expenditure is less subject to the inflationary pressure than total output.

If the assumption is correct, then total output has to grow more slowly than its net value component, that is, the sum of wages and profit. But the indices of average wages from table 2 were growing much less than the indices of total industrial outputs illustrated below in table 3. As for the profit component, only in the 1981-85 period did it grow more than industrial output. To generalize, the correlation between the variables used in the above example, that is, costs, wages, and material expenditure, on the one hand, and economic growth in Soviet industry, on the other, may not necessarily be strong. This implies that the data used by Khanin must differ from those in table 1, but we do not know what discounting procedure, if any, he applied.

If the material expenditure component is imputed in the second method, it is directly accounted for in the third method. The purpose of this third method is to estimate an index of material expenditure and to use it as a proxy for the index of production. One recognizes here the same assumptions as in the second method, that is, that real output grows at the same rate as material expenditure and that material inputs are much less subject to price increases than the goods they help to produce. To justify the use of the index of material expenditure as an indicator of economic growth, Khanin points to the experience of developed capitalist countries and asserts that the difference between their growth rates for outputs and material inputs, as a rule, does not exceed 0.2 to 0.3 percentage points.[7]

However, if one looks at US statistics, one will find a variety of different relationships between the two variables. For instance, in the 1972-80 period the average growth rate of the cost of material inputs in US manufacturing was 13.2 percent, and that of

Table 1
Information for the Computation of the Production Index for Soviet Industry (Second Method)

Indicator	1970	1975	1980	1985
Proportion of wages in production cost (*percent*)	16.1	14.6	14.8	14.1
Average monthly wage per worker (*rubles*)	133.3	162.2	185.4	210.6
Number of workers in industry (*thousands*)	31,593	34,054	36,891	38,103

Sources: *Narkhoz SSSR 1970*, p. 174; *Narkhoz SSSR 1975*, p. 230; *Narkhoz SSSR 1980*, p. 153; *Narkhoz SSSR 1985*, pp. 126, 391, and 397.

Table 2
Computation of the Production Index for Soviet Industry (Second Method)

Indicator	1971-75	1976-80	1981-85
Index of average wage per worker	$\frac{162.2}{133.3} = 1.22$	$\frac{185.4}{162.2} = 1.14$	$\frac{210.6}{185.4} = 1.14$
Index of labor productivity	$\frac{(1-.146)1.22\,(.161)}{(1-.161)\,(.146)} = 1.37$	$\frac{(1-.148)1.14\,(.146)}{(1-.146)\,(.148)} = 1.12$	$\frac{(1-.141)1.14\,(.148)}{(1-.148)\,(.141)} = 1.21$
Index of employment	$\frac{34054}{31593} = 1.08$	$\frac{36891}{34054} = 1.08$	$\frac{38103}{36891} = 1.03$
Index of production	1.37 (1.08) = 1.48	1.12 (1.08) = 1.21	1.21 (1.03) = 1.25

Source: Table 1.

output (the sum of value added and the cost of material inputs) was 11.9 percent, with the consequent difference of 1.3 percentage points.[8] In the 1980-84 period these rates were 4.2 and 5 percent, respectively, with output this time surpassing the cost of inputs by an average 0.8 points. Since, in the two consecutive periods, the difference between these growth rates changed direction, it narrowed for the entire 1972-84 period but still remained 0.6 percentage points. Yet even if the difference between the two rates for the United States was within the narrow margin indicated by Khanin, this fact may be only remotely related to the Soviet economy.

As in the second method, the computation in the third method is performed at the aggregate level. I did it for the 1971-75, 1976-80, and 1981-85 periods. Because the data on industrial material expenditure are not available, I estimated an implicit index of material expenditure in the following form:

$$IM_j = \frac{HM_j \times IQ_j}{HM_{j-1}} \qquad (3)$$

where HM_j and HM_{j-1} = the proportion of material expenditure in the output of the jth and $(j-1)$th period, respectively; IM_j and IQ_j = index of material expenditure and output in the jth period, respectively. One can verify that index (3) is equivalent to the explicit index $IM_j = M_j/M_{j-1}$, for $HM_j = M_j/Q_j$ and $IQ_j = Q_j/Q_{j-1}$. In essence, formula (3) uses the index

Table 3
Information for the Computation of the Index of Material Expenditure for Soviet Industry (Third Method)

Indicator	1970	1975	1980	1985
Proportion of material expenditure in industrial output (*percent*)	64.1	65.2	63.2	61.8
Index of industrial production by five-year period (*percent*)		143	124	120

Source: *Narkhoz SSSR 1985*, pp. 99, 127.

Table 4
Computation of the Index of Material Expenditure for Soviet Industry (Third Method)

Year	Index
1975	$\frac{.652\,(1.43)}{.641} = 1.45$
1980	$\frac{.634\,(1.24)}{.652} = 1.21$
1985	$\frac{.618\,(1.20)}{.634} = 1.17$

Source: Table 3.

of production to restore the index of material expenditure; the production index is then ignored, and the material expenditure index is identified with the index of real production. The data used in formula (3) are in table 3 and the computation is illustrated in table 4.

In table 7, the estimated indices are compared with the official growth indices. As follows from the table, the estimates from the third method obtained in table 4 are almost exactly the same as the official indices. Hence, this method, as well as the second one, does not dramatically reduce the official growth figures as it should have according to Khanin. This means that he used other data on material expenditure. In particular, as he indicates in the case of the third method, he excluded from material expenditure the cost of purchased finished parts. It is not clear whether other discounting procedures were also applied to the data.

If the second and the third methods implement the same idea but different computational schemes, the fourth method is yet another version in which the index of labor productivity is used. An assumption is made that there is a functional relationship between the growth of output per worker and productive consumption of electricity. Moreover, another assumption is that the ratio between the growth of output per worker and productive consumption of electricity must be the same for the US and Soviet economies. If so, then the data on the United States can be used to derive conclusions for Soviet industry. More specifically, the index of labor productivity for Soviet industry can be found on the basis of the ratio of the average product per worker to productive consumption of electricity in US industry and the information on electricity consumption per worker in Soviet industry.

For example, if, in a given period, the average product per worker in US industry rose fourfold and electricity consumption per worker doubled, the ratio between the two indices equals two. Therefore, if in the Soviet case electricity consumption per worker grew 1.5 times in that period, the labor productivity index must equal three. Actually, since Khanin's procedure is equivalent to solving a proportion in which output in the numerator and electricity consumption in the denominator are divided on a per worker basis for both the Soviet and the US economies, such a division cancels out the number of workers. Probably Khanin performed such a division since there was readily available information on electricity consumption per Soviet worker in statistical yearbooks. To illustrate the fourth method, I will use the simplified version in which there is no division by the number of workers:

$$IQ_{su} = \frac{IQ}{IE_{us}} \times IE_{su}. \qquad (4)$$

where IQ and IE = index of industrial production and electricity consumption for Soviet and US

Table 5
Information for the Computation of the Production Index for Soviet Industry (Fourth Method)

	1970	1975	1980	1985
US industrial production index for the five-year period		1.08	1.28	1.15
US electric utility sales to industry (*billion kilowatt-hours*)	571	688	815	827
Soviet index of electricity consumption per industrial worker		1.27	1.09	1.13
Soviet index of industrial employment		1.08	1.08	1.03

Sources: US Bureau of the Census, *Statistical Abstract of the United States: 1987* (Washington, DC, 1986), pp. 553 and 734; *Narkhoz SSSR 1985*, p. 78; table 2.

industries, respectively. The information and the computation according to formula (4) are in tables 5 and 6. (Since the information on Soviet electricity consumption is given per worker, the index of electricity consumption can be found by multiplying the index of electricity consumption per worker and the index of employment in industry.)

In table 7 the estimates from table 6 are compared with the estimates from the two other methods considered above and the official growth indices. As one can see from table 7, if the official and the two other indices demonstrate a similar pattern of decline, the fourth method, on the contrary, points to a picture of slightly accelerating growth. In particular, this growth is significantly higher than that officially reported for the 1981-85 period. One of the reasons is that the relationship between the ratio of US industrial output to productive consumption of electricity and Soviet labor productivity is far from evident. But, while this explains why the resultant estimates may be unreliable, it does not explain why Khanin obtained different estimates. He probably should have used the same data on the US economy. Of the three indices in table 6, the only one pertaining to Soviet industry refers to the productive consumption of electricity. Yet, even for this index, it is difficult to expect big discrepancies since it is verifiable by comparison with the growth of Soviet electricity production in physical terms.

The intent of Khanin's fifth method is to establish the discrepancy between meeting plan targets in money terms and meeting the targets in physical terms and to use that discrepancy in building the index of industrial production. For that purpose, an index of meeting the physical production quota is computed for each good from a selected sample. Using the individual goods indices, a weighted average index is found, with labor time spent on the production of each good as a weight. If it then follows from the average index that the plan for physical output is surpassed by, say, 2 percent, but the plan for the value of output is surpassed by 5 percent, the difference is attributed to inflationary growth. Consequently, the difference is not counted as real growth. Thus, if in this example the planned growth rate for the value of production is 4 percent, the estimate of the achieved real growth rate equals 6 percent (104 × 1.02-100). The method, is, therefore, based on the distinction made between the planned production values that do not foresee hidden price increases and the production values reported afterward that do incorporate such increases. The purpose of the index of meeting the plan targets in physical terms is to permit a correction of the ex post estimates.

The fifth method can be considered as a version of the first method, even though the two methods may seem

Table 6
Computation of the Production Index for Soviet Industry (Fourth Method)

Indicator	1975	1980	1985
US index of electricity consumption in industry	$\frac{688}{571} = 1.20$	$\frac{815}{688} = 1.18$	$\frac{827}{815} = 1.01$
Soviet index of electricity consumption in industry	1.27(1.08)=1.37	1.09(1.08)=1.18	1.13(1.03)=1.16
Soviet index of industrial production	$\frac{1.08}{1.20} \times 1.37 = 1.23$	$\frac{1.28}{1.18} \times 1.18 = 1.28$	$\frac{1.15}{1.01} \times 1.16 = 1.32$

Source: Table 5.

Table 7
Comparison of Different Indices of the Growth of Soviet Industry (Year − 5 = 100)

Year	Estimated Index			Official Index	Ratio		
	Second Method (1)	Third Method (2)	Fourth Method (3)	(4)	(2)÷(1)	(3)÷(1)	(1)÷(4)
1975	148	145	123	143	.98	.83	1.03
1980	121	121	128	124	1.00	1.06	.98
1985	125	117	132	120	.94	1.06	1.04

Sources: Tables 2, 4, and 6; *Narkhoz* SSSR 1985, p. 99.

to be unrelated. The only difference is that, in the first method, the physical outputs of the current and base years are directly compared, whereas, in the fifth method, an intermediate indicator of plan targets in value terms is inserted. It is reasonable to expect that in both methods the same set of physical goods is used and the same weighting procedure is applied. Under these conditions, if no price increases or decreases are planned, the two methods should result in the same estimates.

In the sixth method, Khanin again returns to the index of labor productivity used in the second and fourth methods. This time, the index of the cost of industrial exports is estimated. Probably, the cost of industrial exports is related to total cost, which, in turn, is related to output. What is clear from the method's description is that a ratio of the change in the export cost to the change in export proceeds is calculated, and then, given this ratio and the index of export proceeds, the index of the cost of exports is found. Export proceeds are estimated in constant world prices, and the reliance on the true "constant" nature of those prices seems to be the rationale for the method. I view this method as the least justifiable from an analytical standpoint, not to mention the number of assumptions required.

The Criticism and Its Analysis

The methods described above give an idea of Khanin's approach to deriving "alternative estimates" of Soviet economic growth by sector and as a whole. Khanin does not demonstrate his estimates for industry and

Table 8
Comparison of the Growth of Soviet National Income

Percent

Period	Selyunin-Khanin		Official	
	Total Growth	Growth Rate	Total Growth	Growth Rate
1961-65	24	4.4	37	6.5
1966-70	22	4.1	45	7.7
1971-75	17	3.2	32	5.7
1976-80	5	1.0	23	4.2
1981-85	3	0.6	19	3.5

Sources: Vasiliy Selyunin and Grigoriy Khanin, "Lukavaya tsifra," *Novyy mir* 2 (1987), pp. 196-197; *Narkhoz SSSR 1975*, p. 563; and *Narkhoz SSSR 1985*, p. 39.

other sectors of the Soviet economy, but Selyunin and Khanin do so for national income. The growth percentages from the Selyunin-Khanin article are compared to the official data in table 8. As one can see from the table, Selyunin and Khanin especially discount the official growth rates for the period from 1976 to 1985. Although Selyunin and Khanin pay attention to distortions in growth indices caused by a variety of factors including faulty or fraudulent statistical reports (*pripiski*), concealed price inflation is stressed in Khanin's methodology.

Is a higher pace of price inflation in the Soviet economy in the 1976-85 period responsible for such a difference between the official and the Selyunin-Khanin estimates? Unfortunately, there are no grounds for conclusive answers. As indicated above, Khanin's methods raise questions of justification, plausibility of assumptions, and the validity of data used. An even greater problem in this respect is that Selyunin and Khanin's estimates do not allow for product quality improvements. They admit this shortcoming but, apparently, do not believe it is serious. Since such a belief is typical for the critics of the official Soviet growth figures, it is crucial we understand the motives for it.

The critics in general prefer physical output as an indicator of economic growth. Thus, Val'tukh and Lavrovskiy use the indicator of physical production capacity to characterize the efficiency of the Soviet economy and to eliminate the effect of the "price factor." For estimating economic growth, they also use physical output. Calculations were performed for industry and its three sectors—electric power, chemical, and machine building and metalworking (MBMW)—by five-year periods since 1950. What is interesting about the Val'tukh-Lavrovskiy estimates is that, until the 1966-70 period, they exceeded the official growth indices for industry, and since then they have sharply decelerated.[9] Even though it is impossible to compare Khanin's and the Val'tukh-Lavrovskiy estimates for industry, we learn that they deviate from the official indices in opposite directions until the late 1960s and in the same direction ever since.

It is, however, possible to compare the Val'tukh-Lavrovskiy and the Selyunin-Khanin estimates for the MBMW sector. Although Selyunin and Khanin's article does not contain their indices for this sector, one can restore their approximate range from the information they give. Thus, according to their calculations, in each of the five-year periods since 1965 hidden inflation in the MBMW sector floated between 27 and 34 percent. The growth in the 12th Five-Year Plan (1986-90) is foreseen to be 43 percent of which, according to Selyunin and Khanin, 30 percent will constitute the inflationary component, that is, growth "on paper."[10] (Apparently, they consider the real growth rate as the difference between the nominal and inflation rates, neglecting the crossrate term.) The Selyunin-Khanin estimates obtained by discounting the official Soviet growth indices are compared with the Val'tukh-Lavrovskiy estimates in table 9. As one can see from table 9, the 1961-85 deceleration rate in the Selyunin-Khanin estimates, from an average 8.2 to 0.9 percent, is much lower than in the Val'tukh-Lavrovskiy estimates, from 10.7 to 0.3 percent.

Fal'tsman uses the maximum power of equipment as an indicator of growth for the MBMW sector. In particular he says that, while from 1970 to 1982 the average rate of output growth for 11 civilian MBMW

Table 9
Growth of the Soviet MBMW Sector by Five-Year Period

Percent

Year	Selyunin-Khanin		Val'tukh-Lavrovskiy		Official	
	Growth	Growth Rate	Growth	Growth Rate	Growth	Growth Rate
1965	45-52	7.7-8.7	66	10.7	79	12.3
1970	40-47	7.0-8.0	33	5.9	74	11.7
1975	39-46	6.8-7.9	26	4.7	73	11.6
1980	14-21	2.7-3.9	6	1.2	48	8.2
1985	1-8	0.2-1.6	1 [a]	0.3	35	6.2
1990	13 [b]	2.5	NA	NA	43 [b]	7.4

Sources: *Narkhoz SSSR 1970*, p. 137; *Narkhoz SSSR 1975*, p. 197; *Narkhoz SSSR 1985*, p. 99; Vasiliy Selyunin and Grigoriy Khanin, "Lukavaya tsifra," *Novyy mir* 2 (1987), p. 187; K. K. Val'tukh and B. L. Lavrovskiy, "Proizvodstvennyy potentsial strany," *Ekonomika i organizatsiya promyshlennogo proizvodstva* 2 (1986), pp. 24 and 29.
[a] 1983.
[b] Projection.

ministries was about 8 percent in money terms, it was only 3 percent in equipment maximum power.[11] The difference of 5 percent is interpreted as an inflationary component of growth. Fal'tsman's average growth rate of 3 percent turns out to lie in between the Val'tukh-Lavrovskiy and the Selyunin-Khanin average estimates of 2.5 and 4.5 percent, respectively, for the same 1971-82 period. Fal'tsman's estimates may be more convincing than those of Selyunin and Khanin or Val'tukh and Lavrovskiy, since he takes into consideration not only the physical output of machines and equipment but also their power. His approach, however, is only justified when power could be singled out as the most important characteristic of machines.

These examples demonstrate that, in estimating Soviet economic growth, Soviet economists pay little attention to quality change. In a similar situation, a Western analyst would never ignore such change, at least verbally. People in the Soviet Union generally give quality less consideration than quantity. This should not be understood to mean that quality is not important to them; on the contrary, seeking goods of an adequate quality consumes a substantial part of their lives. But they are hardly used to improvements in domestic manufactures and, for that reason, often disregard the factor of quality change. Persistent shortages play their role, too. As for the producer, he takes whatever the supply system is able to provide. Since there is no shopping around, the problem of quality becomes too hypothetical in the producer's case.

In my work on estimating real growth in the Soviet MBMW sector, I used an approach similar to Fal'tsman's as well as a more general one. The estimates of real growth for the Soviet electrotechnical industry are an example of the first approach. According to my calculations, the output of the electrotechnical industry rose by 138 percent in the 1961-75 period, whereas the Soviet statistics report a 356-percent growth. Hence, my estimates command an average 6-percent growth rate, and the official, 10.6 percent.[12] It therefore follows from these estimates that economic growth for the electrotechnical industry may be overstated by 1.8 times (10.6 ÷ 6); this is lower than the 2.7 times (8 ÷ 3) implied by Fal'tsman's estimates for the entire MBMW sector.[13]

As an example of a more general approach, the estimates for Soviet passenger car production in the 1970-82 period could be noted. In this project, it would be impossible to use indicators such as production capacity or any more reasonable one which clearly dominates the others. For that reason, I built an index of car quality based on the following characteristics: the number of occupants, size, weight, engine volume, horsepower, and fuel efficiency. Estimates were obtained for both the wholesale and retail levels of sales revenue. Although an inflationary component was found to be present at both levels, at the wholesale level it turned out to be insignificant when compared to resultant real growth rates: The average nominal growth rate was discounted by only 1.8 percentage points, from 14.2 to 12.4 percent. At the retail level, this rate was discounted by 4.3 percentage points, from 16.7 to 12.4 percent.[14] In the 1976-82 period, there were even years of disinflationary growth in wholesale prices. Such a result is somewhat unexpected, in light of a widespread belief that the Soviet automotive industry has been notorious for its price inflation.

Why then do we see quality improvements in the Soviet economy where Soviet economists do not? As outside observers, we are perhaps ready to consider as improvements such changes in product characteristics which, under normal conditions of consumer sovereignty, should not have been identified so. The determination on quality is made in the USSR by state certification committees, and regulations set up standards for "objective" characteristics of quality. When these characteristics are the same for a large product group, they only reflect capacity, power, durability, and the like. This is not the place to discuss the well-known issues of Soviet product quality. However, if agriculture needs small and versatile tractors and the industry, instead, continues to raise their horsepower, a Soviet economist does not want to accept such a change as an improvement. That is the only way I can interpret the position of Selyunin and Khanin or Val'tukh and Lavrovskiy.

On the other hand, there is a problem of measuring inflation in this case. An increase in a tractor's horsepower likely causes a rise in production cost and, consequently, the price. The approach of Soviet economists discussed above means that, since such an increase could not be viewed as a quality improvement, the price increase should be treated as inflationary. While the issue is indeed complicated, one should take into account the reality of planning and evaluating success in the Soviet economy. The Soviet producer has to play by the rules established by the state certification committees and pricing authorities for the evaluation of product quality and price setting. Accepting the reality and the criteria established by the authorities, we consequently look at the quality problem from the producer's, rather than the consumer's, standpoint: If the producer has to manufacture a good with new characteristics improved in accordance with the established criteria, a proportionate price increase may be justified. In essence, we say: If the growth is not inflationary, it is real. The Soviet critics of the official statistics do not accept such a compromise.

They are not the only critics of Soviet statistics. The planners themselves always prefer the indicators in physical goods to those in money terms. The national economic plan is primarily built on balances of production and distribution of physical goods, and in many instances monetary aggregates are used for accounting purposes. Thousands of material balances drawn in planning, to a large extent, insulate plan targets from price distortions. Although fraudulent reports on physical outputs are not exceptional, it is much easier to control them than the value indicators. Not surprisingly, people more or less accept Soviet statistical data on the production of oil, machines, or shoes. Serious imbalances do, of course, occur in the Soviet economy. But to consider them a result of poor planning, as many critics do, would imply that better planning would cure Soviet economic problems.

