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## Soviet Investment Policy in the 11th Five-Year Plan

An Intelligence Assessment

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September 1982

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An Intelligence Assessment

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## Soviet Investment Policy in the 11th Five-Year Plan

### Key Judgments

*Information available  
as of 1 August 1982  
was used in this report.*

Rapid growth of new plant and equipment outlays has always played a key role in the Soviet Union's strategy for promoting economic growth. In the latter half of the 1970s, however, growth in capital investment slowed markedly. The reasons for the slowdown include:

- Bottlenecks in sectors that provide key investment inputs such as steel and construction materials.
- A decision to maintain the primacy of defense spending against a background of tightening resource constraints.
- The leadership's apparent conviction, dating from the mid-1970s, that more and more investment was too costly a way of sustaining economic growth.

The decline in investment growth is slated to continue in the 1981-85 Plan period. The investment increase targeted—10.4 percent over 1976-80—is by far the lowest in the post-World War II era. Achievement of the growth in GNP and its component sectors implied by the 1981-85 Plan therefore depends critically on substantial increases in capital productivity. Indeed, increasing the efficiency of capital investment is one of the central national economic goals. The upward trend in the amount of capital per unit of output of goods and services (capital-output ratios) in the 1970s stands out as the dominant feature of the recent slowdown in Soviet economic growth and the source of much of the leadership's difficulty in arriving at decisions on resource allocations.

Moscow's chances of substantially boosting capital productivity during the current plan period are remote. The cornerstone of Soviet investment policy, as laid out at the 26th Party Congress in February 1981, is increased emphasis on replacement of machinery and equipment and the renovation of existing structures rather than investment in new construction. There is, in fact, little new in this policy, which aims at modernizing Soviet capital and using it more efficiently. It has been repeatedly promulgated in past five-year plans but never successfully implemented. The systemic reforms that might permit such an investment strategy to be carried out effectively are not likely to be instituted.

The pattern of investment allocations called for in the 1981-85 Plan also is likely to be a drag on overall capital productivity. The plan lacks balance. It stresses development of fuels and energy—apparently at the expense of other sectors, many of them also vital to economic growth. The projected

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distribution of investment suggests that Moscow has still not devised sound criteria for allocating investment, even though the need for improved planning and management of investment has become more urgent in the face of an impending reduction in the share of investment in GNP.

Without major improvement in capital productivity, the industrial output goals of the 11th Five-Year Plan are unattainable. As measured by a steady rise in incremental capital-output ratios (ICORs) in industry, capital productivity has been declining for several years. Most of the industrial production and investment targets for 1981-85 imply a reversal of this trend. Given the dim prospects for greater efficiency, however, and the continuing upward pressure on capital-output ratios, a reversal of ICOR trends seems virtually impossible.

Nor can the Soviet capital stock be significantly augmented by other means such as putting more plant and equipment into operation by reducing the huge volume of unfinished construction, lowering retirement rates, and buying more machinery abroad. Unfinished construction has, except in 1980, steadily mounted, and the systemic shortcomings that have defeated repeated attempts to arrest the upward trend are not likely to be eliminated. Retirement rates are already extremely low—so low, in fact, that they impede efforts to increase efficiency. The USSR's tight hard currency position restricts Soviet purchases of Western machinery, for which stepped-up imports of less technologically advanced East European machinery would be a poor substitute.

On balance, then, the slowing rate of investment growth and the declining rate of return on investment are likely to reinforce other economic factors impeding economic growth in the 1980s. Investment strategy seems certain to be a central topic in academic and professional debate, and probably in political circles as well. Criticism of the current strategy has already begun in the USSR, in some instances in leading Soviet publications and by prominent economists. Doubts have been expressed not only about the distribution of investment in 1981-85 but about the assumption that higher productivity of investment is compatible with reduced growth in investment.

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## Soviet Investment Policy in the 11th Five-Year Plan (U)

### Introduction

In the 1981-85 Plan, the USSR is counting on a rise in capital productivity to offset the decline in investment growth. The key questions treated in this paper are whether the policies by which the Soviet Union intends to improve the efficiency of capital investment will work and, therefore, whether the plan production targets, particularly the industrial goals, are realistic.

This assessment first describes Soviet investment strategy during the 1960s and 1970s and considers investment policies laid down for 1981-85. After an analysis of the planned allocations of investment, the consistency of industrial output targets and investment plans is discussed. Finally, the paper explores the options open to Soviet policymakers in dealing with the investment squeeze and reviews the evidence that a vigorous debate is under way in the USSR over investment policy.

### Soviet Investment Policy

*Strategy in the 1960s and 1970s.* In the postwar period the USSR has relied primarily on massive injections of labor and new plant and equipment to support economic growth. Total gross fixed capital stock in the USSR more than quadrupled between 1960 and 1980 (table 1). Soviet planners relentlessly pushed the expansion of capital assets by allocating a large and rising share of resources to capital investment, holding retirements to a minimum, and prolonging the service lives of technologically obsolete plant and equipment through repeated major repairs. In addition, past Soviet investment has tended to emphasize the creation of new facilities rather than the renovation of existing enterprises. As a result, the bulk of new fixed investment during the period was channeled into buildings and structures rather than into new machinery and equipment, although machinery and equipment are the principal carriers of new technology.

Table 1

USSR: Gross Fixed Capital in the Economy and in Selected Sectors (End of Year)

	Billion Rubles, 1973 Prices		1980/1960
	1960	1980	
Total *	398	1,744	4.4
Productive fixed capital *	226	1,149	5.1
Industry	100	551	5.5
Agriculture *	54	238	4.4
Nonproductive fixed capital	172	595	3.5
Housing	120	339	2.8

Note: The Soviets break down fixed capital (*osnovnye fondy*) into "productive" and "nonproductive" capital. In Marxist parlance, productive capital is used directly in the production process. Nonproductive capital includes capital in the housing and municipal services sector, in organizations and institutions of public health, education, science, culture, and art, and in administrative organs.