The primacy of planning in physical terms led to a "neglect" of monetary indicators. They did not play an active role in planning before 1965, when their important political function was to demonstrate high rates of Soviet economic growth. Since the 1965 economic reform, inflating value indicators became much less harmless from the planners' perspective. The reason is that profit and average labor productivity were chosen, among others, as the new success

indicators. Since the rise of these monetary indicators could affect wages and bonuses, this created a new reality in the game between plant management and planners; managers intensified their effort to raise prices, and planners attempted to create barriers for unjustified price increases. Continuing price rises indicate that the planners' preventive barriers did not succeed. As a matter of fact, along with the prewar years, the 1976-85 period is one for which the Selyunin-Khanin estimates reduce the official growth rates the most drastically.

Soviet statistics do not appear to respond to these dramatic developments at all. There are in general many unanswered questions with respect to Soviet statistics, and the chief one is: If there is inflation in the Soviet economy, why is it hidden and why is it reported as economic growth? The reason is not to be found among statisticians themselves or in their practices but in Soviet methodology for the computation of growth and the procedures for pricing new goods.

The Soviet methodology of building growth and price indices is based on using comparable prices (*sopostavimyye tseny*). In industry, 1982 prices are now used as comparable ones; in agriculture, 1983 prices are used, and in construction, 1984 prices. Only at the moment of setting these prices do they resemble conventional constant prices. For a good introduced later, say, in 1987, the first approved price becomes its 1982 comparable price. Technically, this solves the problem of estimating the base-period price for the new goods, and the Soviets do not have to worry about linking the old and the new specifications when building an index. But what it actually means is that the whole array of goods introduced in between the setting of comparable prices (in industry, the base years were 1952, 1955, 1967, 1975, and 1982) does not affect the price index one way or another: Their base- and current-year prices are one and the same. Such a price index, therefore, only reflects the revisions of prices for the goods produced in the base years.

As Selyunin and Khanin suggest, the Soviets should have used representative samples of goods in each product category instead of entire outputs, and built indices for the samples. The rationale is simple. Data verification on the entire output is hardly possible. Yet, as I explained elsewhere, the Soviets apply the same comparable price principle to sample indices, too.[15] Therefore, the mere change of the sample size will not ease the problem of hidden inflation. Why then not change the methodology and switch to a conventional Western procedure that involves the computation of base-year or current-year weighted indices? This, I am afraid, is not a panacea either.

At a closer glance, the Soviet methodology is not bad at all. The linking procedure usually involves a comparison, either direct or indirect, of a new good with the existing ones in the same product category. One would hardly comprehend exactly how the Bureau of Labor Statistics in the United States makes a judgement for goods other than automobiles. The Soviets possess an advantage in this respect, since such a comparison is required and is performed in the process of approving a new good's price. It is therefore logical to set the new good's price with the account of improvements in its characteristics. Hence, theoretically, price increases for new goods are allowed to the extent of their projected quality improvement. Yet, due to a number of well-known systematic forces, these improvements mostly remain on paper, while price growth is quite real.

Suppose that the Soviet methodology of constructing indices is revised, and more conventional procedures for linking newly introduced goods to those in the market basket are adopted. The same considerations that are now used in pricing new goods would have to be used in quality and price comparisons by statisticians. Then, in the cases when the Goskomtsen (State Committee on Prices) experts find price increases justifiable, there is little chance that the statisticians constructing the price index would be able to add any new insights to the issue. In other words, the change in the Soviet methodology per se would not raise the reliability of Soviet growth and price indices. In the absence of consumer sovereignty, any procedures for evaluating goods quality would turn into something similar to what Goskomtsen does at present; if so, the results would not be much different.

The Analysis of Orthodox Views

The Selyunin-Khanin estimates have been challenged by Adamov.[16] He believes that a growth index based on the entire output, as in the Soviet Union, is more accurate than one based on a sample of goods, as in the United States. Adamov demonstrates that, by manipulating a sample of goods, it is possible to obtain for the 1976-85 Soviet industrial output either a decline of 29 percent or a rise of more than 300 percent. This is done to prove that, by purposeful selection of an "appropriate" sample of industrial goods, Selyunin and Khanin intended to discredit official growth figures. Two comments are appropriate. First, the Selyunin-Khanin estimates are much less vulnerable to Adamov's criticism than, for example, are the Val'tukh-Lavrovskiy estimates. The reason is that Val'tukh and Lavrovskiy's estimates were built on the basis of a sample in physical terms; it is quite possible that the growth characterized by the sample for which they were able to obtain data is biased with respect to the entire output. The Selyunin-Khanin estimates, on the other hand, are averaged over the indices computed by several different methods, only two of which depend on sample estimation. Second, whereas there are both cons and pros in increasing the size of a sample, the chief problem is in the method applied, not in the fact of using a sample. Thus, if the methodology of the US Bureau of Labor Statistics were applied to exactly the same set of goods the Soviets use, the results would undoubtedly differ from the Soviet official indices. Conversely, if the Soviet methodology, the idea of which was discussed in the previous section, were applied to the entire industrial output and separately to a representative Soviet sample, the two results would probably not differ significantly.

Adamov asserts that when a switch to new comparable prices takes place, the last year's value of output is recalculated in new prices, to allow for the computation of a chain growth index. This is true; but the recalculation is done only for the so-called comparable products (*sopostavimaya produktsiya*), that is, those manufactured in both current and previous years. The prices of these goods seldom rise, and the washing out of cheap items and the introduction of new goods make the difference. Therefore, despite Adamov's assertion, the Soviet experience has proved that the mere fact of using the chain index does not ensure the smooth continuity of indices. While Khanin's criticism is chiefly directed toward the Soviet methodology, Adamov believes that the prime sources of erroneous results in statistics are the deliberate distortions in the initial information (*pripiski*) or the use of samples rather than the entire sets of goods.

Adamov makes several points on Selyunin and Khanin's estimates. He notes that if Soviet national income rose six to seven times in the 1928-85 period as they say, then in 1985 the ratio of Soviet national income to that of the United States would remain at the 1928 level, that is, 10 percent on average. Then how could the Soviets afford parity in military spending and still produce consumer goods? The argument clearly makes sense. However, Adamov believes in both the official growth of 90 times from 1928 to 1985 and in the official ratio of Soviet-to-US national income of 66 percent in 1985, the combination of which does not make sense. Indeed, if, according to Adamov, a 10-percent ratio of Soviet-to-US national income follows from a six- to seven-times growth in Soviet national income, then a 66-percent ratio would command a 6.6-times greater growth, that is, one in the 40- to 46-times range. The latter still falls short of the official growth of 90 times.

Several other of Adamov's numerical examples were aimed to disprove the Selyunin-Khanin estimates and can also be challenged. For example, following up the Selyunin-Khanin approach to look at the proportions between technologically related industries in the US and Soviet economies, Adamov uses metallurgy and the MBMW sectors. He states that in the 1961-85 period the ratio of MBMW-to-metallurgy growth for the United States was equal to 3.3, with the indices of 3.07 and 0.93, respectively. From that standpoint, he indicates as reasonable a similar 2.7 ratio for the Soviet economy. Yet, to find the growth index for the Soviet MBMW sector, Selyunin and Khanin might use the metallurgy growth index in physical, not in value, terms. Using steel production as an indicator, the growth index for Soviet metallurgy in the 1961-85 period would be 2.4. Since a similar index for the

MBMW sector equals 10.9, one would obtain a 4.5 ratio (10.9 ÷ 2.4), rather than 2.7.[17] (The ratio is important in the sense that, the lower its level, the more "reasonable" are the official growth rates for the MBMW sector.)

Adamov's views on the Selyunin-Khanin findings would probably coincide with the official reaction of TsSU. But TsSU, recently transformed into the State Committee on Statistics (Goskomstat), has so far ignored them. In his article outlining the program for *perestroyka* of statistics, the head of Goskomtstat Korolev only in passing remarked that all Selyunin-Khanin calculations and conclusions are "deeply erroneous."[18] Among the targets for improvement outlined by Korolev are the composition of statistical indicators, the reliability of the initial data, and the methodology of the measurement of economic growth and the investment process. The directions of operational changes will include the elimination of all the channels of collecting statistical data outside of the Goskomstat system and the reduction of the amount of data required from industrial firms and organizations.

When it comes to the composition of statistical indicators, the Soviet press reports a lot of criticism and vague suggestions for improvements. The existing indicators are called separate (*razroznennyye*) or piece-wise (*kusochnyye*), while they are supposed to provide a composite picture of social and economic development. But that is what Soviet planners attempted to achieve for decades! Take, for example, the plan for technological change. Many research projects were devoted to development of an indicator characterizing an overall state of technology. The projects failed because there is no such indicator. The current campaign can only result in the introduction of a broader range of indicators of economic and social statistics. If, in addition, they are published, such a development can only be welcomed.

The official Soviet perception of the reliability of statistical data is that whatever statisticians process is true to the extent the initial information collected from firms and organizations is true. This, in particular, implies that the methodology per se challenged by Selyunin and Khanin is also true. Every Soviet leader beginning with Stalin tried to prosecute statistical fraud (*pripiski*) and eyewash (*ochkovtiratel'stvo*). At the same time, the leaders themselves initiated and encouraged the fraudulent Stakhanovite movement and other forms of socialist competition. But this type of fraud was considered "innocent" in the sense of, first, being authorized and, second, not affecting the overall production statistics. Thinking of the new Soviet campaign against statistical fraud, Gorbachev may be sending a signal that there will not be a discriminatory treatment of *pripiski* and that none of them will be tolerated any more.

There has already been some evidence of Gorbachev's new broom sweeping *pripiski*. For example, according to the head of the Moldavian Goskomstat, Vorotilo, after the 1986 resolution of the Central Committee on eyewash and fraud in Moldavia, Kirovograd province, and the Ministry of the Automotive Industry, more than 2,000 Communists were charged with misdemeanors in Moldavia.[19] Disciplinary punishments were given to 1,260 people, one-third of whom were managers, and 111 of them were fired. For fraudulent data, 29 cities and districts were stripped of their positions as the winners in the socialist competition. But, as the official admits, cheating is still alive. Further, the head of the Uzbek Goskomstat Sadukov indicates that, despite all the effort, one out of six enterprises in the republic still engages in *pripiski*.[20]

This is not the place to analyze the distortions of statistical information at industrial firms, where the bulk of it originates. Even though the recent disclosures illustrate the serious nature of the problem, I think it is premature to conclude that the level of proportions is critical. This statement is in part based on my experience of working with plan and statistical data in the 1960s and 1970s. There have always been indicators that are more trustworthy, such as physical outputs, and those that are untrustworthy, such as economic benefits from modernization projects. Planners are well aware of exaggerated volumes of excavation or freight traffic. But in the past those false volumes were quietly accepted as a means of paying workers decent wages and thus keeping them on the job.

But what about *pripiski* at the macro level, in situations when aggregate statistics do not look impressive or even move in undesirable directions? Whenever Soviet statistical reports are unbelievable, Western analysts naturally suspect deliberate distortions. I personally did not come across the cases of "primitive" distortion, in the sense of cooking up good numbers. The distortions practiced are more of an a priori nature that may have nothing to do with falsification. They follow from the Soviet planning and statistical methodology or the changes in the methodology or accounting procedures which remain undisclosed. For example, the production of milk was sharply increased in the early 1970s by lowering its fat and increasing its water content; the meat consumption per capita was "raised" by including the estimated consumption of lard by collective farm households, which was not included before. One could find numerous examples of deliberate lowering of product quality in order to beef up outputs. But what is important in all these cases is that the production, of whatever quality, actually grows if it is reported so. Otherwise, the numbers would disappear from statistical yearbooks.

History does not necessarily repeat itself, and things might have changed in Soviet statistics. Western analysts, however, have recently pointed to new discrepancies in Soviet statistics, in particular to conflicting measures for certain crucial indicators appearing in different and even in the same reports. There were also accusations of deliberate distortions. For example, Vanous, analyzing the 1985 and 1986 data on Soviet retail trade turnover, came to the following conclusion: "It can now be proven beyond any doubts that some of the official statistics were deliberately distorted over the past two years."[21] I, in contrast, believe there are many other factors that could contribute to the difference in estimates for that specific period. I do not, of course, rule out distortions and errors. However, since deliberate distortions apparently were not practiced in the past, and since Gorbachev required a greater scrutiny from statisticians, I find it hard to believe that someone in Goskomstat would take a chance of "beautifying" the statistics.

As for the improvement of statistical methodology, we cannot expect significant changes until the relevant changes are accomplished in planning methodology. For example, statisticians have been criticized severely for using gross value (*valovyye*) indicators of economic growth. According to the rules of the game, the Goskomstat officials have engaged in self-criticism calling for the introduction of "scientifically justified" (*nauchno-obosnovannyye*) success indicators.[22] However, little could be done since a major shift from value to net indicators in planning has still not been completed. (And even if it is completed, the results may turn out to be far from scientifically justified.) The changes that can be expected will probably focus on the revision of the indicators used in statistics and the introduction of new ones, rather than on the revision of the methodology.

Conclusion

This paper analyzes the recent developments in the debate over Soviet statistics, in particular the debate over Soviet economic growth rates. What is encouraging about these developments is that some of the Soviet economists have joined their Western colleagues in an attempt to estimate real Soviet growth. Although research in this area had been going on in the Soviet Union for years, only under Gorbachev's policy of *glasnost* could specific estimates be published. In this respect, the most interesting are the estimates for Soviet industry and its sectors, including MBMW, by Val'tukh and Lavrovskiy and for the Soviet economy as a whole by Selyunin and Khanin.[23] Their results drastically contradict the official Soviet growth figures. For example, Selyunin and Khanin assert that from 1928 to 1985 Soviet national income rose six to seven times, instead of 90 times as officially claimed.[24]

Such polar differences in estimates are a result of problems in both the official methodology and the methodology applied by its critics. Along with specific shortcomings, the methods of the critics have something in common: their failure to consider change of product quality. This sends the important message that the critics do not believe that quality change is indicative of the Soviet economy. If Soviet machines become bigger, or heavier, or more powerful, they probably do not view this as an improvement, since in many instances the consumer does not need all of

these changes. Yet, even accepting the motives of the critics, we have to realize that the quality standards are imposed on the Soviet producer by certification committees, Goskomtsen and Gosstandart, to name a few, not the consumer. If, under these conditions, the producer is required to manufacture a more powerful machine, a consequent price increase, with all of the usual reservations, may be justified.

Even though the Selyunin-Khanin indices do not close the chapter in estimating Soviet economic growth, they have a great advantage of consistency. For industry, for example, six methods are used and the resultant indices are compared and averaged. Taking into account the problem of quality change, these estimates should be viewed as a lower bound for real Soviet growth rates, with the official indices making a logical upper bound. One can wonder what would be the level of significance for such an interval.

The chief questions with respect to the official Soviet methodology are: Why does it encourage concealed inflation and what could be done to cure the problem? When the Soviets build their growth indices, their linking procedures work so that any price increases for newly introduced goods would be ignored, and only price changes for goods that have already been in the market basket would be counted. This is done because price and quality comparisons are performed in the process of price setting, and, theoretically, there should not be unjustified price increases. In reality, however, many well-known factors impede the process of quality improvements, but prices, especially for producer goods, grow. From the methodological standpoint, it does not even matter whether the producer does or does not raise prices. What matters is the pressure on the producer to do anything to justify price increases. For this reason, there is little hope that any changes in statistical methodology could reduce the effects of hidden inflation before major revisions in Soviet pricing policies and in the general economic mechanism are undertaken.

In the meantime, there is much room for partial improvements in the Soviet statistics. Among those could be the establishment of a single base year in measuring growth and price indices. Not only do the base years periodically change, but it is always one year for industry, another for agriculture, a third one for construction, and a fourth for the balance of the national economy that usually coincides with the one for agriculture. Altering the procedure for estimating the base-year comparable prices for goods introduced afterward might also be helpful. While it is difficult to foresee a consistent implementation of such a measure, at least the prices set for new goods should not be traced back to the base year automatically.

Some organizational and substantive changes have already been going on along the lines of *perestroyka* of Soviet statistics. For example, new economic and social statistics are to be introduced. Yet an even greater problem in this respect is the accessibility of the existing statistics. It is the Soviets' obsession with secrecy that makes the data unavailable even to their own scholars, much less to the general population or foreigners. The resultant omissions, cryptic style, or the lack of comments on methodological changes frequently puzzle Western analysts. The controversy over the growth of Soviet retail trade turnover and some other aggregate statistics is a good example. Analyzing some of the factors responsible, I have excluded deliberate distortions on the part of Soviet statisticians. In the Khrushchev period, Soviet statistics were made much more open. Will that happen in Gorbachev's period? I believe that only the success of his economic programs may pave the way to *glasnost* in Soviet statistics. It should be easier to reveal the truth when there is good news.

Notes

1. Vasiliy Selyunin and Grigoriy Khanin, "Lukavaya tsifra," *Novyy mir* 2 (1987), pp. 181-201. See also: A. Popkova, "Gde pyshnyye pirogi?" *Novyy mir* 5 (1987), pp. 239-41; and Nikolay Shmelev, "Avansy i dolgi," *Novyy mir* 6 (1987), pp. 142-58.

2. Selyunin and Khanin, op. cit., p. 192.

3. Grigoriy Khanin, "Al'ternativnyye otsenki rezul'tatov khozyaystvennoy deyatel'nosti proizvodstvennykh yacheyek promyshlennosti," *Izvestiya AN SSSR, seriya ekonomicheskaya* 6 (1981), pp. 62-73; Grigoriy Khanin, "Puti sovershenstvovaniya informatsionnogo obespecheniya svodnykh planovykh narodnokhozyaystvennykh raschetov," *Izvestiya AN SSSR, seriya ekonomicheskaya* 3 (1984), pp. 58-67.

4. V. Adamov, "Chto stoit za indeksami," *Ekonomicheskaya gazeta* 29 (1987), p. 14 and Selyunin and Khanin, op. cit., p. 193.

5. Khanin (1981), pp. 62-73.

6. *Narkhoz SSSR 1985*, pp. 99 and 127.

7. Khanin (1981), p. 67.

8. US Bureau of the Census, *Statistical Abstract of the United States* (Washington, D.C., 1986), p. 723.

9. K. K. Val'tukh and B. L. Lavrovskiy, "Proizvodstvennyy potentsial strany," *Ekonomika i organizatsiya promyshlennogo proizvodstva* 2m (1986L), pp. 24 and 29.

10. Selyunin and Khanin, op. cit., p. 187.

11. V. K. Fal'tsman, *Proizvodstvennyy potensial SSSR: voprosy prognozirovaniya* (Moscow: Ekonomika, 1987), p. 72.

12. Fyodor I. Kushnirsky, *Estimation of Real Growth and Productivity in the Soviet Machine-Building and Metalworking Sector: The Effects on Economic and Military Capabilities* (Falls Church, VA: Delphic Associates, 1986), p. 186; *Narkhoz SSSR 1970*, pp. 205-06 and *Narkhoz SSSR 1975*, pp. 255-56.

13. Fal'tsman, op. cit., p. 72.

14. Fyodor I. Kushnirsky, "Growth and Productivity in the Soviet MBMW Sector" (in progress).

15. Fyodor I. Kushnirsky, "Methodological Aspects In Building Soviet Price Indices," *Soviet Studies* 4 (1985), pp. 505-19.

16. Adamov, op. cit., p. 14.

17. *Narkhoz SSSR 1985*, pp. 98 and 140.

18. Mikhail Korolev, "Zadachi perestroyki statistiki," *Vestnik statistiki* 4 (1987), pp. 3-12.

19. "Uluchshat' delo statistiki," (Excerpts from the Meeting of the Collegium of TsSU) *Vestnik statistiki* 5 (1987), p. 45.

20. Ibid, pp. 36-37.

21. Jan Vanous, *The Dark Side of Glasnost': Unbelievable National Income Statistics in the Gorbachev Era*, PlanEcon Report 6, 1987, p. 1.

22. Nikolay Belov, "Povyshat' uroven' analiticheskoy raboty," *Vestnik statistiki* 11 (1986), pp. 3-7.

23. Val'tukh and Lavrovskiy, op. cit., pp. 17-32; Selyunin and Khanin, op. cit., pp. 181-201.

24. Selyunin and Khanin, op. cit., p. 192.

Changes in the Availability of Economic Data Under Gorbachev

Introduction

On balance, the Gorbachev regime has had a positive impact on the availability of Soviet statistics. The Soviet Government is publishing more statistics than were released in the late 1970s and early 1980s, re-releasing some data series that had been withdrawn previously from publication, and providing some new information for the first time. Moscow also has begun marketing statistical data, both at home and abroad, and is developing new data series for the use of planners and managers.

At the same time, however, much less economic information is released in the USSR than in Western countries and much of the available Soviet data are poorly documented and methodologically flawed. For example, some of the published data on national income appear inconsistent. In addition, information on defense-related matters continues to be almost nonexistent.

This paper focuses first on past changes in the content of the Soviet statistical yearbook (*Narkhoz*). Changes in the most recent handbook, *Narkhoz SSSR za 70 let* (hereafter referred to as *Narkhoz 1986*), are then briefly analyzed, followed by a discussion of new data available this year. The paper then speculates about possible future changes in data availability.

The Soviet Statistical Handbook—A History of Change

Narkhoz is the single most important source of economic data openly published by the Soviet Government. It is published annually by the State Committee on Statistics, Goskomstat.[1] The availability of data in this publication during the Gorbachev period can be examined by comparing the current edition of the statistical handbook with those published in previous years.

According to a recent study of the informational content of the *Narkhoz* from 1970 to 1985, the availability of Soviet economic statistics has varied markedly over time. Although the first volumes published in the 1950s were small,[2] the initiation of the *Narkhoz* series signified a change in the policy of extreme economic secrecy that characterized most of the Stalin era. That thaw continued into the late 1950s when the size of the handbook reached a peak.[3] Volume size in the early 1960s declined somewhat, indicating a mild reversal of Khrushchev's policy toward openness.

Larger volumes appeared again in the mid-1960s at the beginning of the Brezhnev era—a trend which persisted until the early 1970s. During this period the volumes were all of similar size—from a low of 752 pages in 1970 to a high of 821 in 1971. The largest volume of the Brezhnev era was the 908-page 1967 *Narkhoz*, although the inclusion of the 1966 input-output table in that volume exaggerated its appearance.

During the later years of the Brezhnev era an atmosphere of secrecy returned. Indeed, a precipitous and protracted decline in the size of the handbook began in the mid-1970s. The coverage of many tables was reduced, and entire tables were deleted. In addition, the sections that contained explanations of the methodologies employed to derive the statistical data were dropped.

[1] Other Soviet sources of economic data include an abbreviated statistical handbook, *SSSR v tsifrakh*, published each spring; a foreign trade handbook; statistical compendia for each of the 15 republics; and a CEMA handbook titled *Statisticheskiy yezhegodnik stran-chlenov soveta ekonomicheskoy vzaimopomoshchi*. Economic data also appear in newspapers such as *Ekonomicheskaya gazeta* and economic journals such as *Vestnik statistiki*.

[2] The 1955 yearbook—published in 1956—had only 246 pages of statistical material.

[3] The 1958 volume had 924 pages.

Changes in the contents of the *Narkhoz* on a sector-by-sector basis over the past 15 years have varied. While the majority of losses occurred during the mid-70s, the coverage of specific sectors was changed at different times. Some of the categories affected and the volumes from which important information was removed follow:

Category	*Narkhoz* Volumes
Transportation	1971
Population	1973, 1974, 1977, 1978
Science	1974
Foreign trade	1975
Labor	1976
Capital	1981
Grain	1981, 1982
Trucks	1982
Buses	1984
Rail equipment	1984
Alcohol	1984

At the same time, some new data—on computer education, production of industrial robots, and machining-center production—were added during this period. Other data series were added as new topics of concern to the Soviet Government arose, such as information on labor brigades and on self-financing enterprises.

The primary reason for the data reduction policies in the late 1970s seems to have been the worsening performance of the Soviet economy. Another apparent factor has been the utilization of these statistics in Western studies of the Soviet economy. Following the publication of the CIA's negative appraisal of Soviet oil prospects in April 1977,[4] for example, *Narkhoz 1976*, the next statistical yearbook to appear, had a large portion of energy data removed (on regional production of oil, gas, coke, and coal, plus information on fixed capital in the energy sectors).

Data Availability Under Gorbachev

Greater statistical openness seems to be occurring under Gorbachev. A major turning point in the availability of statistics occurred with the publication of the 1985 *Narkhoz* (published in 1986). Statistics on grain production, infant mortality, life expectancy, and alcohol sales and consumption were all returned to *Narkhoz 1985*; trade volume data reappeared in *Narkhoz 1986*. Other statistics have appeared for the first time—such as mechanization of labor by sector, production of precision machine tools, and automobile ownership by union republic.

The reappearance of such important information as grain production and infant mortality statistics is significant. The decision to publish these data probably was made at the highest levels of the party and government. There are several possible reasons for statistical openness:

- An initial period of openness has generally characterized leadership changes in the Soviet era.
- The Kremlin is using the release of statistics to help gain public support for the removal of political adversaries by showing the failings of previous regimes.
- The release of some uncomplimentary statistics is being used to educate the Soviet public about the severity of social problems, to dispel public apathy, and to justify the kind of "radical" reform the regime is trying to implement.
- The release of more statistics may be a precursor to seeking entrance into Western economic organizations (e.g., the IMF or GATT).
- An appearance of more openness is being used to influence Western public opinion and policies toward the Soviet Union.
- Many of the statistics being re-released are from sectors of the economy that have experienced some improvement in performance, thereby placing the regime in a favorable light.

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A Look at *Narkhoz 1986*

Compared to *Narkhoz 1985*, the 1986 handbook contains 83 more pages of data, 106 more tables, and a 21-page methodological appendix—the first such appendix published since *Narkhoz 1978*. In addition, many tables in *Narkhoz 1986* have been streamlined and combined, but with little loss of important data.

The 1986 *Narkhoz*—like many before it—has undergone extensive reorganization and restructuring. Some of the major changes include:

- The foreign relations section has been doubled in size and divided into subsections on "foreign trade," "CEMA cooperation," and "economic assistance."

- A major new section has been created titled "Social Development and Raising the Living Standards of the People." This section combines material in the following sections of *Narkhoz 1985*—"Area and Population," "Growth of the Well-Being of the People," "Labor," "Trade," "Services," "Education," "Culture," and "Health."

- Much of the material in the old "Area and Population" section is combined with some old "Labor" section material in a new subsection, "Population and Labor Resources."

- A new subsection, "Wages and Incomes of the Population," combines data from "Labor" and "Growth of the Well-Being of the People" in *Narkhoz 1985*.

- A new subsection, "Supplies of Goods and Services," combines data from *Narkhoz 1985* sections on "Trade," "Services," and "Growth in the Well-Being of the People."

- Data on National Income have been split. Data on National Income Produced (NIP) are in the section "Development of Material Production." Data on National Income Used (NIU) are in a subsection of "Social Development and Raising the Living Standards of the People" called "Use of National Income."

- A table comparing the Soviet and US economies has been moved from the section titled "International Comparisons" to the first section, called "Basic Indicators of the Economic and Social Development of the USSR During 70 Years of Soviet Power."

The reorganization is clearly related to Gorbachev's restructuring policies. Some of the changes in *Narkhoz 1986*, for example, are called for under the guidelines for "radical improvement of statistical work" included in the decrees on reforming the management of the Soviet economy adopted in July 1987. One of the tasks laid down in that document is for Goskomstat to improve the quality of statistical information used for social planning and everyday management of the economy. Other goals which seem to be reflected at least partially in the reorganization and expansion of data in *Narkhoz 1986* include information on reserves for increasing output, measures of the use of productive potential, measures of savings of labor and material resources, and indicators of the efficiency of production and the use of science and technology in the economy.

Trade Data. Trade data in physical units missing since *Narkhoz 1975* have reappeared (*Narkhoz 1986*, p. 641). Also restored is a table missing since *Narkhoz 1974* showing the share of imports in total Soviet consumption of 29 products (p. 644). A new table has been added giving the share of exports in total Soviet production for 31 products (p. 642).

Plan Information. A considerable amount of new detail on plan goals for 1987 is given in summary tables of basic indicators (*Narkhoz 1986*, pp. 5, 7, 8). Tables on the production of individual industrial goods and transport services also include plan data—roughly 430 products and eight transport services (pp. 125, 132, 161-195, 340). This is more data than was provided in the last anniversary *Narkhoz*, for 1976, which included substantial amounts of data on the 1977 plan.

Investment Data. A new table has been added which gives capital investment in the "social-cultural" complex—as distinct from nonproductive investment. Also included is a definition for this complex—housing, the communal economy, health, education, culture, art, trade and public catering, urban passenger transport, and everyday services for the population (*Narkhoz 1986*, p. 330).

Another new table gives the structure of "productive" state capital investment by industrial complex (p. 105). In addition, it is now possible to back out a number for investment in nonferrous metals using old groupings of investment data for sectors of industry given in *Narkhoz 1985* and new groupings given in *Narkhoz 1986*—roughly 2.6 billion rubles in 1984 prices (*Narkhoz 1985*, p. 368; *Narkhoz 1986*, p. 330).

Collective Farm Markets. *Narkhoz 1986* includes several new tables with information on collective farm markets (CFMs)—the number of such markets, their amenities, the volume of their sales by product, indexes of prices by product, and average CFM prices relative to state retail prices. The material confirms that, despite moves to improve CFM facilities, CFMs are still little more than allotted space, often in open areas (*Narkhoz 1986*, pp. 484, 485).

Regional Data. A considerable amount of new data is provided on regions of the USSR. Of particular interest are demographic data by union republic. New tables of regional data include the following: distribution of urban centers by number of inhabitants (*Narkhoz 1986*, p. 376); population figures for the economic regions of the USSR (p. 377); growth of industrial GVO (gross value of output) by union republic and economic region (p. 135); and life expectancy and infant mortality by union republic (pp. 408, 409). They also include: average money wages of workers and employees by union republic (p. 434); average wage of kolkhozniks by union republic (p. 435); growth of real per-capita incomes by union republic (p. 442); sales to the population of construction materials by union republic (p. 475); the number of CFMs by union republic (p. 484); the number of state and cooperative bookstores, drug stores, and stores selling construction materials per 100,000 people by union republic (pp. 490, 491); the number of self-service stores by union republic (p. 492); and the volume of paid services per inhabitant in 1986 by union republic (p. 499).

Industrial Statistics. New information is included in *Narkhoz 1986* on overall production, the pace of modernization, and the use of labor and capital in industry. Some new material is available as well on the production of consumer goods. The following new tables are included: transition to two- and three- shift work schedules (p. 137); shift-work coefficients for industrial sectors (p. 138); the average use of calendar time of industrial workers (p. 140); loss of work time and turnover of workers in industry (p. 140); machinery commissionings by industrial sector (p. 148); and retirements of productive fixed industrial capital by industrial sector (p. 149). Also wear and tear of industrial productive fixed capital by sector of industry (p. 152); capital repair by industrial sector (p. 153); return on capital by industrial sector in different periods (p. 155); use of productive capacity of industrial enterprises by output of various types of production (p. 156); and the use and assimilation of projects commissioned in 1981-85 (p. 157).

Labor Statistics. A variety of new information appears in the labor statistics section:

- Three new tables on worker participation in government have been added (*Narkhoz 1986*, pp. 382, 385).
- Time and motion study data have been added for cities and farms on running a household (pp. 427-429).
- Two tables are included comparing sources and uses of family income for workers in the oil and textile industries and for peasants of four oblasts (pp. 446-447). A line item has been added to the tables on family budgets which gives family expenditures on alcohol (pp. 443-445). Information on average salaries of workers of leading professions by sector of the economy is also new (p. 432).

- Tables on the number of places in homes for the elderly and the average size of pensions have been added (p. 439).

- Tables on the educational level and age structure of managers and specialists are new (p. 421).

- New information is provided on deaths of the working age population by reason of death, fertility by age group, deaths by age group, average life expectancy by age group, and reasons for loss of work time because of illness (pp. 405, 408, 595).

Deletion of Data

Meanwhile, some important data series have been deleted from the 1986 handbook. Data are no longer given for NIU and its components—consumption and accumulation—in comparable 1973 prices. Without these comparable price data, it is impossible to compare real and current price growth of the components of NIU in 1986. Also missing are production data on trolleybuses, one of the few remaining statistics on production of transport equipment. Nor does *Narkhoz 1986* give an overall value for production of the collection of consumer goods referred to as *tovary*—durable consumer goods and housewares (*Narkhoz 1985*, p. 171). Some investment data are missing as well. Statistics on investment by branch of industry have been deleted.

Revision of Data

Some statistical series have been revised. Coal production in standard fuel units was reduced by roughly 10 percent for 1985 and 1986, but production numbers for coal in tons for those years are unchanged, the implication being that the quality of coal is deteriorating. Data on cotton production have been revised downward, confirming press reports that these statistics were overstated during 1976-84. Soviet investment as a share of US investment in 1985 has been revised downward from 100 percent in *Narkhoz 1985* to 90 percent in *Narkhoz 1986*. Ratios of the production of 25 products in CEMA countries relative to the EEC have been reduced an average of 10 percent.

It is also worth noting that the price base of the table on the "balance of fixed capital" has been changed from "comparable 1973 prices" to unspecified "comparable prices." The capital stock data given for the beginning of 1986 match well with data in *Narkhoz 1985* (p. 51) for end of year 1985—specified as being in 1973 prices. However, the value of commissionings is 33 percent above its 1985 level. According to this same table, retirements also are more than double their reported level in 1985. Elsewhere in *Narkhoz 1986*, on page 104, data show that the coefficient of retirement of productive fixed capital only increased from 1.9 in 1985 to 2.1 percent in 1986. The inconsistencies of these trends suggest that the data on commissionings and retirements may be in a different price base than last year—presumably a price base different from that used to value total fixed capital.

A footnote has been appended to the table of NIP in current prices (*Narkhoz 1986*, p. 122). According to this footnote, in 1986 net output of industry is calculated excluding subsidies. This exclusion makes the figure for 1986 lower than the figure for 1985. This implies that corresponding values before 1986 are overstated and raises questions about how subsidies are handled in the other economic sectors.

Finally, growth of total retail trade has been revised downward from 6.4 percent in *Tsifrakh 1986* to 6.3 percent in *Narkhoz 1986*. There is still a disconnect between movements in retail prices reported in official price indexes and the implicit price indexes calculated by comparing growth of retail trade and its components in current and comparable prices. Growth in current and comparable prices move in different directions for all these aggregates, and—for sales of food and beverages and for alcohol—explicit and implicit price indexes move in opposite directions. The deflation implied by comparing current and comparable price growth for retail trade is also implied by comparison of data for NIU and NIP in current and comparable prices. (See tables 1 to 4.)

Table 1
Growth in Indicators of Retail Sales of Alcohol

Average annual growth in percent

	Sales Comparable Prices	Sales Quantities (dekaliters)	Price Index
1981-84	−0.3	0.7	4.7
1985	−14.5	−8.9	5.6
1986	−37.8	−34.7	24.4

Sources: *Narkhoz 1985*, pp. 459, 471, 478; *Narkhoz 1986*, pp. 451, 468, 480.

Table 2
Implicit Price Changes in Retail Trade

Percent

	Total Trade	Food and Beverages	Nonfood Goods
1981	1.5	2.2	1.0
1982	3.4	4.2	3.0
1983	0.6	0.9	0.5
1984	−1.0	−0.3	−1.9
1985	−1.1	−2.1	−0.9
1986	−3.5	−5.7	−0.9
1987	1.6	NA	NA

Sources: *Narkhoz 1983*, p. 462; *Narkhoz 1985*, pp. 458, 469; *Narkhoz 1986*, pp. 462, 464-465; *Pravda*, 18 October 1987 and 24 January 1988.

Table 3
Changes in Official Price Indexes for Retail Trade

Percent

	Total Trade	Food and Beverages	Nonfood Goods
1981	1.0	1.9	1.0
1982	3.8	3.8	2.9
1983	0.0	0.9	0.0
1984	−0.9	0.0	−1.9
1985	0.9	1.8	−1.0
1986	1.9	5.4	0.0
1987	NA	NA	NA

Sources: *Narkhoz 1984*, p. 494; *Narkhoz 1985*, p. 480; *Narkhoz 1986*, p. 482.

Other Sources for New Data

In addition to the new types of information contained in the latest statistical handbook, some new data have begun to appear in several other sources. The first of these are press releases. As of 11 September 1987, 280 such releases had been made.

The releases, distributed daily, range in size from one to 15 pages and are intended for use by newspapers, journals, radio, and TV. Some of the information is unavailable elsewhere, but much of it is advance release of information usually made available in statistical handbooks or in reports on fulfillment of the state plans. Some of the data also eventually appear in such journals as *Vestnik statistiki* and *Ekonomicheskaya gazeta*.[5]

Examples of the kinds of new statistics that have been reported in these releases include:

- The value of machinery meeting what the Soviets define as "world" standards, which reportedly fell from 18 percent in 1976-80 to 15 percent in 1981-85 and to 14 percent in 1986.
- Stocks of uninstalled equipment at construction sites of civilian machine-building ministries. This table provides data on both the total and above-norm stocks of uninstalled equipment at the beginning of 1986 and 1987.
- Expenditures for the introduction of new equipment in machine building.
- Plan fulfillment data on production costs and profits for each of the 11 civil machine-building ministries and the machine-building complex.

[5] A list of the releases received so far is contained in appendix B.

Table 4
Comparison of Growth in Major Aggregate Economic Indicators

Percent

	NIP			NIU			Retail Trade		
	Current Prices	Comparable Prices	Implicit Price Deflators	Current Prices	Comparable Prices	Implicit Price Deflators	Current Prices	Comparable Prices	Implicit Price Deflators
1981	5.3	3.1	2.1	5.2	3.2	1.9	5.7	4.1	1.5
1982	7.6	4.2	3.3	7.3	3.8	3.4	3.4	0.0	3.4
1983	4.7	4.0	0.7	4.6	3.6	1.0	3.4	2.8	0.6
1984	4.0	3.3	1.2	4.2	2.3	1.9	3.4	4.4	−1.0
1985	1.4	3.2	−1.7	1.7	2.3	−0.7	2.6	3.7	−1.1
1986	1.5	4.1	−2.5	1.3	3.3	−1.9	2.4	6.1	−3.5
1987	2.1	2.3	−0.2	1.7	NA	NA	2.8	1.2	1.6

Sources: *Narkhoz 1980*, p. 429; *Narkhoz 1983*, pp. 37-38, 40, 462; *Narkhoz 1985*, pp. 39, 458; *Narkhoz 1986*, pp. 122, 123, 430, 462, 464-465; *Tsifrakh 1985*, p. 192; *Tsifrakh 1987*, p. 195; *Pravda*, 18 October 1987 and 24 January 1988.

The data in these press releases demonstrate the ambiguities and inconsistencies that are pervasive in Soviet statistical data. For example, one press release (No. 269, p. 14) indicates that investment in the machine-building complex increased by 14 percent in 1986; a second release (No. 4) claims an increase of 17 percent.

Other sources of new information this year are the reports of monthly plan fulfillment published by Goskomstat. In addition to growth in output for individual industrial products, these reports indicate how output relates to planned performance for production of that product. Using this information in conjunction with data on annual plans for the production of individual products given in *Tsifrakh 1986*, it is possible to aggregate these production plans and look at their stability over time.

Prospects for the Release of More Data

Plans recently released by Goskomstat call for the publication of additional statistics on the economy. According to Nikolay Belov, first deputy chairman of Goskomstat, the purpose of releasing more data is to increase the effectiveness of economic research in the USSR. To facilitate the release of more information, a Goskomstat press center—the Information Publication Center—has been created. This center is to become the organizational focal point of all "information propaganda activity" in the area of statistics. Center director Leonid Umanskiy outlined publication plans for 1988 in an article in the October 1987 issue of *Vestnik statistiki*: [6]

- Goskomstat plans to give wide circulation to statistical collections. In 1988 Goskomstat will publish—in addition to the statistical yearbook *Narkhoz 1987*—10 sectoral and thematic statistical handbooks (collections).[7]

- In addition to daily press releases, a press bulletin will be published three times a month containing economic results and data worked up by the statistical agency—i.e., summary measures and aggregations.

[6] See "Improving Work on Statistics" in *Vestnik statistiki*, No. 10, 1987, p. 38.

[7] According to Belov, the following are among the statistical collections planned: Agriculture USSR, Capital Construction USSR, Labor in the USSR, Consumer Goods, and Population USSR.

- Along with statistics on the fulfillment of state plans at the quarter, half year, nine months, and yearend, data on fulfillment of the 12th Five-Year Plan will be published.

- Short statistical collections with commentary on important questions that interest the public and information gained from special social/economic surveys on the most important problems of the development of the USSR will also be released.

- Finally, separate materials on important one-time work—selective investigations carried out by statistical organs—will be made available.

There also are indications that Moscow may be intending to release more defense-related data. In a speech to the UN Conference on Disarmament and Development in August 1987, Soviet Deputy Foreign Minister Vladimir Petrovskiy disclosed the composition of the official Soviet defense budget.[8] Petrovskiy hinted that the USSR might be more forthcoming with information on defense spending than in the past, stating that it would be possible to "compare overall military spending realistically" once the Soviets have implemented a price reform. If released, such data probably would be disclosed to the UN and be tied to revived Soviet proposals for international agreements to freeze or reduce military expenditures. A UN experts group established to study the feasibility of the limitation of military expenditures has designed a standard format for the reporting of military spending.

In an article in the No. 36 issue of *Moscow News*, the author reported that the USSR had tabled a plan at a UN Conference to transfer resources spent on preparations for war to Third World development. According to the author, the USSR is "prepared to publish, for the sake of strengthening mutual confidence, not only the defense budget figures directly connected with expenditures by the USSR Defense Ministry but also those that are connected with the financing of research and development work and with the purchase of arms and military hardware."

In an article in *Pravda* on 17 September 1987, Gorbachev himself stated that "within the next two to three years we will be able to compare the figures that are of interest to us and our partners and which would symmetrically reflect the expenditures of the sides."

Recent statements on this subject also were made by Georgiy Arbatov, director of the USA and Canada Institute of the USSR Academy of Sciences, and Marshal Sergey F. Akhromeyev, chief of the Soviet General Staff. In an interview in the Japanese publication *Yomiuri Shimbun*, Arbatov said that "the Soviet Union will make the components of its defense outlays clear and in a couple of years bring them to a level where they can be compared with the United States. The cost for assembling tanks and the prices of metals or energy are cheaper in the Soviet Union and, therefore, this entails complicated work to make them comparable. But this is necessary—not only to the work, but also to the Soviet Union."