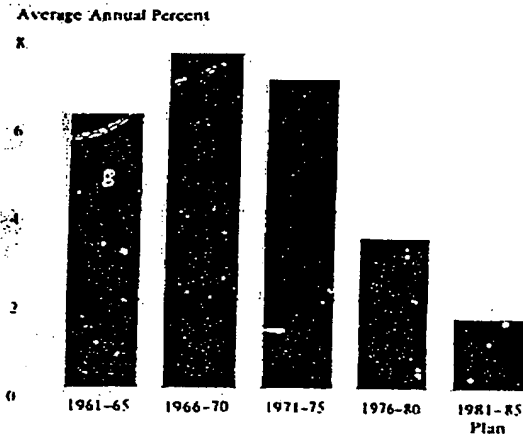
\* Including livestock.

Source: CIA Reference Aid<sup>c</sup>  
1982, *Soviet Statistics on Capital Formation*.

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In the latter half of the 1970s, however, Soviet planners opted to reduce sharply the rate of growth of new fixed investment. This decision was the first major indication that the much talked about transition from "extensive" to "intensive" development would be enforced—that is, from reliance on rapid increase in inputs to much greater emphasis on more efficient use of inputs and technological progress. Capital investment, which had grown at an average annual rate of 7 percent in 1971-75, slowed to an average annual rate of 3.4 percent in the last half of the decade. The leadership probably pared investment growth because it wanted to increase the priority for

Figure 1  
USSR: Growth in Gross Fixed Capital Investment



consumption while maintaining the primacy of defense spending. At the same time, many Soviet officials were concerned that the steady rise in capital-output ratios dating from the early 1960s demonstrated that simply relying on more and more investment to sustain economic growth was too costly (figure 1).

Most of the growth in investment during 1976-80 was concentrated in the first three years of the plan period. Growth averaged about 5 percent a year in 1976-78, but only about 1.5 percent in 1979-80. The slowdown in the last two years of the plan could reflect an attempt to adjust for more-than-desired investment in the first three years. However, it was more likely associated with the emergence in the late 1970s of bottlenecks in the production and distribution of such key investment inputs as steel and construction materials. The persistence of these bottlenecks helps explain the further reduction in planned investment growth in 1981-85.

*Strategy in the 1981-85 Plan:* In devising an investment strategy for the 1981-85 Plan, Soviet planners confronted an array of deserving petitioners:

- Because of declining growth in energy production, particularly coal and oil, huge investments had to be allocated to the exploration and exploitation of energy sources, particularly in West Siberia where large investment expenditures are needed in infrastructure as well as in producing fields.
- Subpar performance in the ferrous metals industry—stemming from inadequate past investment in certain key areas—required heavy outlays in that sector.
- Hobbled by years of neglect, the Soviet transportation system is unprepared to meet the increasing demand for services. Major investments in new roads, inland waterways, rail lines, and rolling stock seemed necessary.
- Despite the huge sums spent on agriculture under Brezhnev—agricultural investment now accounts for 27 percent of total investment—the leadership continues to perceive a strong need for investment in this sector.
- Advocates of consumer-oriented programs argued for a larger share of investment—notably for the modernization of light industry and housing construction.

Meanwhile, capital-output ratios have been steadily rising in all major sectors of the Soviet economy and in most branches of industry, adding to the allocation problem by increasing the demand for investment.

\* This includes capital investment in state and collective farms—both productive and nonproductive investment—as well as expenditures for the construction of agricultural repair enterprises, scientific-research institutions, construction-related enterprises of the Ministry of Land Reclamation and Water Resources, enterprises for the processing of agricultural products, and other similar expenditures for the development of agriculture. This concept of agricultural investment is presented by the Soviets under the rubric "agriculture—entire complex of works." For an in-depth discussion of Soviet published statistics on agricultural investment, see CIA Research Report (S-82-001), August 1982, *Soviet Statistics on Capital Formation*.



**Table 2**  
**USSR: Capital-Output Ratios**

	1960	1965	1970	1975	1980
Total economy	1.6	1.9	2.2	2.7	3.3
Industry	1.5	1.9	2.1	2.4	2.8
Ferrous metals	2.2	2.5	3.0	3.5	4.5
Fuels and power	3.1	3.4	3.8	4.1	4.8
Machinery	0.9	1.1	1.3	1.5	1.8
Chemicals	1.9	2.5	2.9	3.1	3.9
Agriculture	0.6	0.8	1.0	2.0	2.9
Transportation and communications	3.1	3.1	3.2	3.4	4.0
Construction	0.4	0.6	0.8	1.0	1.3

Sources: Ratios were constructed by dividing values of gross fixed capital stock found in CIA Reference Aid *Soviet Statistics on Capital Formation* by values of output found in CIA GNP accounts, unpublished.

The capital-output ratio for the overall economy, for example, more than doubled between 1960 and 1980 (table 2). A number of factors have been responsible. There has been a shift to more capital-intensive forms of production in order to conserve labor and fuel. Minerals, fuels, and raw materials are found in more inaccessible regions of the country. Systemic deficiencies such as the lack of effective control over investment projects and inefficiencies in construction work have also contributed to the rise in the ratio. Construction time, for example, is extremely long in the USSR, and construction norms are often exceeded by significant margins. According to a Soviet economic journal:

*Construction time for large industrial projects is five to 10 or more years and three to four years for medium-sized projects. This is much longer than the construction time in the United States and other developed countries where large enterprises in ferrous metallurgy are built in less than 24 months and enterprises in the majority of other branches are built within a year. The*

*project planning time (frequently two to three years or more) and the time required to reach the technical and economic potential of newly activated production capacities are excessively long at the present time. As a result, when a new or rebuilt enterprise begins operating at full capacity it is already technically obsolete. This is not surprising when we consider the modern tempo of scientific and technical progress.<sup>1</sup>*

After weighing all the competing demands for investment allocations and reviewing the resources available to them, the leadership decreed a further slowdown in the growth of new fixed investment. The original 1981-85 Plan targeted an increase of 12 to 15 percent in total new fixed investment for the five-year period over the last half of the seventies. The goal was revised downward to 10.4 percent by President Brezhnev at the November 1981 meeting of the Supreme Soviet, at least partly on the grounds that investment resources were still out of balance with investment plans.