Marshal Akhromeyev also touched on the subject in an interview in the 30 October 1987 issue of the *New York Times*. In response to a written question, he stated that the Kremlin will make its first public accounting of its military budget in two to three years. He also reaffirmed that the budget figure for military spending—20.2 billion current rubles in 1987—reflects only personnel, pensions, training, and logistics and does not include money for development and acquisition of weapons.

[8] Petrovskiy announced that the defense budget includes Ministry of Defense expenses for maintaining military personnel, military pensions, logistics, military construction, and "a number of other articles." According to Petrovskiy, military research and development and weapons procurement are included in other parts of the USSR state budget.

Appendix A

Data Publication: How Decisions Are Made

Although the workings of Goskomstat are generally surrounded by secrecy, some information is available on how decisions are made concerning the publication of economic statistics. In some cases, information disappears from multiple sources simultaneously, as it did in 1977-78. This is probably the result of an addendum to the *perechen'*, a register of material restricted from publication. This list is updated regularly by Goskomstat based on decisions made at very high levels. In less sensitive cases, data not listed on the *perechen'* are dropped from the *Narkhoz*. The difference is that these data remain available in other sources.

Although changes in the *perechen'* explain some of the broader decisions to remove data from *Narkhoz* and all other statistical handbooks at once, many changes in the *Narkhoz* have been small and limited to specific sections. Many of the sections are monitored by different departments within Goskomstat and each sector and subsector seems to have had its own unique history. This suggests that a lot of lower level decisionmaking within Goskomstat has also affected the composition of the handbook. These departments and regional Goskomstats apparently have considerable leeway in interpreting what information is "detrimental to the state" if it is not specifically proscribed in the *perechen'*.

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Appendix B

Goskomstat Press Releases, January-September 1987

No. 4, 21 January, eight pages, *Capital Construction*

Tables

1. Fulfillment of the Plan for Commissioning of Fixed Capital and Use of the Limit of State Capital Investment by Various Complexes in 1986—percent.

2. 1986 Commissionings of Projects To Be Turned Over According to the Nomenclature of the State Plan by Ordering Ministries—units.

3. Fulfillment of an Established Volume of Contract Work on the Most Important Construction Projects of the Economic Complexes in 1986—percent.

4. Fulfillment of the Established Volume of Contract Work and Tasks for Growth of Labor Productivity in 1986—percent.

5. Fulfillment of the Plan for Capital Construction for the Agroindustrial Complex Using State Funds in 1986—rubles, percent.

6. Commissionings of the Most Important Productive Capacities for the Agroindustrial Complex in 1986—units, percent.

7. Measures for Environmental Protection and Rational Use of Natural Resources—rubles, percent, 1986.

No. 11, 4 February, four pages, *For 70 Years of Soviet Power*

Table

1. Various Indicators About Growth of the Material Well-Being and Cultural Level of the People, 1913-1986 (includes 2 pages of text).

No. 27, 19 February, one page, *Changes in the Administrative-Territorial Structure of the Units*—1923, 1947, 1957, 1977, 1987.

No. 30, 24 February, one page, *Production of Goods for Children and Youth*—units, 1985, 1986.

No. 32, 24 February, one page, *Deliveries to Trade of Wood and Construction Materials in January 1987*—units.

No. 34, 24 February, one page, *Stocks of Uninstalled Equipment in Warehouses for Capital Construction of Individual Ministries*—rubles, 1985, 1986.

No. 35, 4 March, 13 pages, *Statistical Materials for Discussion of the Draft Law of the USSR on State Enterprises*

Tables

1. Productive and Scientific-Productive Associations, Combines, and Enterprises on Independent Balances by Individual Sectors of Industry in 1985—units.

2. Productive and Scientific-Productive Associations in Industry—units, 1970, 1975, 1980, 1985, 1986.

3. Scientific-Productive Associations in Industry—units, 1973, 1975, 1980, 1985, 1986.

4. Industry GVO (enterprise wholesale prices of the corresponding year)—rubles, 1970, 1975, 1980, 1985, 1986.

5. Annual Average Number of Industrial-Production Personnel—units.

6. Productive Fixed Capital in Industry (comparable 1973 prices, at yearend)—rubles, 1970, 1975, 1980, 1985, 1986 estimate.

7. Number of Enterprises and Organization of the APK at Yearend 1986—units.

8. Basic Indicators of Kolkhozes (less fishing cooperatives)—unit and ruble measures, 1970, 1975, 1980, 1985, 1986.

9. Average Size of Kolkhozes (less fishing cooperatives, per farm)—unit and ruble measures, 1970, 1975, 1980, 1985, 1986.

10. Basic Indicators of Sovkhozes—unit and ruble measures, 1970, 1975, 1980, 1986.

11. Average Size of Sovkhozes (per farm)—unit and ruble measures, 1970, 1975, 1980, 1985, 1986.

12. Industrial Enterprises of the APK in 1985—units, rubles.

13. Enterprises of the Food Industry—units, rubles, 1970, 1975, 1980, 1985.

14. Enterprises of Retail Trade and Public Catering by State and Cooperative Organizations and of Everyday Services for the People—units, rubles, 1970, 1975, 1980, 1985.

15. Number of Scientific Establishments (at yearend)—units, 1970, 1975, 1980, 1985.

No. 36, 4 February, two pages, *Women in the National Economy*

Tables

1. Women in the Economy by Sector—units, 1922, 1940, 1960, 1980, 1986.

2. Number of Women Specialists With Higher and Secondary Specialized Education Working in the National Economy—units, 1941, 1960, 1980, 1986.

3. Number of Women Workers and Employees by Union Republic—units, 1922, 1940, 1960, 1980, 1986.

No. 38, 4 March, one page, *About Collective Fruit and Vegetable Gardens (according to data of a survey of 5,000 families of workers and employees, living in urban areas in 1986)*

Tables

1. Distribution of Families of Urban Workers and Employees Having Fruit or Vegetable Plots According to the Size of Their Plots—percent.

2. Output and Disposition of Farm Products From Fruit and Vegetable Plots—units, percent.

No. 42, 10 March, three pages, *Basic Indicators of the Work of Urban Electrical Transport in 1986*

Tables

1. Tramways—units.

2. Trolleys—units.

3. Subways—units.

No. 48, 18 March, two pages, *About Production of Sporting and Tourism Goods*—units, percent, 1986.

No. 53, 24 March, two pages, *Statistical Materials for Geology Day*

Tables

1. Volume of Geological Exploratory Work (at the expense of state budget funds and capital investment in comparable 1985 prices)—rubles, 1980, 1985, 1986.

2. Deep Exploratory Drilling for Oil and Gas—units, 1980, 1985, 1986.

3. Basic Technical-Economic Indicators for the Ministry of Geology SSSR for January-February 1987—rubles, percent.

No. 54, 24 March, one page, *Statistical Materials For Discussion of the Draft Law on State Enterprises (Association)*—text.

Table

1. Number of Workers and Employees by Enterprises and Organizations of Ministries and Departments, Working in Conditions of Full *Khozraschet* and Self-Financing in 1987—units, percent.

No. 55, 24 March, one page, *About the Rhythm of Construction*—text.

No. 58, 24 March, one page, *Results of Verification of the Quality of Goods at Enterprises of the Ministry of Light Industry of the USSR by Wholesale Organizations or the Ministries of Trade of the Union Republics*—units, percent, 1985, 1986.

No. 62, 27 March, two pages, *Forestry in the USSR in 1986*

Tables

1. Forests, 1 January—1978, 1983.

2. Forestry Work—units, 1980, 1985, 1986.

No. 66, 27 March, three pages, *Results of the Development of the Economy of Individual Socialist Countries in 1986*—percent.

No. 75, 10 April, one page, *Production of Cotton in the USSR and Several Foreign Countries*—units, per capita.

No. 79, 15 April, one page, *Number of Foreigners Studying in Higher and Secondary Specialized Educational Institutions in the USSR*

Tables

1. Number of Foreigners Studying in Higher and Secondary Specialized Educational Insitutions in the USSR—units, 1975, 1980, 1985, 1986.

2. Study of Foreign Language in Educational Institutions of the Country in 1986—units.

No. 88, 27 April, two pages, *Number of Days of Temporary Disability for Various Reasons (per 100 workers)*—1980, 1985, 1986.

No. 89, 27 April, 12 pages, *For 70 Years of Great October: Science and Technical Progress in the USSR*—text.

Tables

1. Number of Scientific Institutions—units, 1913, 1940, 1960, 1970, 1980, 1985, 1986.

2. Number of Scientific Workers—units, 1960, 1970, 1980, 1985, 1986.

3. Expenditures on Science From the State Budget and Other Sources—rubles, 1940, 1960, 1970, 1980, 1985, 1986 (plan).

4. Number of Discoveries, Registered in the State Register of Discoveries of the USSR—units, 1970, 1975, 1980-86.

5. Renewal of the Output of Machine Building—percent, 1970, 1975, 1980, 1985, 1986.

6. Creation of the First Models in the USSR of Machines, Equipment, Instruments, and Means of Automation—units, 1971-75, 1976-80, 1981-85, 1986.

7. Assimilation of New Types of Industrial Output—units, 1971-75, 1976-80, 1981-85, 1986.

8. Removal From Production of Obsolete Designs of Machinery, Equipment, Apparati, Instruments, Means of Automation, and Articles of Machinery—units, 1971-75, 1976-80, 1981-85, 1986.

9. Mechanization and Automation of Productive Processes in Industry—units, 1971, 1975, 1981, 1985.

10. Installation of Automated Systems of Management and Information—average annual units, 1971-75, 1976-80, 1981-85.

11. Expenditures for Introduction of Measures for New Technology in Industry and Their Economic Effect—rubles, 1971-75, 1976-80, 1981-85.

12. Inventions and Rationalization Proposals in the Economy—units, rubles, 1971-75, 1976-80, 1981-85, 1986.

13. Production of the Most Important Types of Progressive, Highly Effective Output of the Fuel-Energy and Metallurgy Complexes—units, 1980, 1985, 1986, 1987 (plan).

14. Production of the Most Important Types of Progressive Highly Effective Output of Machine Building—units, 1980, 1985, 1986, 1987 (plan).

15. The Most Important Types of Progressive, Highly Effective Output in the Chemical-Forest Complex and in the Construction Materials Industry—units, 1980, 1985, 1986, 1987 (plan).

No. 99, 7 May, eight pages, *Resource Savings*

Tables

1. Average Annual Growth of Labor or Productivity—percent, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

2. Growth of Output and Work Received on Account of an Increase in Labor Productivity—percent, 1971-75, 1976-80, 1981, 1985, 1986.

3. Correlation of Growth of Wages and Labor Productivity for Individual Sectors of the Economy—percent, 1981-85, 1986.

4. Number of Brigades and Number of Workers in Them in Individual Sectors of the Economy in 1985—units, percent.

5. Mechanization of Labor (correlation of number of workers occupied in mechanized and manual labor; according to data of a one-time inventory, in percent)—Industry, Agriculture, and Construction—1975, 1982, 1985.

6. Average Annual Growth of Produced National Income, Productive Fixed Capital, and Return on Capital—percent, 1971-75, 1976-80, 1981-85, 1986.

7. Lowering of the Prime Cost of Output in Industry and Construction—percent, 1971-75, 1976-80, 1981-85, 1986.

8. Average Annual Rate of Reduction of Material Expenditures—percent, 1971-75, 1976-80, 1981-85, 1986.

No. 100, 7 May, seven pages, *Introduction of Highly Productive Equipment, Expenditures for the Introduction of Measures for New Technology, and the Economic Effectiveness of Increasing the Technological Level of Production*

Tables

1. Introduction of Highly Productive Equipment in Industry—units, 1986, 1987-first quarter.

2. Expenditures for the Introduction of Measures for New Technology in Industry and Their Economic Effectiveness—units, rubles, 1981-85, 1985, 1986.

3. Expenditures for the Introduction of Measures for New Technology in the Fuel-Energy Complex and Their Economic Effectiveness—units, rubles, 1981-85, 1985, 1986.

4. Expenditures for the Introduction of Measures for New Technology in the Metallurgical Complex and Their Economic Effectiveness—units, rubles, 1981-85, 1985, 1986.

5. Expenditures for the Introduction of Measures for New Technology in the Machine-Building Complex and Their Economic Effectiveness—units, rubles, 1981-85, 1985, 1986.

6. Expenditures for the Introduction of Measures for New Technology in the Chemical-Forest Complex—units, rubles, 1981-85, 1985, 1986.

7. Expenditures for the Introduction of Measures for New Technology in the APK and Their Economic Effectiveness—units, rubles, 1981-85, 1985, 1986.

No. 106, 13 May, eight pages, *Housing and Social-Cultural Construction*

Tables

1. Commissionings of Housing (million square meters of total [useful] space)—1918-40, 1956-60, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

2. Commissionings of Housing in Rural Areas (million square meters of total [useful] area)—1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

3. Housing Construction on the Account of State Capital Investment—units, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

4. Commissionings of Housing Built by the Population and Housing-Construction Cooperatives (million square meters of total [useful] area)—1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

5. Number of Apartments Built and the Number of People Improving Their Living Conditions—units, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

6. Commissioning of Projects of Social-Cultural Significance—places, 1971-75, 1976-80, 1981-85, 1986.

7. Commissioning of Projects of Social-Cultural Significance in Rural Areas—places, 1971-75, 1976-80, 1981-85, 1986.

8. Commissionings of Hospital and Ambulatory-Polyclinic Establishments—beds, 1971-75, 1976-80, 1981-85, 1986.

No. 113, 14 May, two pages, *About Fulfillment of the Plan for Prime Cost of Output and the Financial Results of the Work of Industry in the First Quarter of 1987*

Table

1. Fulfillment of the Plan for Prime Cost and Profit in First Quarter 1987—percent, gives component ministries for each complex.

No. 118, 19 May, one page, *Deliveries to Trade of Wood and Construction Materials*—units, Jan-Feb 1987.

No. 120, 19 May, one page, *Sales and Prices of Farm Products on City Markets (according to 264 cities)*—units, rubles, percent, January-April 1987.

No. 130, 25 May, five pages, *About Preservation of the Natural Environment of Lake Baikal*

Tables

1. Disposal of Waste Water in the Basin of Lake Baikal—units, 1980, 1985, 1986.

2. Disposal of Insufficiently Cleaned Waste Water in the Basin of Baikal by Enterprises—units, 1985, 1986.

3. The Pace of Construction of Basic Water Preservation Projects in the Basin of Lake Baikal (on 1 January 1987) by Project—rubles, percent.

4. Characteristics of Air Preservation Activities in the Region of Lake Baikal—units, 1984, 1985, 1986.

No. 134, 28 May, one page, *Structure of Workers and Employees Diverted (Attracted) From Their Basic Jobs*—percent, 1985, 1986.

No. 135, 28 May, one page, *Use of Established Work Time by Individual Sectors of the Economy* (in average for one worker; days)—1985, 1986.

No. 137, 28 May, one page, *Changes in the Population of the Economic Regions of the RSFSR*—units, 1976, 1981.

No. 138, 28 May, one page, *Materials for International Protect the Children Day*

Tables

1. Preschool Establishments—units, places, students, 1980, 1985, 1986.

2. General Education Schools—units, students, 1980-81, 1985-86, 1986-87.

3. Schools With Extended Days—units, students, 1980-81, 1985-86, 1986-87.

4. School Libraries for Children—units, books, users, 1980-81, 1985-86, 1986-87.

5. Children's Library System, Ministry of Culture of the USSR—units, holdings, use, 1980, 1985, 1986.

6. Children's Out-of-School Establishments—units, users, 1980, 1985, 1986.

7. Study Groups in Children's Out-of-School Establishments—units, users, 1980, 1985, 1986.

8. Study Groups for Children in the Club Establishments of the Ministry of Culture of the USSR and Trade Union Organizations—units, users, 1980, 1985, 1986.

9. Study Groups in General Education Day Schools—units, users, 1980-81, 1984-85, 1985-86.

10. Movie Showings and Movie Establishments of Goskino and VTsSPS—units, users, 1980, 1985, 1986.

11. Children's Theaters—units, users, 1980, 1985, 1986.

12. Children and Youth Sports Schools—units, students, 1980, 1985, 1986.

13. Number of Children and Youth Attending Children's Health Resorts—users, 1980, 1985, 1986.

No. 139, 1 June, two pages, *Economic Cadres of the Country*

No. 140, 1 June, 15 pages, *For 70 Years of Great October—The Development of Industry*

Tables

1. Growth of Industry GVO for 1917-87—(1917=1), 1940, 1950, 1960, 1970, 1980, 1985, 1986, 1987 (plan).

2. Growth of Industry GVO for 1940-87—(1940=1), 1960, 1970, 1980, 1985, 1986, 1987 (plan).

3. Growth of Industry GVO by Sector for the Period 1940-86—(1940=1), 1960, 1970, 1980, 1985, 1986.

4. Growth of Labor Productivity by Sector of Industry for the Period 1940-85—(1940=1), 1960, 1970, 1980, 1985, 1986.

5. Increase of Industrial Output Due to the Growth of Labor Productivity by FYP—percent, 1971-75, 1976-80, 1981-85, 1986.

6. Basic Directives for Economic and Social Development 1986-90 and Until the Year 2000—text.

7. Production of the Most Important Types of Industrial Output in Physical Units—1917, 1940, 1945, 1950, 1965, 1970, 1975, 1980, 1985, 1986, 1987 (plan).

8. Growth of Industry GVO by Union Republic—(1940=1), 1960, 1970, 1980, 1985, 1986, 1987 (plan).

9. Brief Discussion of the Economies of Each Republic—text.

No. 146, 5 June, six pages, *Materials for Land Improvers' Day*

Tables

1. Presence and Use of Irrigation and Drainage of Agricultural Areas on Kolkhozes, Sovkhozes, Intersectoral, and Other Productive Agricultural Enterprises—units, 1970, 1980, 1985, 1986.

2. Area of Irrigated Land—units, 1970, 1980, 1985, 1986.

3. Use of Irrigated Areas—units, 1970, 1980, 1985, 1986.

4. Sowing Area of Agricultural Crops on Irrigated Land—units, 1970, 1980, 1985, 1986.

5. Gross Harvest and Yield of Agricultural Crops on Irrigated Land for Four Crops—units, 1971-75, 1976-80, 1981-85, 1986.

6. Area of Drained Land—units, 1970, 1980, 1985, 1986.

7. Use of Drained Agricultural Land on Kolkhozes, Sovkhozes, Interfarm and Other Productive Agricultural Enterprises—units, 1970, 1980, 1985, 1986.

8. Sowing Area of Agricultural Crops on Drained Land for Four Crops—units, 1970, 1980, 1985, 1986.

9. Gross Harvest and Yield of Agricultural Crops on Drained Land for Four Crops—units, 1971-75, 1976-80, 1981-85, 1986.

10. Gross Output of Crops on Irrigated and Drained Lands on Kolkhozes, Sovkhozes, Interfarm and Other Productive Agricultural Enterprises (comparable 1983 prices)—rubles, percent, 1970, 1971-75, 1976-80, 1981-85, 1986.

11. Amelioration Construction on Account of State Capital Investment and Kolkhoz Means—units, rubles, 1971-75, 1976-80, 1981-85, 1986.

No. 158, 17 June, one page, *Sales and Prices of Farm Product in City Markets (264 cities)*—units, percent, January-May 1987

No. 161, 18 June, one page, *About the Certification of Work Places*—units, 1986

No. 166, 22 June, four pages, *For Youth Day*

Tables

1. Number of Young People Under 30 Years of Age Working in the National Economy (Including Kolkhozes) on 15 November 1985—by education by union republic, percent.

2. Number of Managers and Specialists Under 30 Years of Age on 1 November 1985—by occupation, units, percent.

3. Job Placement and Further Study of Young People According to a One-Time Survey on 1 December—percent, 1974, 1981, 1986.

No. 167, 22 June, five pages, *Inventions and Rationalizing Proposals in the Economy*

Tables

1. Total Indicators—units, rubles, 1971-75, 1976-80, 1981-85, 1986.

2. Basic Indicators of Invention in the Economy—units, percent, rubles, 1971-75, 1976-80, 1981-85, 1986.

3. Basic Indicators of Rationalizing Work in the Economy—units, 1971-75, 1976-80, 1981-85, 1986.

4. Inventions and Rationalization in Industry—units, rubles, 1971-75, 1976-80, 1981-85, 1986.

5. Invention and Rationalization in Agriculture—units, rubles, 1971-75, 1976-80, 1981-85, 1986.

No. 168, 23 June, one page, *Average Wage by Sector and Average Bonus Size*

No. 177, 29 June, nine pages, *Scientific Potential*

Tables

1. Number of Scientific Institutions (at Yearend)—units, 1970, 1975, 1980, 1985, 1986.

2. Number of Scientific Institutions by Union Republic (at Yearend)—units, 1970, 1975, 1980, 1985, 1986.

3. Distribution of Scientific Institutions by Sector of the Economy (at Yearend)—units, 1975, 1980, 1985, 1986.

4. Number of Scientific Workers (at Yearend)—units, 1970, 1975, 1980, 1985, 1986.

5. Distribution of Scientific Workers (at End 1986) by Sector of Science—units.

6. Number of Graduates With Advanced Degrees—persons, 1970, 1975, 1980, 1985, 1986.

7. Graduates With Advanced Degrees by Sector of Science—persons, 1970, 1975, 1980, 1985, 1986.

8. Average Annual Number of Workers and Employees Working in Science and Scientific Service—persons, 1970, 1975, 1980, 1985, 1986.