To justify the gamble it is taking, the regime is counting on an upturn in capital productivity. Increasing the efficiency of capital investment has been singled out as one of the central national economic goals of the 1981-85 Plan. As Gosplan Chairman Baybakov put the issue in his November 1981 speech to the Supreme Soviet:

*For the first time in the practice of national economic planning, the planned growth of national income exceeds the planned growth of capital investment. This requires fundamentally new approaches to the distribution of capital investments and organization of construction. Chief attention must be devoted to increasing the effectiveness of capital investments and better coordinating capital construction with the material and technical resources and potential of construction and installation organizations*

<sup>1</sup> T. Khachaturov, "Puti povysheniya effektivnosti kapital'nykh vlozheniy." *Voprosy ekonomiki* (July 1979), pp. 120-133.

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The investment strategy hammered out at the 26th Party Congress in February 1981 depends first of all on getting better control over construction work. Detailed lists of all construction projects—both new construction starts and reconstruction—are to be assembled, approved by appropriate authorities, and rigidly adhered to over the course of the plan. The plan for construction projects is to be consistent with available construction materials, labor resources, power-generating equipment, financial resources, and with the existing capabilities of construction and installation organizations. To speed up construction work, payment for construction work will not be made until a project is completed, and up to 0.5 percent of the estimated cost of construction and installation work is to be credited to the participating organizations for each month that construction is finished ahead of schedule. In addition, construction worker bonuses are to be predicated on the volume of construction and reconstruction work completed.

The dominant theme of Moscow's investment policy, however, is the increased emphasis on renovating and reequipping existing facilities. That is, a larger share of investment is to go for machinery and equipment and less for buildings and other structures. About half the increase in ferrous metals output during 1981-85, for instance, and approximately 85 percent of the increment in machinery output are to result from renovation. Soviet planners claim that renovation is advantageous because it (1) involves mainly new machinery and equipment and relatively little expensive construction work, (2) accelerates the withdrawal of old technology from production processes and hastens its replacement with new, resource-saving technology, and (3) shortens construction time.

But this approach is not new. The Soviet leadership has long stressed the importance of renovation and reequipping at the expense of new construction. Professor Stanley H. Cohn estimates that the share of

<sup>1</sup> According to the Central Statistical Administration, the rate of return on reconstruction investment is 1.5 times larger and lead-times 27 percent lower than on new construction. See David A. Dyker, *Planned and Unplanned Investment Patterns in the 1980s*, paper delivered at Colloquium on the CMEA Five-Year (1981-85) Plans in a New Perspective: Planned and Non-Planned Economies, NATO, Economics Division, 28-29 June 1981.

equipment in the Soviet capital stock increased by only one percentage point between 1958 and 1977.<sup>4</sup> According to data published by the Scientific Institute of Gosplan, in the 1970s the share of equipment in the industrial stock of fixed capital increased from 39.2 to only 39.8 percent.

Boris Rumer, among others, has examined the reasons for the failure of this renovation and reequipping strategy.<sup>5</sup> He found that:

- The replacement of machines often requires extensive and expensive remodeling, reengineering, and even the expansion of existing facilities. This is especially true in the European parts of the country where the Soviet industrial plant is much older and is situated in densely populated areas.
- The Soviet "investment complex" (machine-building industries, construction enterprises, and design organizations) has been ill prepared and poorly motivated to sustain the policy. Design enterprises, for instance, tend to concentrate on designing new enterprises because standard construction projects are much easier and more profitable. Also, the machine-building industry prefers to manufacture serial, standardized equipment rather than machines to fit the specific conditions and dimensions of an enterprise under renovation.
- Both the contracting enterprise and the construction firm prefer expansion to renovating or reequipping. Renovation interferes with production activity and can therefore jeopardize output goals and cut worker and managerial bonuses. Construction enterprises would rather expand existing facilities because they find it easier to work on open building sites and they can report a larger volume of work, enhancing their plan fulfillment record.

<sup>4</sup> Stanley H. Cohn, "Soviet Replacement Investment: A Rising Policy Imperative," *Soviet Economy in a Time of Change*, a compendium of papers submitted to the Joint Economic Committee, 96th Congress, 1st Session, Volume 1, 10 October 1979, p. 234.

<sup>5</sup> V. Kremyanskii, "Izmenenii stoimosti stroitel'stva," *Voprosy ekonomiki*, No. 10 (October 1981), pp. 52-64.

<sup>6</sup> Boris Rumer, *Soviet Industrial Investments: Problems of the 1981-85 Plan*, The National Council for Soviet and East European Research, Washington, D.C., 10 June 1982.

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In any event, expansion often amounts to new construction, because both additions to existing structures and new enterprises built adjacent to existing facilities are frequently reported as expansion. The ability of construction organizations and their customers to thwart the will of the central authorities on investment policy is probably in large measure a reflection of the difficulty of monitoring myriad construction sites in a vast country. The evasion process may be aided by the failure of the statistical authorities to distinguish among expansion, renovation, and technological reequipping. In published statistics, all three of these items are lumped together under the heading of reconstruction.<sup>7</sup>

**Investment Allocations in the 1981-85 Plan**

Industry receives the largest increase in investment during 1981-85—a 23-percent increase compared with 1976-80 (table 3). Historically, industry has received the lion's share of investment resources, but if the 1981-85 Plan is fulfilled, industry's share would rise from about one-third (during the 1970s) to two-fifths of total capital investment. More than four-fifths of the increment to industrial investment is directed to just three branches—fuels and power, ferrous metals, and machine building. The fuel and power industries alone have been allocated two-thirds of the total increase in investment in industry

Capital investment in the entire fuel and power complex—electric power generation; coal, oil, and gas production; and pipeline construction—is to be 50 percent larger than in 1976-80 (table 4). The investment goals for fuels and power include increases of 20 percent for electric power, 63 percent for oil, and 120

<sup>7</sup> According to official data, the share of "renovation, expansion, and reequipping of existing enterprises" in the total volume of state capital investment increased from 68 percent in 1975 to 72 percent in 1980. Rumer estimates, however, that almost 60 percent of the money invested in existing enterprises between 1976 and 1980 was swallowed up by expansion. See Rumer op. cit., p. 21. According to Rumer, emphasizing reconstruction has increased the share of construction in total investment: "It seems justified to conclude that one of the consequences of expanding the extent of reconstruction in industry is to raise the share of construction in capital investment, and this leads to the relatively more rapid growth of buildings and structures than of equipment in fixed capital. In other words, the results attained contradict the stated goal." (Boris Rumer, *The Dynamics of the Capital Coefficient of USSR Industrial Output: Investment Process in Soviet Industry*, Final Report to National Council for Soviet and East European Research, Washington, D.C., p. 26.

**Table 3**  
**USSR: Investment in the**  
**11th Five-Year Plan**

Sector	Billion Rubles, 1973 Prices		Percentage Increase
	1976-80 (Actual)	1981-85 <sup>a</sup> (Plan)	Plan 1981-85 Over 1976-80
<b>Total</b>	<b>634.1</b>	<b>700</b>	<b>10</b>
<b>Industry</b>	<b>223.6</b>	<b>275<sup>b</sup></b>	<b>23</b>
Ferrous metals	15.2	20 <sup>b</sup>	30
Fuels and power	65.7	100 <sup>c</sup>	52
Machinery <sup>d</sup>	53.9	59 <sup>e</sup>	10
Other	88.8	96	8
<b>Agriculture</b>	<b>128.5</b>	<b>138<sup>b</sup></b>	<b>7</b>
(Agriculture—whole complex of works)	(171.0)	(190)	(11)
<b>Transportation and communications</b>	<b>75.9</b>	<b>NA</b>	<b>NA</b>
Railroads	17.3	21 <sup>b</sup>	22
<b>Construction</b>	<b>25.4</b>	<b>NA</b>	<b>NA</b>
Housing	86.3	93	8

Note: Data for 1976-80 are from *Narodnoye khozyaystvo SSSR v 1980 g.*, p. 337. Plans for 1981-85 were compiled on the basis of information found in the open literature.

<sup>a</sup> In the case of total industry, ferrous metals, machinery, and the railroads, the 1981-85 figures were (a) calculated from planned percentage increases over 1976-80 published in the open press and (b) rounded to the nearest billion rubles.

<sup>b</sup> Estimated.

<sup>c</sup> See table 4.

<sup>d</sup> Includes metalworking.

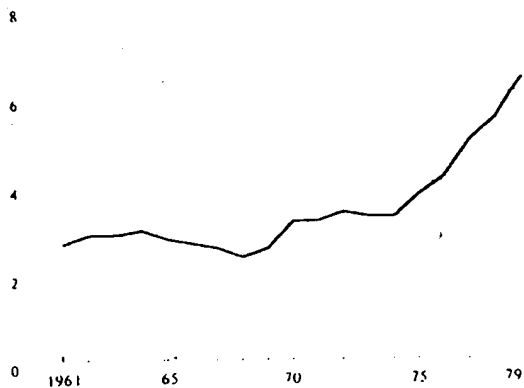
<sup>e</sup> Based on a statement by a Soviet official that capital investment in machine building will significantly exceed the level of the previous five-year period.

percent for gas. Although plans for the coal industry have not been published, investment in this sector probably will increase by about 20 percent.

<sup>8</sup> Gosplan Chairman Baybakov, in a speech before the USSR Supreme Soviet in November 1981, stated that 132 billion rubles of capital investment would be allocated to the fuel and energy complex during 1981-85. We estimate that the construction of gas and oil pipelines planned for this period will cost about 32 billion rubles. Subtracting this and planned allocations for oil, gas, and electric power published in the open literature (table 4) from 132 billion rubles results in an estimate of 12 billion rubles of capital investment for the coal industry during the 11th Five-Year Plan.

**Figure 2**  
**USSR: Incremental Capital-Output Ratios in Industry, 1961-79**

Three-Year Moving Average



most, if not all, of these sectors may have been slashed again in the plan for 1981-85. Even the consumer-related industries may have been cut despite leadership rhetoric that a central part of the program to raise living standards is the accelerated expansion of the light and food industries.