9. Creation in the USSR of First Models of New Types of Machines, Equipment, Apparatus, and Means of Automation—units, percent, 1976-80, 1981-85, 1986.

No. 178, 29 June, three pages, *Supply of Consumer Durables to the Rural and Urban Population*

Tables

1. Supply of Urban and Rural Populations With Consumer Durables (Per 100 Families at Yearend)—units, 1980, 1985, 1986.

2. Supply of the Urban Population With Consumer Durables (Per 100 Families at Yearend)—units, 1980, 1985, 1986.

3. Supply of the Rural Population With Consumer Durables (Per 100 Families at Yearend)—units, 1980, 1985, 1986.

No. 179, 1 July, one page, *Average Supply of Housing to the Population by Union Republic*

No. 188, 9 July, nine pages, *Materials for Trade Workers*

Tables

1. State and Cooperative Retail Trade—rubles, percent, 1970, 1980, 1985, 1986.

2. State and Cooperative Retail Trade (Per Capita)—rubles, 1970, 1980, 1985, 1986.

3. Retail Trade and Public Catering Enterprises of State and Cooperative Organizations (at Yearend)—units, 1970, 1980, 1985, 1986.

4. Trade Areas in Stores and the Number of Places in Public Catering Enterprises (Per 10,000 persons at Yearend)—units, 1970, 1980, 1985, 1986.

5. Number of Self-Service Stores in State and Cooperative Trade—units, 1970, 1980, 1985, 1986.

6. Grouping of Enterprises of Public Catering of State and Cooperative Organizations by Location—units, 1970, 1980, 1985.

7. The Provision to Various Contingents of the Population With Places in Enterprises of Public Catering—units, percent, 1980, 1985, 1986.

8. Material-Technical Base of State and Cooperative Trade for Preserving Potatoes, Vegetables, and Fruits (at Yearend)—units, capacity, 1970, 1980, 1985, 1986.

9. General Warehouses and Refrigerators in Retail and Wholesale Trade (at Yearend)—1970, 1980, 1985, 1986.

No. 195, 16 July, 13 pages, *The Agroindustrial Complex of the USSR*

Tables

1. Role of the Agroindustrial Complex in Accelerating Progress and Raising the People's Well-Being—text.

2. Output, Productive Fixed Capital, and Number of Persons Working in the APK Complex—rubles, persons, 1970, 1975, 1980, 1985, 1986.

3. Number of APK Enterprises and Organizations—at yearend 1986, units.

4. Industrial Enterprises of the APK in 1986—units, rubles, fixed productive capital.

5. Enterprises of the Food Industry—units, rubles, fixed productive capital, 1970, 1975, 1980, 1985, 1986.

6. Basic Indicators of the Development of Agriculture in the USSR—1913, 1940, 1950, 1960, 1970, 1980, 1985, 1986.

7. Gross Output of Agriculture per 100 Hectares of Agricultural Land by Union Republic—rubles, 1960, 1970, 1980, 1985, 1986.

8. Purchases of Livestock by Type and Nutritional State at All Categories of Farms (Without Additional Weight) for the USSR—units, 1960, 1970, 1975, 1980, 1985, 1986.

9. Quality of Milk Sold to the State—percent, 1975, 1980, 1985, 1986.

10. Economic-Technical Indicators of Work by Enterprises of Sugar and the Oil-Fats Industry of the USSR—percent, 1940, 1960, 1970, 1975, 1980, 1985, 1986.

11. Growth of Agricultural Gross Output by Union Republic—(1913=1), 1940, 1960, 1970, 1980, 1985, 1986.

12. Indicators of the Use of Irrigated and Drained Agricultural Land on Kolkhozes, Sovkhozes, Interfarm and Other Productive Agricultural Enterprises—percent, rubles, 1971-75, 1976-80, 1981-85, 1986.

No. 199, 17 July, two pages, *State Capital Construction in the Social Sphere, First Half 1987*—text, pinpoints laggards.

No. 207, 28 July, seven pages, *For Railworkers Day*

Tables

1. Basic Indicators of Work of Rail Transport for General Use—units, 1940, 1960, 1970, 1980, 1985, 1986.

2. Number of Brigades and Number of Workers in Them in General Purpose Rail Transportation—units, 1940, 1960, 1970, 1980, 1985, 1986.

3. Density of the Network of Railroads and Density of Freight and Passenger Transport on Railroads of the MPS SSSR—units, 1940, 1960, 1970, 1980, 1985, 1986.

4. Use of the Rail Lines of the MPS SSSR—units, 1940, 1960, 1970, 1980, 1985, 1986.

5. Meeting Train Schedules—percent, 1980, 1981, 1982, 1983, 1984, 1985, 1986.

6. VUZ Graduates Specializing in Rail Transportation—persons, 1985, 1986.

7. Secondary School Graduates Specializing in Rail Transportation—persons, 1985, 1986.

8. Sending of Freight by MPS Rail Transport in the First Half of 1987—percent of plan and of 1986 level.

No. 208, 28 July, one page, *Public Catering Cooperative, 1 July 1987*

No. 212, 30 July, 12 pages, *Transport and Communication in the USSR*

Tables

1. Basic Indicators of the Development of All Types of Transportation—units, 1913, 1917, 1940, 1950, 1960, 1980, 1985, 1986.

2. Basic Indicators of the Development of Rail Transportation of the MPS SSSR—units, 1913, 1917, 1940, 1945, 1960, 1980, 1985, 1986.

3. Basic Indicators of the Development of River Transportation—units, 1913, 1917, 1940, 1960, 1980, 1985, 1986.

4. Basic Indicators of the Development of Highway Transport—units (kilometers, ton-kilometers, tons, persons) 1913, 1917, 1940, 1980, 1985, 1986.

5. Basic Indicators of the Development of Air Transport of the Ministry of Civil Aviations of the USSR—units, 1928 1940, 1945, 1960, 1980, 1985, 1986, 1987 (plan).

6. Basic Indicators of the Development of Maritime Transport of the Ministry of the Maritime Fleet of the USSR—units (ton-miles, tons, passenger-miles, persons) 1913, 1917, 1940, 1960, 1980, 1985, 1986.

7. Basic Indicators of the Development of Oil and Oil Product Transport—units, 1913, 1917, 1940, 1960, 1980, 1985, 1986.

8. Basic Indicators of Development of Gas Transport—units, 1950, 1960, 1970, 1980, 1985, 1986.

9. Basic Indicators of the Development of Communication by the Ministry—units, 1913, 1917, 1940, 1960, 1980, 1985, 1986.

10. Development of Radio and Television—units, 1940, 1960, 1970, 1980, 1985, 1986.

No. 213, 30 July, five pages, *For Physical Education Day*

Tables

1. Physical Culture and Sport—units, 1980, 1985, 1986.

2. Number of Sports Facilities—units, 1980, 1985, 1986.

3. Supply to the Population of Sports Facilities by Union Republic—persons, units per 10,000 persons, 1985, 1986.

4. VUZ Graduates Specializing in Physical Culture and Sport by Union Republic—persons, 1985, 1986.

5. Specialized Secondary School Graduates Specializing in Physical Culture—persons, percent, 1985, 1986.

6. VUZ Graduates Specializing in Physical Culture by Specialization (includes initial military instruction and physical education)—persons, percent, 1985-86.

No. 214, 3 August, 10 pages, *For Builders Day*

Tables

1. Commissionings of Fixed Capital—rubles, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

2. Number of Contract Construction and Installation Organizations—units, 1960, 1970, 1980, 1985, 1986.

3. Growth of Labor Productivity in Construction—index, 1960, 1970, 1980, 1985, 1986.

4. Number and Average Size of Newly Constructed Apartments—units, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

5. Commissionings of Projects of Socio-Cultural Significance—units, 1961-65, 1966-70, 1971-75, 1976-80, 1981-85, 1986.

6. Capital Construction in First Half 1987—text.

7. Specialists in Construction Graduating From VUZ—persons, percent, 1985, 1986.

8. Specialists in Construction Graduating From VUZ by Union Republic—persons, percent, 1985, 1986.

9. Secondary Specialized School Graduates With Specialities in Construction—persons, percent, 1985, 1986.

10. Secondary Specialized School Graduates With Specialities in Construction by Union Republic—persons, percent, 1985, 1986.

No. 222, 10 August, 10 pages, *Vital Statistics (Basic Indicators of the Reproduction of the Population)*

Tables

1. General Coefficients of Fertility, Death, and Natural Growth of the Population by Union Republic—per thousand persons, 1970, 1980, 1985, 1986.

2. Summary Coefficients of Fertility in the USSR—total, city, country, children, 1938-86.

3. Summary Coefficients of Fertility by Union Republic—total, city, country, children, 1969-70, 1985-86.

4. Distribution of Births by Birth Order—children, birth order 1-5, 1970, 1975, 1980, 1981, 1982, 1983, 1984, 1985, 1986.

5. Age-Specific Birth Rates—children per 1,000 women, 1969-70, 1974-75, 1979-80, 1981-82, 1983-84, 1985-86.

6. Age-Specific Death Rates—deaths per 1,000 persons, 1896-97, 1958-59, 1969-70, 1978-79, 1982-83, 1984-85, 1985-86.

7. Deaths of the Working Age Population by Reason of Death—deaths per 100,000 persons, 1970, 1980, 1985, 1986.

8. Infant Mortality by Union Republic—deaths per 1,000 births, under age 1, 1970, 1980, 1985, 1986.

9. Average Life Expectancy for Men and Women—years, 1896-97, 1926-27, 1938-39, 1955-56, 1958-59, 1971-72, 1978-79, 1983-84, 1984-85, 1985-86, 1984, 1985, 1986.

10. Average Life Expectancy for Men and Women by Union Republic—year, 1969-70, 1979-80, 1985-86. Accents improvement since 1984.

No. 233, 13 August, three pages, *National Income and Labor Productivity by Union Republic*

Tables

1. Growth of National Income Produced, 1970=100—total and per capita, by union republic, index, 1980, 1985, 1986.

2. Growth of National Income on Account of an Increase in Labor Productivity by Union Republic—percent, 1971-75, 1976-80, 1981-1985, 1986.

3. Growth of Social Labor Productivity, 1970=100—index, 1980, 1985, 1986.

No. 247, 24 August, seven pages, *For Educators Day*

Tables

1. Number of Educational Institutions by Type—units, 1970-71, 1975-76, 1980-81, 1985-86, 1986-87.

2. Wage Data for Teachers at Different Levels of Education—rubles, 1984, 1987.

3. Number of Students by Type of School—students, 1970-71, 1975-76, 1980-81, 1985-86, 1986-87.

4. Number of the Population Having Higher and Secondary Education—persons, 1970, 1979, 1986, 1987.

5. Number of Students Including All Types of Schools by Union Republic—students, 1970-71, 1980-81, 1985-86, 1986-87.

6. Publications—units, 1970, 1975, 1980, 1985, 1986.

No. 263, 4 September, eight pages, *Draft Decree on Development of Public Health in the 12th Five-Year Plan and to the Year 2000*

Tables

1. Medical Institutions by Union Republic in 1986—number of hospitals, health-ambulatory polyclinics, women's consultation centers and children's polyclinics, number of independent fel'dsher obstetrical centers, number of sanitary-epidemiological stations and departments of united regional hospitals.

2. Number of Dispensaries by Union Republic in 1986—units.

3. Emergency and First-Aid Facilities by Union Republic in 1986 (System of the Ministry of Health of the USSR)—independent stations, departments, and number of persons giving out-patient aid per 1,000 persons.

4. Mobile Types of Medical Aid by Union Republic in 1986—number of mobile surgeries, stomatological installations, flu-orographic installations, X-ray units, and institutions having mobile clinic-diagnostic labs.

5. Number of Persons Under Dispensary Supervision by Union Republic—persons, percent of total population, 1980, 1985, 1986.

6. Sanitoriums and Rest Institutions—beds, population per bed, 1980, 1986.

7. Incidence of Disease With Loss of Work Time by Union Republic per 100 Workers—cases, number of days, 1980, 1985, 1986.

No. 264, 4 September, one page, *Brigades in 1986*

No. 269, 8 September, 15 pages, *For 70 Years of Great October: Capital Construction*—text, general discussion of construction by five-year plan. Includes two numbers for 1987: Share of total productive capital investment going to renovation 38.7 percent in 1985, 43.0 percent in 1986, planned for 45.0 percent in 1987. Capital investment in MBMW grew 17 percent in 1986, planned for 30 percent in 1987.

No. 280, 11 September, one page, *Distribution of Housing by Union Republic*

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Perestroyka and Soviet Statistics [1]

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Introduction

An assessment of the impact of *perestroyka* on the quality and reliability of Soviet economic statistics at this time would be premature since there has been little fundamental change in the Soviet statistical system since March of 1985. The winds of change finally reached the Central Statistical Administration (now the State Committee on Statistics) in the spring of 1987, and there is evidence that the tempo of change is accelerating. Still, given the serious difficulties facing the state statistical system, we should not expect to see radical improvements for at least two to three years.

A survey of Soviet statistics and of changes which have been introduced into the system since Gorbachev became General Secretary is, nevertheless, quite useful. It will better prepare us for the evaluation of future, more fundamental changes which we hope lie ahead. Careful monitoring and analysis of recent developments also promise to yield valuable insights into the quality and reliability of the Soviet economic statistics Western specialists have been using for the last 25 to 30 years.

"Sovietologists" have achieved a good deal of success in interpreting the published Soviet statistics, filling in gaps in methodologies and classifications, correcting shortcomings, and estimating and reconstructing unavailable data. But we have been less successful in fully understanding the internal workings of the Soviet statistical system and the role played by official statistics in decisionmaking in the USSR.

For a long time we have been assuming that published Soviet statistics represent but the tip of the iceberg and that the TsSU and other agencies in the USSR have at their fingertips large and well-integrated sets of economic statistics which were removed from public view either because they presented economic performance or the welfare of Soviet people in an unfavorable light or because of military or commercial security considerations. The evidence which became available over the past 10 to 15 years suggests that the submerged part of the iceberg was neither as large as we assumed nor of particularly high quality. There seems to be more and more evidence indicating that in the past such adverse social phenomena as prostitution, drug abuse, and certain types of crime had not been studied in secrecy by the police, medical authorities, or the TsSU but simply dismissed a priori as nonexistent.

Indeed, the TsSU probably was responsible for concealing or ignoring evidence in the late 1970s of deterioration of the quality of life, the rapid growth of the "second" or underground economy, and factors contributing to the slowdown of economic growth. And, it appears now that these adverse developments were concealed not only from the general public but from central authorities as well. In the 1970s and the early 1980s the TsSU operated, as did many other Soviet institutions and organizations, without challenges from central authorities or from the statistical and economic professions. Except for the gradual introduction of computers and the organization of separate accounting and computational facilities, one does not see any evidence of innovation, revision of methodologies, or even expressions of need for improvement of statistical series on the part of TsSU functionaries.

Gorbachev's accession to power and his early demands for modernization and increased efficiency of the Soviet economy had little or no effect on TsSU leadership.[2] A careful study of conferences, articles on

[2] A detailed, fully documented chronology of *perestroyka* of the state statistical system is appended at the end of this paper.

[1] [redacted] conference paper has been modified to reflect developments through February 1988.

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new topics, discussion of plans, and reform desiderata published in *Vestnik statistiki* between mid-1985 and late 1986 shows little evidence of recognition of the need of fundamental changes of the state statistical system. One of the main reasons for the slow progress probably was the administrative staff of TsSU, which remained essentially intact after Gorbachev came to power. Thus, while hundreds of key officials were being replaced in the state and the party apparatus, the "old guard" continued to run the TsSU.[3] Virtually nothing of importance happened in 1986 as evidenced by the lack of change in *Narkhoz 1985* and the statistical appendices in *Vestnik statistiki*.

A full year after Gorbachev became Secretary General the TsSU leadership was not even considering large-scale release of previously suppressed statistics. This can be seen in discussions during several conferences of TsSU officials held in 1986. For example, Korolev's only reference to a possible release of more economic statistics was a promise "to discuss the issue of accessibility of a wider circle of specialists to statistical information" (Markovich 1986, p. 64). More statistical data, including data which have not been published for many years, began to appear only in early 1987 in the form of periodically issued statistical bulletins by a newly created Center for Publication and Information.

To put the TsSU's behavior in its proper context, it should be stressed that Gorbachev's policy of *glasnost* and democratization was not formulated and implemented immediately after his accession to power but evolved gradually over time. Modernization and increased economic efficiency were high on the General Secretary's agenda from the very beginning. But the policy of *glasnost*, with its stress on the need to openly expose and discuss the shortcomings of the Soviet economic system, emerged later, when Gorbachev came to realize the immense difficulties he was facing. It is clear that the urgent need for wide-reaching economic reforms would be more readily acceptable if the majority of people were to realize how bad the economic situation had become by the mid-1980s. Thus in early 1987 we hear Gorbachev referring to the "near-crisis" and "stagnation" of the economy. At the same time, his demands for openness were becoming more vocal and the definition of *glasnost* was expanding.

The pressure to reform the statistical system thus came from above and in stages. The Central Committee reviewed the work of the state statistical system in January of 1986, but the directives issued stressed only the need for the TsSU to reduce the level of unauthorized statistical work and to eradicate falsification in reported data. Early in 1987 the Central Committee returned to the question of improving state statistics, but this time it voiced strong criticism of shortcomings in the work of the TsSU. Almost at the same time, the TsSU and the whole statistical system were harshly criticized in the journal *Novyy mir* in an article written by an economist named Khanin and a journalist specializing in economic matters named Selyunin. The authors showed that, by using improper statistical techniques and by intentionally distorting data, the TsSU systematically overstated the true rates of economic growth of the Soviet economy. Alternative measures developed by Khanin show that national income of the USSR increased in the 1928-1985 period 6.6 times compared with official figures of 89, thus suggesting that official figures overstated the true growth by a factor of 13. Official capital and labor productivity indices were shown to be overstated by a similar order of magnitude.[4]

The appearance of Selyunin and Khanin's article in *Novyy mir* could conceivably be viewed as accidental but it should be noted that a much shorter article by the two authors with essentially the same message was published a couple of weeks earlier in *Pravda* (Selyunin and Khanin 1986, p. 2). Thus we have grounds to believe that the appearance of their criticism was a

[3] Lev Volodarsky, the head of the TsSU since 1975, retired in December of 1985. His replacement, Mikhail Korolev, served as Volodarskiy's first deputy for 10 years and can hardly be considered a "young Turk."

[4] Selyunin and Khanin 1987, pp. 182-201 and Khanin 1987, pp. 21-28. Khanin published several studies criticizing official statistics in the past (Khanin 1981, pp. 62-73; 1984, pp. 58-67; 1986, p. 2) but none were as direct and as strongly critical as the *Novyy mir* article. For an excellent summary of Khanin's work, see Ericson 1988.

part of a strategy designed to put pressure on the TsSU and, at the same time, to offer evidence to support Gorbachev's demands for urgent reforms of the economy.

Neither the criticism voiced by the Central Committee nor the attack by Selyunin and Khanin had much effect on the TsSU. At a special conference of the TsSU party organization and management held in the spring of 1987 the director, Korolev, made a speech on the tasks of *perestroyka* of statistics. The speech and other statements made at the conference indicate that the TsSU leadership did not take the mounting criticism seriously. Apparently they felt that the release of a few formerly suppressed statistical series and routine exhortations to the cadres to improve their efficiency were sufficient to satisfy the reformers.

The pressure from above, however, continued to increase. The Polituro stressed the need for radical improvement in state statistics in April and emphasized that *glasnost* policy applied also to the TsSU. In May, the Central Committee returned to the same issue. Finally, in July the Central Committee and the Council of Ministers of the USSR issued a decree demanding radical changes in the state statistical system and reorganized the TsSU into a more prestigious State Committee on Statistics, or Goskomstat. A conference of the TsSU party organization and management similar to the one held in March was convened in August. Korolev again discussed the tasks of *perestroyka* but this time added "radical" to the title of his address and more soul searching to the text. The new 1986 *Narkhoz*, which was apparently ready for printing in the early summer, was held up and several sets of long-suppressed data were added to it. Thus, things were finally changing, particularly the availability of statistical data in the open literature. According to Belov, a total of "90,000 units of statistical information" were removed from the "closed" list in 1987 (Belov 1988, p. 4).

The pace of release of previously unavailable data was thus accelerating, but the whole process shows evidence of haste and confusion.[5] Unfortunately, there was no noticeable progress in the area of statistical methodology and in the quality of statistics released by the Goskomstat in 1986 and 1987, but the demands for more credible information generated by the *glasnost* campaign continued to increase. Two developments late in 1987 were particulary disturbing for Goskomstat. The prestigious Institute of World Economy and International Relations (IMEMO) published a detailed study which showed that, in the 1917-1986 period, Soviet national income was growing at rates 3.5 times lower than the rates reported in official sources, and the industrial product rates were lower by a factor of almost 5 ("Sovetskiy Soyuz . . . " 1987). The Soviet data were converted to 1980 US dollars, making the results not quite comparable to official statistics, but the order of the difference was nevertheless striking and has without doubt adversely affected the credibility of official data in the eyes of the public. At the same time, a leading Soviet economist, Abel Aganbegyan, published an article on the progress of *perestroyka* in which he cited official national income growth rates but added that they were overstated because they did not correctly reflect inflationary trends, particularly in consumer goods, machinery, and construction (Aganbegyan 1987, p. 7).