**Consistency of Investment and Production Plans Trends in ICORs.** Can the output goals for 1981-85 be achieved with the low growth planned for investment? For help in dealing with this question, we examined recent trends in the incremental capital-output ratios (ICORs) in industry—that is, the additional investment associated with a ruble's worth of additional industrial production. The ratios were then used to test the consistency between Soviet industrial output and investment plans for 1981-85

Because of data limitations we restricted the analysis to industry. Alternative sets of investment requirements were calculated for industry in 1981-85 depending on whether (a) the ICORs continued to rise as

they did in 1961-80 (Variant I in table 5), (b) the USSR managed to hold ICORs to 1980 levels (Variant II), or (c) the ICORs behaved as they did in 1976-80—that is, increased more steeply than in the 1961-80 period (Variant III)

The results for industry as a whole were sobering (figure 2). Whereas in the early 1970s each additional ruble's worth of output required three additional rubles of capital, by the end of the decade over six additional rubles of capital were required. Should this trend continue during 1981-85, overall industrial output would increase by little more than 2 percent per year rather than 5 percent per year as planned. Even if the rise in the ICOR for industry is somehow arrested, output would grow by no more than 3 percent annually during 1981-85."

There appear to be two exceptions to the general picture of output goals being set far too high with respect to projected capital outlays. Investment plans for fuels and ferrous metallurgy appear sufficient to

"These calculations are based on Western estimates of actual industrial output, which differ from Soviet estimates because of methodological differences in their calculation. In short, Western observers consistently find official achieved rates of output growth to be biased upward. (On the other hand, *ex ante* planned indicators are acceptable.) For more on these matters, see CIA Research Paper August 1980, *Comparing Planned and Actual Growth of Industrial Output in Centrally Planned Economies*.

Moscow's perceptions of its economic problems, however, depend on its own economic statistics. To test the difference, we recalculated ICORs for total industry using Soviet figures for actual gross value of industrial output published in the annual issues of *Narodnoye khozyaystvo*. A comparison of the estimated investment requirements obtained with the results we obtained previously (table 5) are shown below in billions of rubles (1973 prices):

	Variants			Planned Investment
	I	II	III	
Western output measure	462	403	558	275
Soviet output measure	383	355	477	275

There is a substantial difference in the two calculations, indicating that Soviet perceptions of the USSR's investment needs may be much lower than our own. Still, even using the Soviet measure of industrial output, requirements exceed planned investment by a significant margin, particularly if recent ICOR trends continue

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**Table 4**  
**USSR: Planned Energy Investment During 1981-85**

Energy Sector	Billion Rubles, 1973 Prices		Percentage Increase
	1976-80 <sup>a</sup> (Actual)	1981-85 <sup>b</sup> (Plan)	
Fuel and power complex	88	132	50
Nonpipeline investment	66	100	52
Electric power	19	23	20
Coal	10	12	20
Oil	26	43	63
Gas	10	22	120
Pipeline construction	22	32	45

<sup>a</sup> Because of rounding, components of nonpipeline investment do not add to the total shown.

<sup>b</sup> In the case of electric power and oil, the 1981-85 figures shown were (a) calculated from planned percentage increases over 1976-80 published in the open press and (b) rounded to the nearest billion rubles.

Particularly ambitious targets have been set for the construction of gas pipelines. Five main lines extending from Tyumen Oblast in West Siberia to central regions of the country are to be brought on stream during 1981-85, and construction of a major export line from Urengoy to Western Europe is under way.

Investment in ferrous metallurgy is scheduled for a 30-percent boost during 1981-85 in an effort to revive steel production, to modernize producing facilities, and to improve product quality. In addition, Soviet sources have hinted that capital investment in the machine-building industry will "significantly exceed" the level of the previous five-year period.<sup>5</sup> Ferrous metals and machinery are pivotal industries in the USSR, and they must do better than they have in the past few years if the economy is to regain earlier rates

<sup>5</sup> A. Stepun, "O ratsional'nom napravlenii kapitalovlozheniy v odinnadtsatoy pyatiletke," *Planovoye khozyaystvo*, No. 10, (October 1981) pp. 34-42.

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of growth. More modern machinery is vitally needed in almost all sectors of the economy to improve labor productivity, to substitute for increasingly tight labor supplies, and to conserve energy resources—all key components of the official investment and growth strategy for the eighties.

Investment in the entire agricultural complex is slated to rise by 11 percent during 1981-85—compared with 31 percent during 1976-80—and maintain its 27-percent share of total investment. In particular, to reduce losses of farm products, large increases are planned for constructing storage facilities—up 60 percent over 1976-80—and hard-surfaced roads on farms—up 40 percent over 1976-80. Crop waste and losses during and after harvest, reportedly amounting to 20 percent of total output annually, constitute one of Soviet agriculture's biggest problems.<sup>6</sup> The lack of adequate storage facilities is particularly serious. Last year in the RSFSR, for example, silage and haylage installations were available on only 44 percent of the republic's collective farms and 38 percent of its state farms. Only 55 percent of collective farms and 65 percent of state farms had vegetable and potato storehouses, and 83 percent and 76 percent, respectively, had grain and seed storehouses.

The increases in new fixed investment scheduled for the two major sectors of the economy—industry and agriculture—coupled with increases planned for the railroads and for housing construction more than consume the total targeted increment to overall investment. Consequently, investment allocations to selected industries and some sectors of the economy must have been cut. We cannot say with certainty which particular sectors have been singled out for reductions. Among the possibilities are the chemicals, construction materials, timber, and consumer goods (light and processed foods) branches of industry as well as the so-called nonproductive sectors of the economy—science, education, health, personal services, and the like. Investment allocations to most of these sectors, with the notable exception of the consumer goods industries, were reduced in 1980 compared with the previous year. Investment funds for

<sup>6</sup> G. Kulik, "Ob effektivnosti kapital'nykh vlozheniy v sel'skom khozyaystve," *Planovoye khozyaystvo*, No. 10, (October 1981), pp. 91-97.

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**Table 5**  
**USSR: Estimated Investment Requirements, 1981-85<sup>a</sup>**

*Billion rubles, 1973 prices*

	Variant I: 1961-80 ICOR Trend Continues	Variant II: ICOR Stays the Same as in 1980	Variant III: 1976-80 ICOR Trend Continues	Planned Investment
<b>Total industry</b>	<b>462</b>	<b>403</b>	<b>558</b>	<b>275</b>
Ferrous metals	19	17	21	20
Fuel	58	46	80	77
Electric power	30	28	37	23
Machinery	112	97	115	59
Chemicals	47	41	61	22 <sup>b</sup>
Construction materials	42	33	73	9 <sup>b</sup>
Light industry	17	15	19	9 <sup>b</sup>

<sup>a</sup> The ICORs were derived by dividing changes in the capital stock by changes in output. The figures in the above table give investment requirements for each industry on the assumption that investment is equal to the expansion of the capital stock commensurate with various ICOR trends, with allowance made for replacement of wornout structures and machines as well as for projected increases in unfinished construction. An additional adjustment was made in the case of the fuels sector mainly because of large expenditures for drilling for oil and gas. Expenditures for drilling in the USSR are classified as new fixed investment, but such outlays do not result in additional commissioned capacity. To allow for this, the investment requirement figures for fuel in Variants I, II, and III were raised from their unadjusted values of 34, 27, and 47 billion rubles,

respectively, as follows: During 1976-80 about 46 billion rubles were invested in the coal, oil, and gas industries, but the capital stock in these industries increased only 23 billion rubles. Allowing for an increase in unfinished construction of over 4.5 billion rubles and perhaps another 3 billion rubles of investment to replace wornout machinery and equipment means that each billion ruble increment to the capital stock required 1.7 billion rubles of capital investment during the period. Applying a similar ratio to the 1981-85 period yields the investment requirements shown in the table.

<sup>b</sup> The figures shown are the investment allocations during 1976-80. These industries probably face cuts. At best, investment will be held at 1976-80 levels.

meet output goals even if ICORs rise in these sectors at the rates of the recent past. Even in some parts of these sectors, however, output goals may be beyond reach for other reasons. In the coal industry, for instance, labor shortages are hampering production.

As for other sectors, inadequate amounts of investment alone probably will preclude fulfillment of production targets. Investment goals for electric power, machine building, construction materials, light industry, and chemicals will be far short of requirements even if rising ICOR trends can be stopped—which, as we argue below, seems unlikely.

**Prospects for ICORs.** It is highly unlikely that the planners can reverse or even arrest the rising trends in the ICORs in industry during the current five-year plan period. The ratios for overall industry and for individual branches such as chemicals, machine building, and construction materials would have to be reduced to mid-1970 or earlier levels in order to meet 1981-85 output targets. The factors that influenced ICOR trends in the late 1970s, moreover, are likely to have even more impact in the 1980s

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The Soviet economy is becoming increasingly dependent on the Siberian areas of the country for fuel and raw materials. Developing these new resource areas requires heavy capital investment, particularly construction activity. Construction costs in the eastern regions range from 30 percent higher to more than double those in the European part of the USSR. Furthermore, most of the areas where resources must be developed require large investments in both basic facilities for exploration and exploitation and social overhead capital—roads, housing, and cultural and service facilities. During the 1980s, for instance, we estimate that the eastern regions of the USSR will provide almost the entire increment of oil and gas production and more than 90 percent of the increment of coal production.

In addition, in both the traditional producing areas of the European USSR and Siberia, the declining quality of readily available raw materials is pushing up capital requirements because of the cost of enriching the minerals and ores. As lower quality resources are being extracted from more distant, less hospitable locations, capital costs have been rising more rapidly than output.

The returns from many investment projects, moreover, will not materialize for long periods of time. This is particularly true in ferrous and nonferrous metallurgy, where the time to bring new capacity on line is often 10 to 15 years or longer. The construction of the Muruntau gold plant, potentially the world's largest, began in 1967 and is still not completed. Large investment expenditures are required also to explore for new oil reserves. Return on this investment could be as far off as five to 10 years, the time it takes to bring new oilfields on stream.

For particular industries, these and other circumstances translate into escalating requirements for capital goods just to produce current levels of output. In the oil industry, for example, investment requirements are rising sharply, as reflected in the investment plans. By 1985 drilling is to be almost double the 1980 level, much of it to greater depths and in more isolated areas. This will require increasing

amounts of high-quality drill pipe, rigs, and other equipment. In addition, the current inventory of producing wells is being converted from free-flowing to mechanized wells—particularly in West Siberia. This will require large investments in gas lift equipment, pumps, and the like. Meanwhile, the share of water in total fluid produced at Soviet oilfields has been increasing rapidly. Far more pumping equipment will be required in the 1980s to stabilize and maintain the oil output at aging fields.

Declining quality of resources has hindered steel and coal production. The erosion in iron ore grades, for example, has raised production costs sharply and forced the USSR to devote a growing share of investment to building iron ore enrichment facilities. Accessibility to resource supplies has become a particularly difficult problem for the forestry and wood-working industry. Moscow has had to go further and further into climatically and geographically difficult areas of Siberia for new timber supplies.

Large up-front investment costs and delayed payoffs are being confronted particularly in transportation and in the nonferrous and ferrous metallurgy industries. For example, the Soviets are allocating large amounts of investment capital to the construction of the Baikal-Amur Mainline. The return from this investment cannot be expected for many years since much of the increased investment expenditure is for structures such as roadbeds, bridges, and tunnels rather than equipment that might significantly improve present railroad performance through gains in worker productivity. In ferrous and nonferrous metallurgy, it often takes 10 to 15 years and in some cases even longer to bring new capacity on line.

#### Coping With the Investment Squeeze

If trends in capital-output ratios continue to be unfavorable, the options available to the leadership in dealing with the investment squeeze are limited. It could try to (1) reduce dramatically the amount of unfinished construction in the different branches of industry, (2) lower retirement rates for the industrial capital stock, (3) increase imports of machinery and

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equipment, or (4) generally improve the planning and management of investment. None of these possibilities, however, hold much promise for significant gains in the near term.