Neither the IMEMO nor Aganbegyan's study attacked the Goskomstat directly, and the differences were not as large as suggested by Selyunin and

[5] Not all data, by far, which disappeared from the public domain in the mid-1970s were restored in Goskomstat publications. In fact, some new deletions in published statistics were made. The data on the ruble value of unfinished construction, which had been routinely published in *Narkhoz* for years, were deleted in the 1985 *Narkhoz* and not restored in the 1986 *Narkhoz*. The format of the tabulation of ruble value of working capital was completely changed in the 1986 *Narkhoz*. Furthermore, in constrast to the traditional format, the working capital data were given for one year only, making comparisons with earlier years impossible. The confusion with the declassification of statistics can also be illustrated by the following case. The short statistical handbook, *SSSR v tsifrakh v 1986 godu*, published a table with rates of death per 100,000 of working age population and the absolute number of deaths. These data, of course, made it possible to estimate the absolute number of the working age population of the USSR, which has not been published since the early 1970s. Apparently, the publication of both rates and absolute numbers was an error, and the latter were deleted in the 1986 *Narkhoz* published in August 1987. The December issue of *Vestnik statistiki*, however, carried a table with sex-age specific population data for 1987, including a separate row with the working age population statistics.

Khanin earlier. The implied criticism, however, came from within the official Soviet establishment and therefore could not be dismissed by Goskomstat as easily as was Selyunin and Khanin's study. Consequently the need to review and alter national income methodology will be felt even stronger.

Weaknesses in Soviet Statistics

Shortcomings of Soviet economic and social statistics and of the statistical system itself have been analyzed by Western scholars many times. There is evidence that the paucity of explanatory and methodological material extends to internal and closed data as well. Discontinuities in time series, residuals in tabulated statistics, and obvious inconsistencies among different sets of data are seldom if ever explained in official publications.

Methodology. The TsSU relies almost exclusively on total coverage in the collection of data. It seldom relies on samples and surveys.[6] Biased formulas, inconsistent use of formulas, the use of excessively long periods of time between benchmark years in calculating constant price output and price indexes, and chain-linking of indexes make most time series erratic. Aggregate measures such as national income and gross social product are particularly suspect because separate components (that is, industry, construction, etc.) are derived on the basis of different methods and definitions.

Accuracy and Reliability. The methodological shortcomings described above, of course, reduce the reliability of processed summary statistics made available by TsSU. In the past, Western specialists believed that at least the primary data collected by the TsSU from various reporting units were fairly reliable, particularly the data in physical units or in current prices. The natural tendency to distort the data by reporting units was believed to produce unbiased results because distortions were likely to be in the upward or downward direction, thus canceling each other. The continuous concern expressed by TsSU with inflated statistical reporting (*pripiski*) and numerous anecdotal references found in the literature, however, suggest that primary data collected by the TsSU may not be too reliable and the production statistics and aggregate data very often contain upward biases.

Functions of the TsSU. Unlike most other state statistical agencies in the world which collect and process national statistics, the TsSU performs two distinctly different functions for the Soviet Government. The first is the basic task of collecting, processing, and publishing statistical data for government users. The second function is to serve as a central recordkeeping organization responsibile for the accuracy of the data obtained from enterprises and organizations, including the authority to audit suspect reporting units. This second function determines certain aspects of and even interferes with the first function of statistical collection of the TsSU. For example, the predilection for total coverage in collection of data over sampling techniques referred to above is directly related to the auditing function.[7] The perennial concern of the TsSU over the possibility of willful distortions and falsifications (*pripiski*) on the part of the reporting units is legitimate. On the other hand, were the TsSU simply a state agency collecting, processing, and analyzing national statistics, the whole issue of distortions would become irrelevant. Such an agency would probably rely mainly on sampling and properly designed sampling techniques, which would have significantly reduced the possibility of obtaining biased data. Other aspects of TsSU work,

[6] Among the few known sets of *Narkhoz* statistics based on sampling are the household budget data reported by a group of 62,000 families (being increased to 90,000 in 1988) and average urban kolkhoz market prices and quantities collected from markets in 251 cities. The latter have not been published for some time. In addition to these, the TsSU would periodically conduct special sample surveys.

[7] In the 1920s the TsSU was performing purely statistical functions and, as far as one can see from published statistical compendia, extensively used sampling techniques. In 1931 the TsSU ceased to be an independent statistical agency and was subordinated to Gosplan under the new name of the Central Administration of National Economic Accounting (TsUNKhU) and the TsSU house organ, *Vestnik statistiki*, was merged with the Gosplan's *Planovoye khozyaystvo*. Assumption of the auditing and control functions on behalf of Gosplan was the logical result of this reorganization. In 1941 the name TsSU was restored but the agency continued to be subordinated to Gosplan until 1948, when it regained its independence. Either by inertia or by design, the TsSU kept the responsibility for the auditing of all governmental statistics.

such as the concentration on production at the expense of consumption, neglect of such aggregate statistics as national income and product, and lack of interest in preparation of data by economic regions, in contrast to republic or oblast' divisions,[8] can also be explained by the requirements of the auditing role of TsSU. Nonetheless, Goskomstat is not likely to separate the two functions, since this would reduce its prestige and status.[9]

Political Factors

The issue of the authority of the central statistical agency over other state agencies and organizations is interesting. Conventional wisdom has it that the TsSU has had a monopoly on the collection, processing, and publication of all economic, social, and demographic statistics in the USSR. In addition, the statistical authorities have had almost unlimited authority to request data from other agencies and to prohibit collection of statistical information which TsSU deems to be unnecessary. It is difficult to document this issue fully, but I have always believed that the authority of the TsSU over other agencies varies according to the importance and prestige of the latter. For example, the Ministry of Foreign Trade and Ministry of Finance (and Gosbank) were sufficiently powerful to deliver statistics they felt were appropriate and in the form they wanted to TsSU. Both ministries published their own detailed statistical compendia, and the TsSU publications essentially reprinted certain series from these publications without change.[10]

This sometimes resulted in inconsistencies among the data in TsSU publications. For example, the Ministry of Foreign Trade continues to use its own foreign trade commodity classification, which is different in several respects from the unified classification used by TsSU and Gosplan. TsSU apparently could not revise or change the data submitted by the Ministry of Foreign Trade and had to publish them without correcting any inconsistencies.[11]

The case of the so-called "moral" statistics is even more complex. The responsibility for the collection and processing of "moral" statistics—covering such areas as crimes of various types, prostitution, arrests, alcohol and probably drug abuse, certain types of mental illnesses, accidents (industrial and street), suicides, and the like—was transferred from the TsSU (then TsUNKhU) to the NKVD in the early 1930s and is still controlled by the internal security agency. We know little about their scope, coverage, or accuracy. Officials of the Ministry of Internal Affairs apparently are not inclined to share statistics collected by them with other state agencies, including the TsSU.[12] Thus, TsSU has not been processing or publishing "moral" statistics for years.

One probable reason for the unexpected elevation of the TsSU to the position of a state committee is to give the statistical agency more power to deal with influential and independent organizations such as the Ministry of Foreign Trade and the Ministry of Internal Affairs. In fact, the Central Committee decree creating Goskomstat specifically provided for "centralization of all foreign trade statistics in statistical

[8] As in many other countries, the administrative divisions of the USSR, that is, republics, kray, and oblast, do not concide with true economic regions. Spokesmen for economic geography (a well-developed and prestigious discipline in the USSR) have long been demanding statistical groupings by economic regions but without success. The main reason is, of course, that the TsSU has to audit performance of existing governmental geographic divisions and is not interested in regions which have no administrative functions.

[9] Nikolay Belov specifically singled out complete coverage as the strong point of the Soviet statistical system, in contrast to statistical systems of capitalist countries, which rely on sampling (Belov 1987c, p. 3).

[10] *Vneshnyaya torgovlya SSSR* is published annually by the Ministry of Foreign Trade and budgetary compendia by the Ministry of Finance every five years. *Vneshnyaya torgovlya* 1986, which appeared in the spring of 1987, showed absolutely no changes in coverage or in methodology. The handbook of budgetary statistics covering the 1981-1985 period was published in the fall of 1987. As with foreign trade data, there were no changes in the format or coverage, and the same is true of the CEMA statistical handbook which was released in December of 1987.

[11] For example, according to the foreign trade classification, consumer durables and appliances and ship repair are not classified as machinery products as they are under the general classification. As a result, the structure of foreign trade obtained by the TsSU from the Ministry of Foreign Trade data and published in *Narkhoz* shows machinery which is not comparable to machinery data reported elsewhere in the compendium.

[12] The case of the statistics on the stock of motorcycles will illustrate this. The traffic division of the MVD, GAI, has the responsibility of registering all motor vehicles in the country and thus has all information on the stock. The TsSU, however, apparently never succeeded in obtaining these data from the GAI, and the stock of privately owned motorcycles reported in the *Narkhoz* is based on cumulative sales of motorcyles in retail trade and some rough assumptions of the useful life of an average motorcycle (Gorchak and Lobko 1979, p. 44).

agencies" (*O korennoy* . . . 1987, p. 183). It will be interesting to see whether foreign trade statistical compendia will be transferred to the Goskomstat and modified to agree with Goskomstat and classifications and statistical conventions.[13]

As for social statistics, it is too early to say whether the Goskomstat will succeed in wresting them from the MVD. The absence of reliable and comprehensive social and socioeconomic statistics in the USSR was singled out for harsh criticism by several Soviet writers, particularly Tatyana Zaslavskaya. The deputy head of the Goskomstat, Nikolay Belov, timidly suggested in an otherwise strongly critical and frank article that the time has come to "re-create" moral statistics in order to ensure systematic analysis of all social processes, including deviant behavior (*Vestnik statistiki*, No. 17, 1987, p. 12). Still, it is too early to say whether and how this might be accomplished.[14] The Central Committee decree on the improvements in the statistical system did not direct the transfer of social statistics to Goskomstat, but only called for increased coordination of all studies of sociodemographic processes among statistical agencies (*O korennoy* . . . 1987, p. 182).

The More Recent Data: A Look at Their Quality

I do not propose to review and assess in a comprehensive manner the new statistical data which became available recently. The information contained in the new *Narkhoz* and the "press information" released by the TsSU in 1987 are evidence that statistical methodologies have not been improved or defective time series data revised. Most of the price and output index series, and the indicators of aggregate performance—such as national income, gross social product, or value of gross output of industry—are continuations of data series presented in the 1985 and earlier issues of the *Narkhoz*. Price data represent one of the areas that needs to be improved the most. One high-level Goskomstat official recently referred to financial and price statistics (along with the statistics of the agroindustrial complex) as serious bottlenecks (Ryabushkin and Remizov 1987, p. 28). Still, a review of all articles and reports dealing with TsSU plans published in *Vestnik statistiki* yielded only a few references to plans to study prices, relations between prices and work incentives, and relations between prices and productivity of new machinery.[15] It means that Goskomstat may be planning marginal improvements, but no major changes in the methodology of constructing price indexes and the employment of such indexes for the computation of output indexes in constant prices appear in the works.

Several Western analysts have recently concluded that Goskomstat—with or without Gorbachev's knowledge—has "doctored" retail trade sales data and their incorporation into the national income accounts in 1985 and 1986. In both years, sales of alcoholic beverages were reduced substantially as the result of Gorbachev's antidrinking campaign. With liquor sales constituting a large share of retail trade turnover, such cutbacks should have resulted in a drop in consumption and national income. Instead, these show significant increases in those years. In my opinion, Soviet authorities have not deliberately falsified these data. Rather, the inconsistencies in the national income data in constant prices probably are caused by the use of biased formulas and the mixing of different types of price indexes.

The evidence of improvements in methodology or revisions in the data reflecting important changes found in the 1986 *Narkhoz* is not impressive. Although these are minor, they are worth mentioning because of their novelty. As was widely reported in

[13] In a rather dramatic and completely unexpected move, the Soviet Government disbanded the Ministry of Foreign Trade and the State Committee on Foreign Economic Relations, creating a new Ministry of Foreign Economic Relations in January 1988 (TASS dispatch, January 16, 1988). Several foreign trade organizations which operated under the old ministry were transferred to manufacturing ministries. By all accounts the new Ministry of Foreign Economic Relations will have a much more restricted scope of operations than the old and the Goskomstat will be in a better position to assume the responsibility for collection and publication of foreign trade statistics.

[14] It is interesting to note that Belov used in this context the Russian verb *vossozdat'*, which could be interpreted as "to reintroduce" or "to re-create," implying that moral statistics are not being collected by the TsSU as they had been in the past.

[15] About the only innovation in the field of prices which emerged from the Goskomstat in the last three years is an index reflecting changes in prices of material inputs purchased by agriculture. The Council of Ministers directed the then TsSU to prepare such a price index for the purposes of indexing procurement prices. The price index was prepared and published without documentation or any technical detail, so we cannot evaluate its effectiveness.

the media, Soviet authorities uncovered a major scandal involving large-scale overstatement of raw cotton production and procurement in Central Asia, particularly in Uzbekistan. The overstatement of procurement, which generated tens of millions of rubles in illegal income shared by hundreds of officials, was particularly flagrant in the 1975-83 period. Despite the widely publicized prosecutions and numerous estimates of fictitious cotton tonnage given in the media, the 1985 USSR and Uzbekistan statistical yearbooks listed the cotton procurement figures for earlier years without revisions (*Narkhoz 1985*, p. 210). The 1986 *Narkhoz*, however, reported substantially lower figures for the years in question (p. 228). Comparison of the two sets of figures indicates that, in the 1976-80 period, procurement of raw cotton by all producers was overstated by 1,925,000 tons (about 5 percent over the correct figures), with Uzbekistan accounting for 1,725,000 tons. In the 1980-83 period the overstatement increased to 3,935,000 tons (about 14 percent), 2,645,000 of which was in Uzbekistan.

Data revisions contained in the national income section in *Narkhoz 1986* could mean that the methodologies used to calculate these data have been changed, something which has not been done in Soviet national income accounting for many years. National income produced in industry in 1986 was reported as 258 billion rubles (in prices of the current year) compared with 263.1 billion rubles in 1985. A footnote in the table explained that the drop in 1986 was due to increased subsidies and added that, without this adjustment, the 1986 figure would have been 265.6 billion rubles (*Narkhoz 1986*, p. 122). It should be noted that, while references to agricultural subsidies are found frequently in the Soviet literature, official statistical compendia such as *Narkhoz* and budgetary handbooks have never identified these subsidies or even recognized their existence. The implied subsidy of 7.6 billion rubles must represent the subsidy of manufactured goods sold to agriculture (machinery, fertilizer, electrical power, etc.), but we need more information to understand the accounting principles involved. The subsidy on manufactured goods sold to agriculture has been in effect since 1967 and has ranged between 4 billion and 5 billion rubles in the early 1980s. The puzzling aspect of this adjustment is that it affected only 1986 and that national income values for earlier years were left unadjusted in the new *Narkhoz*. Unfortunately, a much higher subsidy of some 70 billion rubles on purchases of agricultural raw materials by food-processing and light industries, which is concealed in national income originating in industry, was neither identified nor corrected.[16] National income flows between agriculture and industry basically remain as distorted as before.[17] Thus, as is the case with other recently introduced improvements, the correction in national income accounts in 1986 is not fully explained and does not go far enough.

There was another development in Goskomstat's publications of national income data. The July 1987 decree, among other specific instructions, directed the Goskomstat to expand international economic analyses and to construct more meaningful measures of international comparisons (*O korennoy* . . . 1987, p. 183). As with other instructions, Goskomstat responded with a reorganization and expansion of a special section on international comparisons in the 1986 *Narkhoz* (pp. 653-698). The section consisted of simple tabulations of production data by countries and did not offer any aggregate measures. There is one interesting detail—for many years *Narkhoz* compendia have been publishing a table of main aggregate measures for the USSR as a percent of the United States. For purposes of comparison, Soviet net material product (NMP) was converted to US dollars and divided by a similar measure estimated for the United States. Over the years these ratios became almost meaningless—the ratio of Soviet and US NMP remained almost constant at about 66 percent between 1970 and 1985, while the same section reported that the average annual growth of Soviet NMP was 4.5

[16] State procurement agencies sell agricultural raw materials to processing industries at much lower prices than they pay to agricultural producers. This subsidy averaged over 25 billion rubles in the late 1970s and increased to some 70 billion rubles by the mid-1980s. In what I consider to be an incorrect accounting convention, this subsidy is not recorded in national income originating in agriculture but in industry (Treml 1982 and 1988).

[17] Although a large share of turnover taxes is levied on industrial goods of agricultural origin (alcoholic beverages, sugar, vegetable oil, wool, and other textiles), all turnover taxes are recorded in national income originating in industry. Recognizing this distortion, the national income tables in the *Narkhoz* carried a footnote reimputing national income between industry and agriculture proportionally to labor costs (see for example *Narkhoz 1984*, p. 424). Unfortunately, this useful correction was deleted in 1985 and not restored in 1986.

percent compared with 2.8 percent for the United States (*Narkhoz 1986*, p. 582). It is, of course, impossible for one country to grow much faster than another country while the ratio of their national income remains unchanged. Realizing the obvious incongruity between the ratios and the rates of growth, the editors of the 1986 *Narkhoz* deleted the tabulation of the ratios from the international comparison section and placed it in a different part of the compendium (p. 13), that is, as far from the table on growth rates as possible. In doing this they have, of course, removed one of the few aggregate measures of international comparisons from the appropriate section. There was one sign of progress in this respect. Responding to some criticism, the Goskomstat constructed a measure of Soviet Gross National Product as used in the West, which was never done before. The 1987 plan fulfillment summary prepared by Goskomstat included a statement that the 1987 USSR GNP increased by 3.3 percent compared with 1986 ("Ob itogakh . . . " 1988, p.5). No explanation of the methodology of conversion or documentation was, however, given. Since the traditionally measured Soviet NMP grew at a disappointingly low 2.5 percent, the introduction of the GNP rates of growth was probably dictated by a desire to show the development of the Soviet economy in a more favorable light.

Overall, the national income accounts remain the weakest part of published Soviet statistics. The methodology of recomputing national income (net material product) in constant prices has serious shortcomings which make the official series almost useless. The method is as follows: as a first step, gross value of output in five major branches of the economy—industry, construction, agriculture, transportation and communications, and trade and distribution—in prices of the current year are deflated by appropriate price indexes. Separate price indexes for material inputs into production and for depreciation are used to convert the material component of each GVO to constant prices. Net material product for each branch is estimated by subtracting the material component and depreciation computed in constant prices from GVO in constant prices. NMP distributed (that is, calculated by the expenditures on final material goods) is broken into major components—industrial goods, agricultural goods, other goods, and construction—and each is deflated by specially prepared price indexes.

The problem with this dual approach is that in the last 27 years for which we have data, the rates of growth of constant-price NMP produced consistently exceed the rates of growth of constant-price NMP distributed. The annual differences are in the range of 0.5 to 1.5 percentage points and for the whole 1960-1987 period amount to 56 percentage points. Since the difference always has the same sign, it suggests that the method used to deflate has a built-in bias.[18]

The problem of estimating NMP growth is compounded by a bizarre choice of base years for the different components of NMP produced and NMP distributed. Aggregate NMP values were measured in 1956 constant prices in the 1956-58 period, 1958 prices in the 1959-65 period, 1965 prices in the 1966-75 period, 1973 prices in the 1976-85 period, and 1983 prices starting with 1986. Price indexes for gross output of industry, agriculture, capital investment, consumer services, commodity exports and imports, and goods sold in retail trade have been derived with different base-year weights, and in virtually all instances the introduction of new weights occurred in different years, none of which coincided with NMP periods or base years. One can only hope that the criticism of official national income rates of growth implicit in the IMEMO study and by Aganbegyan discussed above will force the Goskomstat to finally address the thorny issue of revising the methodology of national income accounting and of price indices.

[18] NMP growth rates by republics present a mixed picture. For most years rates of growth of NMP produced exceed rates of growth of NMP used but not always. The range of differences between the two rates are also wider. For example, the 1985-86 rate of growth of Armenian NMP produced was reported as 3.9 percent and the rate for NMP used was an unusually high 9.9 percent. Major components of the NMP used, such as retail trade turnover, grew only by 3.5 percent in constant prices, which makes the inconsistency between reported rates even more marked (Armenia 1986, p. 215).

Appendix

Perestroyka of State Statistics in the USSR Under Gorbachev: A Chronology

Spring 1985
The *SSSR v tsifrakh v 1984 godu* (short handbook) is published. No evidence of improvement in quantity or quality of statistics. In fact, some statistical series which have been published for years, such as production of wine and beer, are deleted. The same is true of the *Narodnoye khozyaystvo SSSR v 1984 godu* (*Narkhoz 1984*) published in the late summer.

December 1985
Lev Volodarskiy, the head of the TsSU since 1975, is replaced by the former first deputy, Mikhail Korolev. No major administrative changes. Because of Volodarskiy's age (74) it is impossible to say whether he was dismissed or simply retired.

January 1986
Vestnik statistiki publishes the traditional January article summarizing plans for state statistical agencies in the current year. As in the past, the article is signed by Ivan Matyukha, the head of the Summary Statistics and Statistical Methodology Division—the key division of TsSU. The plan does not contain anything new (Matyukha 1986, pp. 3-13).

The Central Committee reviews the problems of improving the organization of state statistics and stresses the need to eliminate unneccessary paperwork and unauthorized statistical reporting. The TsSU is criticized for not exercising sufficient control over state statistics ("V Tsentral'nom Komitete . . . " 1986, p. 3).