**Reduced Level of Unfinished Construction.** Reducing the large amount of unfinished construction—construction and installation work beyond initial stages but not finished to the point of permitting use of the assets—has always seemed to Soviet planners a cheap way of generating more fixed capital in a short time. The amount of unfinished construction has more than doubled since 1970 and in 1980 was equivalent to about 6 percent of the value of the total capital stock in the economy, and to almost 80 percent of total fixed capital investment. Indeed, the volume of unfinished construction is largest in some of the more troubled branches of industry—machine building and ferrous metals.

The existence of such a large volume of idle capital assets in the face of the increasing scarcity of investment goods is somewhat paradoxical. Much of the explanation lies in the persistent overbidding for investment resources by ministries and enterprises, for which capital is generally inexpensive. Much capital is allocated directly by the central authorities, and the relatively low 6-percent charge on capital that enterprises have had to pay since the mid-1960s has not significantly discouraged them from undertaking more investment than they can complete in reasonable lengths of time.<sup>11</sup>

Even the rapid commissioning of this pool of idle assets would provide at best a one-time boost to the existing capital stock, not a continuous infusion of fixed capital. Furthermore, the boost would be relatively small. If Moscow succeeded in commissioning as much as half of the present volume of unfinished construction during 1981-85, the average annual growth of the total capital stock during this period would increase less than half a percentage point

<sup>11</sup> Overbidding, as David A. Dyker points out, reflects the built-in incentive ministries have (a) to undertake as many building projects as possible in period 1 in order to get more investment funds in period 2 and (b) to continue projects once begun even if they become uneconomical for fear of jeopardizing future investment allocations. Enterprises also have an interest in spending internally generated capital investment funds as rapidly as possible. See Dyker, *op. cit.*, pp. 7-8.

In point of fact, the Soviet leadership has rarely succeeded in reducing the backlog of unfinished construction. It has been rising almost without pause during the last two decades despite repeated efforts to reduce it. The single exception was 1980, when it fell by 1 percent.<sup>12</sup>

**Lower Retirement Rates.** Moscow could also make fixed capital grow faster by requiring enterprises to hold on to existing capital assets for longer periods of time. Retirement rates in the USSR, however, are already extremely low. Even though officially designated service lives of productive assets have been shortened twice during the postwar period—in 1963 and in 1975—Soviet asset lives still substantially exceed those in the United States and other Western economies. For example, the average retirement rate of the Soviet capital stock during 1961-80 was 1.5 to 1.7 percent annually.<sup>13</sup> By way of comparison, the overall stock of equipment and structures in the United States was retired at an average annual rate of 3.7 percent during the same period.<sup>14</sup>

Productive assets can be retained for longer periods only by heavier maintenance expenditures—"capital repairs" in Soviet terminology—and at the expense of modernization through investment in new equipment.<sup>15</sup> In 1976, 29 billion rubles were spent on capital repairs—13.3 billion for repair of buildings and structures and 15.7 billion to repair machinery and equipment. This was roughly equal to one-fourth of total

<sup>12</sup> Note, however, that statistics on unfinished construction are given in current prices, whereas capital stock data are published in constant prices. There may be some overstatement, therefore, of the volume of assets available in the form of unfinished construction.

<sup>13</sup> CIA Reference / JSOV-82-10093 (Unclassified), *op. cit.*, pp. 10-11.

<sup>14</sup> See Cohn, *op. cit.*, pp. 238-239, for a comparison of the service lives of industrial equipment in the USSR with those in the United States and other Western countries.

<sup>15</sup> In Soviet practice, maintenance expenditures fall into two categories: current and capital repairs. Current repairs cover preventive maintenance and routine servicing of machinery and equipment. Capital repairs involve major renovation outlays to replace defective or worn parts of existing assets in order to extend the useful life of machines. The former are treated as a cost of production whereas the latter are financed from amortization allowances. Capital repairs account for 40 percent and replacement investment for 60 percent of amortization allowances.

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capital investment that year." When the large sums spent annually on current repairs, which are estimated to equal the cost of capital repairs, are added in, Moscow's maintenance bill becomes staggering. Capital repair is also a highly labor-intensive and capital-intensive activity that represents a heavy drain on scarce manpower and equipment resources. Repair activity, for example, absorbs an estimated one-tenth of the entire industrial labor force and one-third or more of the Soviet machine tool park.

Reducing retirement rates, therefore, might well be counterproductive. The demands for capital and current repair would become even greater. Moreover, since capital repairs are an alternative to replacement investment, increasing service lives of existing assets would further delay the modernization of industry in the Soviet Union.

*Imports of Machinery and Equipment.* The USSR could also ease the strain on investment resources by importing more machinery and equipment, both from the West and from Eastern Europe. Soviet purchases of machinery from the West, however, have fallen by two-thirds since the mid-1970s as the USSR struggles to right its hard currency balance, and Moscow's ability to increase machinery imports from the West is currently constrained by its tight hard currency position. The USSR's continuing requirements for hard currency imports of grain and other agricultural commodities, combined with soft Western markets for Soviet oil and other primary product exports, suggest that the leadership will be unable to buy substantial amounts of machinery and equipment from the West in the near term.

The East Europeans currently provide a large volume of machinery and equipment to the USSR. In the main, however, this machinery does not approach the quality or the technological level of that available in the West. Consequently, Moscow will not be able to turn to Eastern Europe for more sophisticated machinery. The Soviets also will be hard pressed to free up hard currency to purchase equipment in the West by turning to Eastern Europe for nonmachinery imports. Eastern Europe is not in a position to fill

"Scott Butler, *The Growth of Capital Repair in the USSR, 1950-1977*, unpublished, p. 53

Moscow's needs for grain or much of its requirements for industrial raw and semifinished materials.

*Better Planning and Management.* Improved planning and management of investment could offset some of the effects of slower investment growth. In particular, steps that would permit more rational allocation of investment among sectors and projects, and more rational use of investment resources on given projects, could help boost the overall productivity of capital. Without major (and unexpected) systemic changes, however, such improvements are unlikely. The basic problem is that resources for investment are still for the most part allocated more or less arbitrarily by Moscow.

Efforts to introduce economic criteria to put centralized, administratively determined investment on a more rational footing have not fared well. As noted above, squandering of capital resources was not materially reduced by terminating capital's status as a "free good" with the introduction in the mid-1960s of a 6-percent charge on capital. Nor has application of various "coefficients of effectiveness" to serve as measures of the return on capital helped. In any event, even well-designed and effectively enforced criteria could still lead to misallocation of capital because of the failure of Soviet prices to adequately reflect relative scarcities

#### *Intensified Debate Over Investment Policy*

The official view that the need for increased investment can be substantially avoided by higher capital productivity has been publicly challenged within the Soviet Union. The fact that opposition views were published at all suggests significant political support for such criticism and could mean that a debate over investment policy is currently under way in the USSR. The prominent Soviet economist A. G. Aganbegyan, for instance, questioned the planned distribution of investment in 1981-85 in *Pravda* earlier this year.<sup>1</sup> He argued that there should be more investment in the machinery sector now, even at the expense

"A. G. Aganbegyan, "Intensifikatsiya: sushchnosti, puti i sredstva klyuchevoy faktor rosta," *Pravda*, 24 February 1982, p. 1

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of other industries with a high priority for capital investment, since, in the long run, the productive capacity of these other industries depends on the acquisition of more and better machinery.<sup>1</sup>

The strongest and most direct criticism, however, appeared in two articles in the March 1982 issue of *The Economics and Organization of Industrial Production* (EKO).<sup>2</sup> The authors went beyond Aganbegyan's statement. They argued that increased capital productivity and the success of an "intensive" development strategy, at this juncture at least, require rapid growth in investment because:

- Rising labor productivity, through means other than increased productive capacity (such as better organization and management of labor), will lead to unemployment of workers released because of greater efficiency unless there is capital for them to work with.
- Capacity utilization rates went above optimum levels in the mid-1970s. Therefore, attempting to push these rates still higher simply leads to higher unit costs, increased downtime, and reduced production.
- Capacity utilization rates in fact have recently fallen in many industries, but the lower rates do not indicate the existence of usable capacity that can be put into operation on demand. Rather, they reflect bottlenecks in sectors supplying inputs on which use of this capacity depends.
- Much of the USSR's plant and equipment is old and obsolete, requiring large investment outlays to replace these outmoded facilities with the modern, technologically advanced capital that economic progress and growth demands.

In other words, future progress in the development of the industrial sector is possible only on the basis of accelerating growth in the investment sector. More,

<sup>1</sup> K. K. Val'tukh, "Investitsionny kompleks i intensifikatsiya proizvodstva," and N. N. Baryshnikov and B. L. Lavrovsky, "Moshchnosti i rezervy," *Ekonomika i organizatsiya promyshlennogo proizvodstva*, No. 3, 1982, pp. 4-51.

not less, investment is required to make the transition from extensive to intensive growth.<sup>3</sup>

Advocates of the existing policy of reduced investment growth have not fallen silent, however. In *Ekonomicheskaya Gazeta*, D. Chernikov of the Gosplan Economics Institute maintained that studies undertaken by the institute have shown a trade-off between the rate of investment spending and investment leadtimes and capital stock retirement rates.<sup>4</sup> According to the study, too high a rate of capital investment requires longer periods of time for the investment to be assimilated and leads to slower rates of retirement of the capital stock. Modernization of existing plant and equipment is therefore delayed. He further notes that the studies have shown that capital and labor are not readily substitutable. Like Val'tukh, Chernikov implies that the complementarity between labor and capital is greater than generally believed. Chernikov concludes, however, that the rate of growth of capital investment should be slowed rather than accelerated to be consistent with the slower growth of the labor force and to take account of lags in the assimilation of new capital assets.

At some point, the arguments for higher investment may win out, particularly if economic growth continues to slow as we believe it will. This would entail, however, cutting either the defense sector or the share of resources going to the consumer, or both. Either of these operations would be painful. Living standards are stagnating in the USSR. Reducing the rate of growth in defense spending would also be difficult

<sup>2</sup> According to Val'tukh: "Sometimes one has occasion to encounter the notion that raising the efficiency of capital investments unfailingly involves a transition to low rates of growth of the scale of investments. Quite the opposite relationship is the normal one: When capital investments grow rapidly, there is an opportunity to eliminate disproportions, to accomplish major structural shifts aimed at raising the technical level of production and product quality, that is, in the final analysis to increase the efficiency of the investments themselves and of the economy as a whole. A slackening of investment activity inevitably leads to disproportions and a drop in the benefit per unit of the capital investments."  
<sup>3</sup> D. Chernikov, "Intensifikatsiya i sbalansirovannost'," *Ekonomicheskaya Gazeta*, No. 10, 1982, p. 10.

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given the momentum of present defense programs and the likelihood that the decision would have to be made during a succession period in the Soviet Union.

In any case, substantially raising the rate of increase in investment could not be done quickly. Much of the Soviet plant and equipment is badly in need of modernization, and resource bottlenecks are constraining production in industrial sectors that either produce investment goods directly—the machine-building industries—or provide inputs to these sectors—steel and construction materials. Boosting output in these industries will first require substantial investment in these sectors.

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