May 1986
The Central Committee returns to the issues of improvement of organization of state statistics. The TsSU is reported to have succeeded in reducing the volume of government reporting by one-half, but more effort on reduction of the level of unauthorized statistics is needed (reported in *Pravda*, June 5, 1986).

May-June 1986
Three conferences on the improvement of statistical work are convened in Moscow under TsSU's auspices. Two are for "in-house" specialists: a conference of heads of summary statistics and statistical information divisions of republic TsSUs, and a conference on statistics of the newly created Gosagroprom (State Agroindustrial Committee). At the third conference, TsSU statisticians meet with their counterparts from other state organizations. The issues of excessive paperwork and of unauthorized statistics are discussed again. Speakers suggest improvements in some statistical methods, stress the need to avoid discrepancies between TsSU and ministerial data, but, in general, the tone of criticism of the state statistical system is mild and the issues raised are trivial. The issue of wider availability of statistical information is barely mentioned (Dubnov 1986, pp. 67-71; Markovich 1986, pp. 63-67; Somova 1986, pp. 60-62).

October 1986
The new 1985 *Narkhoz* offers some evidence of the announced policy of *glasnost* with publication of some statistical series which were not available for some time, such as the grain harvest statistics (discontinued in 1981) and data on production, sale, and per capita consumption of alcohol (not published since the early 1930s); but, generally speaking, the new *Narkhoz* is a disappointment.

The Central Committee publishes a resolution with an unusually strong condemnation of falsification in statistical reporting in Moldavia, Kirovograd oblast of the Ukraine, and the Ministry of Automobile Production.

December 1986
Korolev discusses the newly released *Narkhoz 1985* in an *Izvestiya* interview, stressing the need for open discussion of information reflecting both successes and weaknesses of the Soviet economy, improvements in quality and timeliness of data, etc. (Korolev 1986, p. 3).

January 1987
TsSU begins distribution of "press-information," three- to five-page bulletins appearing once or twice weekly. The bulletins offer statistics which have not been published before but also some routine data. Major Soviet dailies and periodicals, such as *Kommunist* and *Ekonomicheskaya gazeta*, selectively publish some of the "press-information."

February 1987
A long article with unprecedentedly harsh criticism of official statistics, written by Vasiliy Selyunin and Grigoriy Khanin, appears in *Novyy mir* (1987a, pp. 182-201). The same two authors published a shorter version of the same article earlier in *Pravda* (1986, p. 2), while Khanin published an article of a more historical nature in January (1987, pp. 21-28). The authors reject official price and output indices as biased, criticize the TsSU for data distortions and the use of improper methods, and offer their own estimates of rates of growth of national income, which are much lower than the official rates. The open criticism of official statistics creates a sensation. Khanin is invited to speak to different audiences such as the Moscow State University and the Central Economic-Mathematical Institute (Ericson 1988).

After an unusual delay of almost a month, *Vestnik statistiki* publishes the traditional article by Matyukha summarizing the TsSU work plan for 1987 (Matyukha 1987, pp. 10-20). The plan, however, does not contain anything radically new.

March 1987
Vestnik statistiki publishes an unsigned lead article which probably originated not in the TsSU but with the Central Committee or with somebody on Gorbachev's staff. The article discusses the tasks ahead for the Soviet economy and criticizes the TsSU for not providing timely and accurate information ("Statistika . . . " 1987, pp. 3-9). A conference of the party organization and management of the TsSU meets to discuss the criticism of the statistical system voiced at the Central Committee plenary session ("Rasshirennoye . . . " 1987a, pp. 32-48). In his main address Korolev also briefly refers to Selyunin and Khanin's article, labeling it as "profoundly misleading" while noting that the poor quality of statistical information in the country gives support to such criticism. Importance of timely publication of statistics and wider availability is stressed (Korolev 1987a, p. 6).

Pravda reports that the Politburo reviewed the need for "radical improvement" of statistics in the country. The issued instructions stress the need to improve the reliability of statistics and to increase their availability.

May 1987
The Central Committee reviews the status of statistical work in the country and criticizes the excessive amount of data collected outside of regular TsSU channels.

Vestnik statistiki publishes an article by two authors (Skobtsova and Adler 1987, pp. 52-56) with relatively strong criticism of methodological and classificational shortcomings of published state statistics. Inconsistencies among data reported by different republic TsSUs are noted.

June 1987
Responding to Selyunin and Khanin's criticism, three professors of statistics defend the state statistical system in *Vestnik statistiki*, but the arguments are rather weak and miss the most important points

(Knyazevskiy et al. 1987, pp. 53-60). Selyunin and Khanin's conclusions are also attacked in *Ekonomicheskaya gazeta* (Adamov 1987, p. 14).

The deputy director of the TsSU, Nikolay Belov, is interviewed in *Argumenty i fakty*. Belov notes with regret that so far there has not been real progress in the struggle with falsification in statistical reports. He also states that new methodological and specialized statistical compendia will be published by the TsSU in the next five years (Belov 1987c, pp. 2-3).

July 1987

The July issue of *Vestnik statistiki* publishes an article by the deputy head of TsSU, Belov, about the tasks facing the statistical system in connection with the reforms (pp. 8-19). The article is more critical than similar articles published earlier and demands major improvements. Belov focuses on the struggle with "illegal" statistics (that is, statistical data collected outside of the TsSU and without its approval) and on falsification in statistical reporting.

The Central Committee and the Council of Ministers of the USSR publish a decree concerning "measures of radical improvement of statistics work" in the country. TsSU is reorganized into a union-republic State Committee for Statistics (Goskomstat) with Korolev retained as the director. Among other measures, the Central Committee demands a reduction in the level of statistical reporting taking place outside the regular channels, an end to falsified reporting, and greater reliability of statistics. Goskomstat is also instructed to develop new statistical techniques for measuring the progress of *perestroyka* and quantitative measures of "success indicators." The decree addresses a number of specific issues such as the need to increase the size and the representativeness of the household budget survey, wider use of surveys of public opinion, and an increase in the number of statistical publications, including both specialized compendia and methodological sources. The decree also asks for the concentration of foreign trade statistics under the auspices of Goskomstat and for Goskomstat coordination of all studies of sociodemographic processes in the country (*O korennoy* . . . 1987, pp. 178-190).

Goskomstat organizes a large conference to discuss a set of experimental formulas designed to measure the effectiveness of productive processes under the new conditions. Reaction of outside specialists invited to the conference is basically negative (Ippolitov 1987).

August 1987

The new status and the tasks of a radical change of the statistical system are discussed at a special conference of the party organization and management of the Goskomstat. The tone of the criticism is much sharper than earlier, and a series of far-reaching changes are discussed. Korolev's speech at the conference is published in *Vestnik statistiki* No. 9, 1987, and summaries of statements made by others are published in the October issue. The head of the newly created Center for Publications and Information of the Goskomstat, Leonid Umanskiy, reports that 10 statistical compendia devoted to different subjects will be published in 1988 ("Rasshirennoye . . . " 1987b, p. 38).

Korolev discusses the tasks of the reorganized Goskomstat in an interview in *Pravda* (Korolev 1987c, p. 2).

The Deputy Minister of Foreign Affairs of the USSR, speaking in New York, states that what was always claimed to be the Soviet defense budget (and published as such in official statistical compendia) covers only military pay, operational costs, military pensions, and military construction. Procurement of weapons and military research and development are covered out of other (unspecified) budgetary categories (Petrovskiy 1987, p. 4).

October 1987

The 1986 *Narkhoz* is published.[19] The new *Narkhoz* offers several sets of new statistics (some of which had

[19] In the second part of the 1970s the annual issue of *Narkhoz* would be approved for publication (*podpisano k pechati*) in July; in the early 1980s the approval date moved to August. A puzzling feature of the 1986 *Narkhoz* is that it carries two dates of approval—June 5 and August 25. The probable explanation is that, having promised to expedite their publications, the Goskomstat was ready at an unusually early date in June but then had the manuscript returned. We do not know what happened, but the final approval was delayed by two months.

already appeared in Goskomstat press releases), but the whole compendium shows evidence of haste and confusion, and some data are contradictory. A methodological appendix to the compendium which has not appeared for several years is restored but does not contain anything new. The format and the table of contents are completely reorganized with new sections and divisions reflecting economic reforms. The new format is, however, more confusing than helpful and special sections do not contain new aggregate measures.

As a followup on the decision of the Central Committee and the Council of Ministers of July of 1987, the latter adopts a decree with further details on the organization and restructuring of the Goskomstat ("Uskorit' . . . " 1988, pp. 3-6). The Ministry of Finance of the USSR publishes its statistical compendium covering state finances for 1981-85 (*Ministerstvo finansov SSSR 1987*). The compendium follows the format of similar compendia published in the past; no new data are given and all summary budgetary tables contain unidentified residuals.

Nikolay Belov (1987b, p. 16) reports on progress in restructuring of the state statistical system and says that five new statistical compendia will be published in 1988 (population, labor, consumer goods, capital investment, and agriculture).

November 1987

Policy of *glasnost* is not evident in the newly published 1987 Statistical Handbook of CEMA Countries (Sovet Ekonomicheskoy Vzaimopomoshchi 1987). The format and contents are identical to CEMA handbooks published in the past with no new statistics added.

November 1987–January 1988

Direct and indirect criticism of official Goskomstat statistics, particularly national income data, appear with increasing frequency. Aganbegyan, one of the key engineers of *perestroyka*, notes in a lead article in the journal *Ekonomika i organizatsiya promyshlennogo proizvodstva* (Aganbegyan 1987, p.7) that official Soviet national income statistics understate inflationary factors and therefore overstate the true rates of growth. The house organ of the prestigious Institute of World Economy and International Relations (IMEMO) publishes a two-part study of aggregate indices of growth (national income, industrial and agricultural product measured in constant 1980 dollars) for the 1913-1987 period. National income growth rates reported in the study are three times lower than the official rates and industrial product growth rates are five times lower ("Sovetskiy Soyuz . . . " 1987). *Novyy mir* publishes an article by Selyunin and Khanin in which the authors defend their analysis and repeat the main points of criticism of official state statistics published earlier (1987b, pp. 255-257). Selyunin attacks some policies of *perestroyka* in an article in *Sotsialisticheskaya industriya* and criticizes official statistics for distorting the real growth of standards of living in the country (1988, p. 3). Sharp criticism of official statistics is also voiced by an average man in the street. Thus, the publication of Goskomstat data on household budgets in *Izvestiya* produced a large number of angry letters to the editor dismissing the budgetary data as total fabrication (*Izvestiya*, December 19, 1987). Selyunin's article in *Sotsialisticheskaya industriya* also produced many letters to the editor in which the readers fully supported Selyunin's criticism of official statistics. The statistical section of *Vestnik statistiki* and Goskomstat press releases continue to publish data which have not been published for years, such as age-sex specific demographic data for 1987, alcohol mortality by major causes, ruble values of different categories of pensions, and more detailed breakdowns of national income accounts in current prices. Belov reports that a total of 90,000 "units of statistical information" were removed from the "closed" list, that is, declassified, in 1987 (1988, p. 4).

January 1988

Goskomstat report on the plan fulfillment shows that the economy did not do well in 1987; national income grew 2.5 percent compared with the planned rate of

4.1 percent. A novel feature of the plan fulfillment report is the use of the Western concept of GNP measure applied to the USSR ("Ob itogakh . . . " 1988, pp. 15-26.)

Goskomstat publishes new regulations governing collection of statistics in the country aimed at reduction of "unauthorized statistics." Two sets of statistical data are recognized—the interbranch (*mezhotraslevaya*) statistics, which are uniform for the whole economy, and branch statistics established in separate branches. The authority of Goskomstat to approve all forms of statistical reporting is reiterated ("Poryadok . . . " 1988, pp. 19-21).

February 1988

The Goskomstat announces changes in financial arrangements with the state treasury—starting in 1988 the agency will receive (negotiate) a government order (*zakaz*) for certain types of statistical services and data analyses. A long article in *Vestnik statistiki* (Matyukha 1988, pp. 3-14) spells out tasks and assignments given to the Goskomstat. The order specifies that for purposes of expansion of *glasnost*, Goskomstat will publish several topical compendia covering industry (last published in 1964), agriculture (last published in 1971), and population (1975).

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The New Look at Soviet Statistics: Implications for CIA Measures of the USSR's Economic Growth

STAT

Introduction

The criticisms of Soviet statistics that have been reviewed at this conference today obviously raise questions about CIA measures of economic growth. Unfortunately, *glasnost*, with some exceptions, has not added a great deal to what we already know about the deficiencies of these statistics. For production statistics—the principal focus of my presentation this afternoon—the major deficiencies are:

- First, the availability of economic data is still extremely limited compared with the situation in most developed countries. Moreover, in many instances, we still know little about how the statistics are collected and processed, or when changes in definitions and methods occur.

- Second, statistics on value of output still seem much more suspect than physical production statistics. What Soviet critics have been saying reinforces substantially what Westerners have argued for years—that value statistics are flawed by the hidden inflation resulting from new product pricing.

In this connection, although more is being written about overreporting (and sometimes underreporting) of production in physical terms, I do not have the sense that the degree of distortion increased or decreased in the pre-Gorbachev decades. At any rate, I will be talking mainly about the effects of inflation in Soviet value statistics on CIA GNP accounts.

I want to review our estimates of Soviet GNP growth and try to gain some appreciation of how much they may be biased. First, I will illustrate how the selection of production statistics can lead to bias. I will then make a preliminary appraisal of the net bias in our sector-of-origin and end-use measures. Finally, I will discuss the possibility that Gorbachev's stress on quality and his reorganization of statistics will introduce a disconnect between pre-Gorbachev and post-Gorbachev statistics—and analyze what this could mean for our measures of Soviet growth.

Physical Versus Value Statistics

Turning first to the kinds of output statistics used in CIA's GNP accounts, I would note that these data can be differentiated according to the degree of disaggregation they reflect. Table 1 shows some of the possibilities. Consider the example of metal-cutting machine tools. The growth of the total number of units in a category is compared with that based on a breakdown of these tools into types; each type is valued at a representative price. Alternatively, there are the official figures on total value of production of metal-cutting machine tools in so-called constant prices. When the measure supposedly represents the summation of all or almost all ps times qs, it can be called a model-based measure. In the case of coal and gas, I am stretching the definition a bit. Here, the prices are the conversion coefficients for translating tons and billion cubic meters of different kinds of coal and gas into standard fuel units.

Some generalizations can be drawn from the comparisons. As might be expected, the disaggregated measures of production tend to grow faster than the aggregated measures for entire categories—like the number of all machine tools, production of passenger cars, or total output of cement in tons. However, for most fuels and basic materials, measures based on entire categories do not behave very differently from measures that break categories into types. This suggests that if changes in the production profile are important, they result from improvements within types of products. Thus, the big differences are between measures based on a disaggregation by product

Table 1
USSR: Comparison of Different Measures of Industrial Production

Average annual percentage change

Metal-cutting machine tools	**1951-65**	**1951-55**	**1956-60**	**1961-65**
Category–units	6.7	10.7	5.9	3.6
Type–SPIOER [a] values (1 July 1955 prices)	7.2	10.2	6.7	5.0
Model–*Narkhoz* values (1 July 1955 prices)	13.6	19.4	12.7	8.8
Tractors	**1971-85**	**1971-75**	**1976-80**	**1981-85**
Type–units	1.6	3.7	0.2	1.1
Type–horsepower (basis for SPIOER)	4.0	7.1	2.6	2.4
Model–value (based on sample)	2.7	5.6	1.7	0.9
Agricultural machinery	**1966-82**	**1966-75**	**1976-82**	
Type–value (Treml)	2.8	3.0	2.5	
Model–value (*Narkhoz*, 1 July 1967 prices)	7.4	9.0	5.1	
Light automobiles	**1951-85**	**1951-70**	**1971-85**	
Category–units	9.3	9.2	9.4	
Model–value (SPIOER-1970 rubles)	11.3	11.3	11.4	
Trucks				
Category–units	2.9	2.9	2.9	
Model–value (SPIOER-1970 rubles)	6.2	7.8	4.2	
Buses				
Category–units	9.1	13.3	3.9	
Model–value (SPIOER-1970 rubles)	10.0	14.3	4.6	
Finished rolled ferrous metals				
Category–units (*million tons*)	5.3	7.8	2.0	
Type–value (SPIOER)	5.4	8.2	2.0	
Coal	**1956-86**	**1956-75**	**1976-86**	
Category–units	2.1	3.0	0.6	
Model–standard fuel units	1.2	2.1	−0.4	
Natural gas	**1961-85**	**1961-80**	**1981-85**	
Category–units	11.2	12.0	8.1	
Model–standard fuel units	11.0	11.9	7.6	
Cement				
Type–units (*million tons*)	7.6	11.8	2.1	
Model–value (SPIOER)	8.1	12.6	2.3	
Canned goods	**1951-85**	**1951-70**	**1971-85**	
Category–units (*million standard cans*)	7.3	10.2	3.5	
Type–value (SPIOER)	7.4	9.9	4.2	
Processed meat				
Category–units (*thousand tons*)	5.7	7.9	2.8	
Type–value (SPIOER)	5.8	7.9	3.2	

[a] SPIOER refers to CIA's index of Soviet industrial production.

Table 2
Bias in CIA Index of Soviet GNP by Sector of Origin:
A First Approximation

Branch and Sector	Measure	Assessment of Bias			Percentage Share of GNP at Factor Cost in 1982
		Understatement	About Right	Overstatement	
Industry					33.4
Ferrous metals branch		X			2.2
Ferrous ores sector		X			(0.4)
Ferrous metal sector		X			(1.6)
Coke products sector			X		(0.04)
Refractory materials sector			X		
Nonferrous metals branch			X		1.3
Fuels branch					3.4
Coal sector				X	(0.9)
Oil extraction sector			X		(1.6)
Oil refining sector		X			(0.5)
Gas sector				X	(0.5)
Other fuels			X		(0.03)
Electric power branch			X		2.5
Machinery branch					11.2
Energy and power machinery sector		X			(0.1)
Electrotechnical machinery and equipment (M&E) sector		X			(0.6)
Machine tools sector				X	(0.2)
Forge press equipment sector				X	(0.1)
Precision instruments sector				X	(0.7)
Metallurgical and mining M&E sector		X			(0.1)
Pumps and compressors sector				X	(0.2)
Logging and paper M&E sector				X	(0.03)
Light industry M&E sector				X	(0.1)
Food industry M&E sector				X	(0.1)
Printing M&E sector				X	(0.01)
Hoist-transport equipment sector		X			(0.1)
Construction M&E sector		X			(0.2)
Transportation M&E sector			X		(0.5)
Automotive sector					(0.8)
Motorcycles, mopeds, motor scooters			X		
Cars			X		
Trucks			X		
Buses			X		
Automobile spare parts			X		
Tractors and agricultural M&E				X	(0.5)
Other machinery				X	(0.6)
Military machinery			X		(3.7)
Other metal wares				X	(0.4)

Table 2
Bias in CIA Index of Soviet GNP by Sector of Origin:
A First Approximation (continued)

Branch and Sector	Measure	Assessment of Bias			Percentage Share of GNP at Factor Cost in 1982
		Understatement	About Right	Overstatement	
Metal structures				X	(0.2)
Sanitary engineering products				X	(0.1)
Machinery repair				X	(1.9)
Chemicals and petrochemicals branch					2.6
Mineral chemicals sector				X	(0.1)
Basic chemicals sector			X		(1.3)
Aniline dye products sector		X			(0.02)
Synthetic resins and plastics sector		X			(0.2)
Synthetic fibers sector		X			(0.2)
Organic synthetic products sector			X		(0.2)
Paints and lacquers sector			X		(0.1)
Rubber products sector		X			(0.4)
Synthetic rubber sector		X			(0.1)
Wood, pulp, and paper products branch					2.0
Logging sector			X		(0.7)
Sawing and woodworking sector			X		(0.5)
Furniture sector				X	(0.5)
Pulp and paper sector			X		(0.3)
Wood chemicals sector			X		(0.02)
Construction materials branch					2.0
Cement sector			X		(0.2)
Concrete sector			X		(0.6)
Wall materials sector			X		(0.3)
Asbestos cement sector			X		(0.03)
Roofing material sector			X		(0.02)
Construction ceramics sector		X			(0.07)
Other construction materials			X		(0.6)
Glass and porcelain sector		X			(0.1)
Light industry branch					2.3
Cotton fabric sector			X		(0.6)
Silk fabric sector			X		(0.2)
Wool fabric sector			X		(0.2)
Linen fabric sector			X		(0.06)
Hosiery and knitwear sector			X		(0.2)
Sewn goods sector				X	(0.8)
Other light industry sector		X			(0.2)
Processed food branch			X		2.6
Fish products sector			X		(0.4)
Meat products sector			X		(0.2)

Table 2
Bias in CIA Index of Soviet GNP by Sector of Origin: A First Approximation (continued)

Branch and Sector	Measure	Assessment of Bias			Percentage Share of GNP at Factor Cost in 1982
		Understatement	About Right	Overstatement	
Dairy products sector			X		(0.4)
Sugar sector			X		(0.2)
Flour and cereal sector			X		(0.1)
Bread products sector			X		(0.2)
Confectionary products sector		X			(0.2)
Vegetable oils sector			X		(0.06)
Fruit and vegetable products sector			X		(0.09)
Other foods sector			X		(0.8)
Construction			X		8.0
Agriculture			X		20.2
Transportation			X		9.9
Communications			X		0.9
Trade			X		6.5
Services					18.5
Housing		X			(4.7)
Utilities		X			(1.2)
Repair and personal care				X	(1.6)
Recreation		X			(0.9)
Education		X			(3.4)
Health			X		(1.8)
Science			X		(1.9)
Credit and insurance		X			(0.3)
Administration and miscellaneous		X			(2.6)
Military personnel			X		2.0
Other branches			X		0.6
GNP					**100.0**

type and those based on the disaggregation by model implied in the Soviet value series—e.g., machine tools and agricultural machinery. But I would note that where we have tried to disaggregate machinery production by model (that is, for light automobiles, trucks, and buses), the model-based measure does not behave much differently from the measures based on total unit production.

Bias in the Sector-of-Origin Accounts

I want to demonstrate my sense of the direction of bias in the individual branch and sector indexes in the GNP by sector-of-origin accounts (see table 2). In general I think the bias is negligible in most of the

fuels and basic materials branches of industry. However, some exceptions were revealed in the new Soviet statistical handbook (*Narkhoz*) for 1986: coal and gas. In my opinion, there are only two machinery sectors in which bias is not, prima facie, a problem. These are the automotive sector and military machinery, where we build up indexes of value, model by model. The other machinery sectors are represented by indexes that probably either understate growth because they use physical measures to move values for a given type of equipment or overstate growth because they use Soviet value indexes.

In most of the other major sectors of origin—construction, agriculture, transportation, communications, and trade—I assume, as a first approximation, that there is little or no net bias in the indexes of growth. But many of the services are represented by indexes based on employment or, in the case of housing, on the growth of square meters of housing. The employment-based indexes very likely do not take account of productivity gains, while growth in housing stock does not capture quality change.

To obtain an initial sense of the net effect of the biases, I first used a -1, 0, and $+1$ scoring scheme—that is, a -1 for negative bias, 0 for no bias, and $+1$ for positive bias. If one interprets these values as percentage points of average annual growth and weights them by their share of GNP at factor cost, the net result would be a downward bias in CIA's GNP measure of about one-tenth of a percentage point.

This, of course, is not a very satisfying answer. Going a step further, one can try to attach some more plausible values to the degree of understatement and overstatement. Consider first the metals sector of industry. I accept the current estimates for nonferrous metals, which are based on the index of GVO for the Ministry of Nonferrous Metals. However, I allow for the possibility that the ferrous metals index may understate growth by as much as 1 percentage point per year because of a failure to capture changes in assortment and quality within product types like cold rolled sheets and seamless pipes and tubes. Next are the fuels branches. We can substitute the recently released information on the production of coal and gas in standard fuel units for the physical production measures we have been using.

Machine building and metalworking (MBMW), of course, is the toughest call. The first approach that I tried involves a branch-level correction based on a comparison of factor productivity growth in MBMW with productivity growth in other sectors where inflation in product prices is not likely to be much of a factor. The underlying premise is that labor and new machinery should be, on average, about as productive in nonmachinery sectors as in MBMW. It turns out that factor productivity in MBMW increased about 1.3 percentage points faster than a simple average of factor productivity in electric power, ferrous metals, construction materials, and light industry between 1965 and 1975. In 1976-80, this gap narrowed to six-tenths of a percentage point. In 1981-85, however, factor productivity in these other four sectors grew six-tenths of a percent faster than factor productivity in MBMW. Since the measure of MBMW output is CIA's measure, one might conclude that in the late 1960s and early 1970s it may exaggerate growth of MBMW by more than a percentage point and since 1975 by half a percentage point or even less.

I also tried to take a more disaggregated approach to evaluating the bias in the machinery index, relying on some work done a few years ago by Professor Vlad Treml. He compiled an index of civil machinery production based entirely on samples reported in physical units for various sectors of MBMW. For a number of sectors where we also rely on physical production, our estimates of growth are not very different. But our indexes are very different for those sectors of MBMW for which we use value of output as reported by the Soviets—almost 40 percent of all MBMW. On the argument that the physical series understate growth because they do not reflect quality change while the value series are flawed by hidden

inflation, I simply split the differences between Treml's and the CIA's rates of growth and substituted the adjusted indexes for those that are now in SPIOER. For this part of MBMW, the adjusted series grew by 6.4 percent per year between 1965 and 1982, compared with the 9.2-percent-per-year rate for this portion of the present SPIOER sample. Carried over to the entire machinery sample, the adjustment cuts the rate of growth of value added in MBMW from 5.3 to 4.7 percent for the same period.

This excursion suggests an overstatement of CIA's index of MBMW growth of about half a percentage point. This is, of course, before any account is taken of the likely understatement of growth in other machine-building sectors where we rely on physical measures of output. Applying this discount factor to the whole period, 1950 to 1986, reduces MBMW growth from 5.8 percent per year to 5.0 percent per year. This may not seem like much, but the effect is to lower CIA's estimated value for MBMW output in 1986 by 24 percent.

Because the degree of inflation in MBMW output is a controversial issue, it is worth trying still another approach to try to appraise its significance. Our analysis of the Soviet literature and some of our own research [1] suggests strongly that inflation in the price of new products is the preeminent cause of inflation in overall machinery prices. I asked some of my colleagues to model the relationship between the extent of inflation in new product prices, the share of new products in total output, and average inflation in a sector. To repeat, the assumption is that a new product comes in at a price greater than is warranted by its productivity, durability, labor-saving potential, and the like, and that the new price becomes the comparable price in the Soviet index of gross or net output. Thereafter, the comparable price is retained until a general price revision comes along.

The results of the modeling exercise are shown in table 3. The values in the table indicate, for example, that if the share of new products in output is 3 percent, then the level of new product prices would have to be 1.49 times the level of existing prices to generate an overall inflation rate of 1 percent. This year's *Narkhoz* reports the share of products assimilated for the first time in the machine-building complex as a share of total *tovarnaya produktsiya*. The shares were 4.5 percent in 1970, 3 percent in 1980, 3 percent in 1985, and 4.5 percent in 1986. How these shares are calculated is somewhat a mystery. The share, for example, might not count one-time orders or some kinds of batch production. Although the exercise can only be suggestive, it does suggest to me that it would be hard to defend an estimate of the hidden inflation component of Soviet value statistics for MBMW of more than 2 to 3 percent per year, which is roughly what my 1-percentage point discount factor for MBMW implies.

Table 3 *Percent*

The Dependence of Overall Inflation on the Extent of New Product Price Inflation and the Share of New Products in Total Output

Overall Price Inflation	Share of New Products in Total Output for a Given Year				
	3 percent	4 percent	5 percent	6 percent	7 percent
1 percent per year	49	33	25	20	16
2 percent per year	189	96	65	49	39
3 percent per year	3,333	268	140	94	71
4 percent per year		2,500	333	179	122
5 percent per year			2,000	385	213

[1] See, for example, [redacted] STAT
[redacted] STAT
[redacted] Robert E. Leggett, "Measuring Inflation in the Soviet Machine Sector, 1960-1973," *Journal of Comparative Economics*, vol. 5 (June 1981), pp. 169-84. STAT

Table 4
USSR: Alternative Estimates of Growth of Value Added in Services, 1951-84

Average annual percentage change.

	Prell	CIA	Difference
Housing	6.0	3.2	2.8
Education	4.2	3.1	1.1
Health	4.7	3.2	1.5
Science	5.9	6.6	−0.7
Government	2.0	1.3	0.7
Municipal services	5.2	3.2	2.0

Table 5
USSR: Alternative Estimates of Growth of GNP by Sector of Origin at Factor Cost, 1951-86

Average annual percentage change

	Current CIA Estimate	Adjusted Estimate
Industry	5.7	5.5
Agriculture	1.8	1.8
Services	3.3	4.1
Other [a]	5.2	5.2
GNP	**3.9**	**4.0**

[a] Construction, transportation, communications, trade, military personnel, and other branches.

For chemicals, I simply assume a notional average understatement of 1 percentage point per year for the aniline dye, rubber products, and the three synthetics sectors and a 1-percent overstatement for the one Soviet value series—mineral chemicals. The net result is an implied understatement of growth in chemicals output of three-tenths of a percentage point. Not much happens, largely because the sector adjustments cover only about 25 percent of value added in chemicals.

In other industrial branches, several sector indexes suspected of being biased have so tiny a weight (construction ceramics in construction materials and confectionary products in processed foods) that I ignored them. For other sectors, where I have no way of judging the degree of bias, an arbitrary 2-percentage-point adjustment was made to the growth rates presently used.

This brings me to the service sectors, where—as I noted earlier—we have been accused of ignoring productivity advances. Here I can take advantage of some work carried out by Mark Prell while writing a Ph.D. dissertation for Professor Martin Weitzman at Massachussetts Institute of Technology. Essentially, he estimated new indexes of output for housing and other services. For housing, he uses the value of housing stock as reported by the Soviets rather than square meters of housing. For education, health, science, municipal services, and government he constructs indexes based on a weighted average of labor and capital inputs. His estimates and CIA's are compared in table 4. I believe that the implied annnual growth in the value of a square meter of housing construction is too high, so I take the average of the Prell and CIA growth factors. But for the rest of the services in question I simply replace the CIA estimates with Prell's.

The end result of this primitive round of sensitivity testing is not very exciting. The comparisons of the sector-of-origin estimates that the CIA now carries with my adjusted estimates are set out in table 5. The figures in the column representing the current CIA estimate reflect the values for GNP in 1950 and 1986 at factor cost in 1982 prices. To obtain the adjusted estimate, I first took the values for 1950 in our current estimate as sector weights and applied adjusted indexes in the instances I have indicated to obtain adjusted values for 1986. As you can see, the net effect of the adjustments is to raise the rate of growth of GNP slightly as industrial growth is reduced and that of services raised. If one accepts the adjustment for industry and leaves services alone, GNP growth declines—but only to 3.8 percent per year.

Bias in the End-Use Accounts

I have carried out the same kind of exercise for the end-use accounts. Here again, I believe we are most likely to understate growth when we track service activity by some kind of physical index—like housing stock—or employment plus material inputs, which are the basis for measuring trends in education, health, and administration. As I noted earlier, we do not in these instances allow for improvements in productivity related in part to the rising stock of fixed capital per worker in these sectors.

For the food and soft goods components of consumption, and for the other services, the CIA's subindexes are based on Soviet reported per capita consumption, physical production, and deflated retail sales. The data on per capita consumption and physical production may not capture some quality change, but I do not believe that this is important in food and soft goods. Deflated retail sales, which rely on published Soviet price indexes, are likely to reflect some hidden price inflation, but for the moment I ignore it.

The indexes for the various components of defense are our own and rely on what we believe is an almost complete enumeration of Soviet activities, each with its own price weight. I would not exclude the possibility of hidden quality change here, but I am not sure of its direction. For example, the average educational attainment of military personnel has increased, but the complaints about the dedication and toughness of the armed forces parallel what has been said about industrial workers.

The most serious danger of overstating growth arises, I believe, in the machinery sector—consumer durables, the machinery and equipment component of new fixed investment, and capital repair. The index for consumer durables is based on deflated retail sales, that for investment in machinery and equipment relies on the Soviet constant price series, and the index for capital repair is derived by deflating reported Soviet data in current prices. Indeed, the problem is potentially worse on the end-use side than it is on the sector-of-origin side because the end-use indexes do not include a deflationary component like the physical production series in the machinery production index.

My sense of where the biases may be on the end-use account is set out in table 6; the trick is to weight these various biases in some reasonable fashion. My approach was much like that taken on the sector-of-origin side. Instead of a consumer durables index based on the official *tovary* series, I assumed that the degree of inflation in this series was equal to half the difference between the average growth in Treml's indexes for producer durables, which are based on physical production, and our indexes for equivalent sectors, which are based on reported ruble values of output. For the period 1950 to 1986, this worked out to a 5.6-percent instead of a 9.6-percent average annual rate of growth. For the machinery and equipment component of investment I used the same discount factor that was applied for the production of machinery and equipment. This reduced growth of this end-use component from 9.2 percent to 6.4 percent. Similarly, the discount for growth of capital repair is carried over from the capital repair sector of MBMW output. Finally, the adjusted indexes for end-use services were obtained by applying the same adjustment factors that were used on the sector-of-origin service accounts.[2]

The results of this exercise can be seen in table 7. Remember that the rates of growth for GNP are the same as those in the table for GNP by sector of origin because the sector-of-origin estimates provide the control totals for GNP. The main differences between CIA's current estimate and the adjusted estimate lie in (a) a somewhat slower growth for consumer goods in the adjusted estimate because of slower growth of consumer durables, (b) substantially faster growth of consumer and government services, and (c) an appreciably slower growth of new fixed investment and capital repair. The effect of these adjustments to CIA's GNP measures is not negligible, however. If these differential rates of inflation had indeed prevailed over the whole period from 1950 to 1986, the

[2] More work needs to be done here, because the understatement of growth of the materials components of the various services is not likely to be as large as that for the value-added part.

Table 6
Bias in CIA Index of Soviet GNP by End Use:
A First Approximation

End Use	Assessment of Bias			Percentage Share of GNP at Factor Cost in 1982
	Understatement	About Right	Overstatement	
Consumption				52.6
Consumer goods				34.7
Food		x		24.6
Animal products		x		(13.1)
Processed foods		x		(2.2)
Basic foods		x		(6.0)
Beverages		x		(3.4)
Soft goods		x		6.5
Durables			x	3.6
Consumer services				17.9
Housing	x			4.7
Utilities	x			1.7
Personal transportation		x		1.7
Personal communications		x		0.4
Repair and personal care			x	1.9
Recreation, art, physical culture		x		1.0
Education	x			4.1
Health	x			2.5
Investment				27.4
New fixed investment				22.0
Machinery and equipment			x	7.6
Construction and other		x		14.2
Net additions to livestock inventories		x		0.3
Capital repair			x	5.5
Defense		x		15.9
Other government expenditures				3.6
Administration and other services	x			3.2
Civilian research and development		x		0.4
Outlays, not elsewhere counted (including inventory change and net exports)				0.5
GNP				**100.0**

Table 7
USSR: Alternative Estimates of Growth of GNP by End Use at Factor Cost, 1951-86

Average annual percentage change

	Current CIA Estimate	Adjusted Estimate
Consumption	3.8	4.0
Consumer goods	3.7	3.4
Consumer services	4.1	5.0
Investment	7.1	6.2
New fixed investment	6.6	5.6
Capital repair	10.3	9.2
Defense	2.8	2.8
Other government expenditures [a]	2.4	3.2
Residual [b]	[c]	4.3
GNP	**3.9**	**4.0**

[a] Administration, other services, and civilian research and development.
[b] Includes net exports, inventory change, and statistical discrepancy.
[c] Declines from 8.5 billion rubles to −1.2 billion rubles.

Table 8
USSR: Alternative Estimates and Distribution of GNP by End Use at Factor Cost, 1986

Percentage shares

	Current CIA Estimate	Adjusted Estimate
Consumption	52.1	53.7
Consumer goods	34.0	29.8
Consumer services	18.1	23.9
Investment	29.2	21.2
New fixed investment	23.4	17.2
Capital repair	5.8	3.9
Defense	15.8	15.2
Other government expenditures [a]	3.1	3.8
Residual [b]	−0.2	6.1
GNP	**100.0**	**100.0**

[a] Administration, other services, and civilian research and development.
[b] Includes net exports, inventory change, and statistical discrepancy.

distribution of GNP by 1986 would have been quite different. The composition of consumption shifts markedly, for instance, and investment's share of GNP drops by almost one-third (see table 8).

Even more striking would be the implications of the adjustments for how we view factor productivity in the Soviet economy or—even before we can do this—how we estimate factor cost weights for our measures of GNP by sector of origin and end use. To demonstrate, a simple exercise looking at the stock of machinery and equipment (M&E) over time by means of the perpetual inventory method was undertaken. Investment was assumed to enter the stock, retain its initial value through time, and then drop out after 20 years. We further assumed an average rate of growth of investment of 7.6 percent, the value the Soviets report as the average annual growth of the machinery and equipment component of new fixed investment from 1950 to 1986. The behavior of the capital stock of M&E under alternative assumptions regarding the inflation component in new fixed investment in M&E is shown in table 9 and 10. We look at two end points: letting the model run for 20 years and, alternatively, for 40 years. The results simply illustrate the profound effect on the value of the capital stock if we conclude that the official investment numbers have an inflation component of as little as 2 percent.

Comparability of Soviet Statistics: Pre- and Post-1985

Finally, let me turn to *glasnost* and its effects on our GNP measures. [redacted] STAT STAT STAT It is probably fair to say that it has not been a bonanza so far. We live in hope, however. In this connection, the promised publication of some of the specialized statistical handbooks will be welcome after a lapse of so many years. And, of course, we will be greatly interested to see what the USSR decides to reveal about its defense budget. Will the revelations put us

Table 9
Deflated and Undeflated Growth in Capital Stock With Initial Investment of 5 Billion Rubles [a]

Rate of Inflation	Billion rubles			Average annual percentage growth		
in Percent	K	K*	K/K*	K	K*	K/K*
a. Capital stock after 20 years (no retirements)						
0	331	331	1.0	5.3	5.3	0.0
1	331	302	1.1	5.3	4.4	0.9
2	331	279	1.2	5.3	3.6	1.7
3	331	258	1.3	5.3	2.8	2.5
4	331	241	1.4	5.3	2.1	3.2
b. Capital stock after 40 years						
0	1,114	1,114	1.0	6.9	6.9	0.0
1	1,114	831	1.3	6.9	5.8	1.1
2	1,114	630	1.8	6.9	4.6	2.2
3	1,114	486	2.3	6.9	3.6	3.2
4	1,114	383	2.9	6.9	2.6	4.2

[a] Where:
1. Nominal average annual growth of investment = 7.6 percent.
2. Initial stock of capital = 100 billion rubles.
3. K = undeflated capital stock and K* = deflated capital stock.

out of work or become another area of dispute between the United States and the Soviet Union?

The other effects of *perestroyka*, however, are still very hard to figure out. Perhaps the most important potential effects are (a) the wringing of some of the water out of the statistics reported up through the statistical hierarchy, (b) the impact of the campaign for higher quality on both physical production and value statistics, (c) the possibility that some production of goods and services that used to go unreported will now be reported under the new regulations on private and cooperative activity, and (d) the effect of self-financing and a partial decentralization of pricing decisions on Soviet value statistics.

Because of stricter controls over reporting and state inspection, the level of output reported may be less than would have been reported in the pre-Gorbachev era. We have seen a good deal of evidence, for example, that *Gospriyemka* has held production down, especially in machine building. Therefore, we have a problem this year and perhaps in the next few years in evaluating Soviet economic performance. I would think, though, that after a relatively brief interval a new equilibrium would be established. Overreporting should stabilize, probably at a lower level, although Gorbachevian pressure to fulfill the plan while undergoing reform encourages enterprises to overstate their performance. Similarly, state inspection will be extended throughout industry, and enterprises are likely to find a fairly stable combination of compliance and evasion.

Another new development—the new encouragement to private activity—works the other way. To the extent that activities that had been carried out in the second economy are brought into the open, statistical reporting will give an inflated picture of the growth, particularly in the service sector. In a year or so, however, the Soviets are likely to have published enough about the results of the new decrees to give us

Table 10
Deflated and Undeflated Growth in Capital Stock
With Initial Investment of 10 Billion Rubles [a]

Rate of Inflation	Billion rubles			Average annual percentage growth		
in Percent	K	K*	K/K*	K	K*	K/K*
a. Capital stock after 20 years (no retirements)						
0	561	561	1.0	6.3	6.3	0.0
1	561	505	1.1	6.3	5.3	0.9
2	561	457	1.2	6.3	4.4	1.9
3	561	417	1.3	6.3	3.5	2.7
4	561	381	1.5	6.3	2.6	3.6
b. Capital stock after 40 years						
0	2,129	2,129	1.0	7.3	7.3	0.0
1	2,129	1,562	1.4	7.3	6.1	1.1
2	2,129	1,160	1.8	7.3	5.0	2.1
3	2,129	872	2.4	7.3	4.0	3.1
4	2,129	665	3.2	7.3	3.0	4.2

[a] Where:
1. Nominal average annual growth of investment = 7.6 percent.
2. Initial stock of capital = 100 billion rubles.
3. K = undeflated capital stock and K* = deflated capital stock.

an idea of how much of a shift has occurred. And, as with tighter supervision of reporting, a new balance between the second and the first or open economy is likely to be struck.

What the combination of conversion to self-financing and some decentralization of pricing decisions will mean for Soviet data in so-called comparable prices is a much tougher problem. Certainly, the Soviets worry about enterprises pushing up prices. My hypothesis, nonetheless, is that in a long-term perspective, changes in the degree of exaggeration in Soviet reporting will not make much difference for our measures of GNP.

I would like to conclude with some observations about improving CIA's GNP estimates. First, we should assume that the Soviets are not going to go back and correct their statistics for distortions that arise from the pricing mechanism. We may, however, see some isolated instances of changing series given in physical measures, as the Soviets did in the case of cotton. Our best hope is that Goskomstat will provide more statistics on production. We need to be able to disaggregate our samples so that we can have more based on individual models rather than on broader categories. In other words, there is no quick fix to dealing with distortion in Soviet statistics. It requires a substantial investment in research time and some luck in getting access to more data.

[redacted]

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