Soviet Economic Problems and Prospects

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Summary

The Soviet economy faces serious strains in the decade ahead. The simple growth formula upon which the economy has relied for more than a generation—maximum inputs of labor and capital—will no longer yield the sizeable annual growth which has provided resources needed for competing claims.

In the past, rapid growth enabled Moscow simultaneously to pursue three key objectives:

- catching up with the US militarily;
- steadily expanding the industrial base; and
- meeting at least minimal consumer expectations for improved living conditions and welfare.

Reduced growth, as is foreshadowed over the next decade, will make pursuit of these objectives much more difficult, and pose hard choices for the leadership, which can have a major impact on Soviet relations with Eastern Europe and the West.

This study examines the causes of the slowdown in growth, its implications, the policy choices open to the Soviet leadership, and their possible impact on defense, the consumer, foreign trade, and US relations.

Causes of the Slowdown

Factors tending to slow down the rate of growth have been apparent for some time.

- The drying up of rural sources of urban labor force growth;
- A slowdown in the growth of capital productivity;
- An inefficient and undependable agriculture which may be hit hard by a return of the harsher—but probably more normal—climatic patterns that prevailed in the 1960s;
- A limited capacity to earn hard currency to pay for needed technology imports and intermittent massive grain purchases.

These problems are not new. The Soviet leadership has tried to offset their effect by improvisation and palliatives, without impairing the priority development of defense production. They did not succeed, however, in preventing a steady fall-off in economic growth from its earlier high rate.

Looking toward the next five to ten years, these long-standing problems are likely to intensify, and will be joined by two new constraints which will greatly aggravate the resource strain: a sharp decline in the growth of the working age population and an energy constraint.

Labor force. In the 1980s the rate of growth of the labor force is expected to drop sharply (to less than 1 percent beginning in 1982) because of the depressed birth rates of the 1960s. Moreover, additions to the labor force will come mostly from ethnic minorities in Central Asia who do not readily move to the northern industrial areas.

In anticipation of this labor force constraint, the Soviet government is planning for an accelerated growth in the productivity of both labor and capital in the current 5-year plan (1976-80). But for years productivity gains have been slowing, and this trend is likely to continue given the sharply rising resource costs facing the economy. The more readily accessible fuel and mineral reserves west of the Urals are being rapidly depleted, while the abundant but more remote resources of Siberia and Central Asia require enormous investment outlays.

Energy. The most serious problem is a looming oil shortage. Soviet exploration and extraction policy has long favored increasing current output over developing sources of future output. As a result, new oil deposits have not been discovered rapidly enough to offset inevitable declines in older

fields. Consequently, production will begin to fall off in the late 1970s or early 1980s. The current level of oil production is close to the estimated maximum potential of 11 million to 12 million b/d. By 1985 oil output is likely to fall to between 8 million and 10 million b/d.

The decline in output may or may not be a temporary phenomenon. The USSR is counting on large new supplies of oil and alternative energy sources—coal, natural gas, and hydroelectric power—coming onstream beyond the mid-1980s. But most of these energy sources lie east of the Urals, far from major industrial and population centers: their development would take years and require massive capital investment.

In the near-term, however, even if the development of alternative energy sources is pushed to the maximum, overall energy output will grow at a sharply declining rate. Under a plausible set of assumptions, it would decline from 4 percent in 1976-80 to slightly above 1 percent in 1981-85. Since Soviet energy consumption increases in close parallel with the growth of the economy, a sharp slowdown in energy production would seriously constrain economic growth unless Moscow finds ways of conserving large amounts of energy or covers its shortfall by becoming a net oil importer. The Soviet government appears to be aware that it has an energy problem but has not yet made the difficult choices which will be needed to deal with it. The longer the delay in adoption of a top-priority energy program, the greater will be the economic impact in the 1980s.

Policy Choices

Measures for grappling with these varied problems must meet two tests: first, they must be designed to remedy particular elements of the problem—the labor force, productivity, and energy constraints; second, they must be shaped with the recognition that the problems are interrelated, and that measures aimed at easing one problem may aggravate another.

Even on the first level, it will not be easy to find solutions that will do more than alleviate the component problems. Powerful remedies are either not readily available or not politically feasible.

The labor force constraint could be eased somewhat by such measures as retaining older workers longer in the labor force, shortening secondary education, and reducing military manpower by cutting the term of service. But such measures would have only a one-time impact.

Moscow's options for raising the rate of growth and productivity of plant and equipment are even more constrained.

- They could convert industrial capacity from defense to the production of investment goods. They would be reluctant, however, to impair their defense production capability. Moreover, specialized defense resources are not easily transferred on short notice.

- They could stretch out R&D programs and production schedules and slow the rate of expansion of defense-oriented industrial capacity, but this would have limited effect in the short run.

- They could institute incentive-enhancing reforms of economic management. Such reforms, however, will be resisted by powerful vested political and bureaucratic interests.

Even a combination of these measures—such as a leveling off of defense production, coupled with measures to obtain additional manpower—would probably raise economic growth only slightly.

Options for dealing with the energy problem are similarly constrained. Opportunities for conservation are less obvious in the USSR than in the West—for example, there are few automobiles and most are for commercial or industrial use. Consequently, conservation measures alone are unlikely to yield large oil savings. The leadership thus will probably have to rely on some combination of the following measures:

- importing substantial amounts of oil from non-Communist countries;

- cutting oil exports to Eastern Europe; and

- severely rationing oil to domestic users.

Moving from a position of major oil exporter to that of a net importer would be particularly painful. Last year Soviet oil exports of $4.5 billion accounted for almost one-half of its hard currency earnings. If current trends are projected with no change in present policies, Soviet oil import requirements by 1985 could cost $10 billion at today's prices. Even with high priority measures to boost other exports, including gold sales, oil imports at

that level would absorb most of the Soviet hard currency earnings in the 1980s, and largely foreclose the import of other goods from the West, including badly needed Western technology.

Cutting oil exports to Eastern Europe would ease this problem by forcing Eastern Europe to share the burden of the oil shortage. Any substantial cut in the Soviet oil supply commitment to Eastern Europe, however, would worsen that area's already difficult economic situation.

Placing the burden of the oil shortage on the domestic economy would mean curtailing oil rations to producing enterprises. Such cuts would almost certainly impede production, though the impact would be less severe if reductions were more gradual as part of a long-term energy-saving program.

Implementing the foregoing solutions is complicated by the fact that the problems are interrelated and the solutions impinge upon each other. For example, pressure on enterprises to save labor will be much less effective if they must also save energy. If the energy shortage is eased by allocating foreign exchange to import oil, the resulting decline of imports of foreign machinery and technology would adversely affect productivity and economic growth within a few years. Failure to import large amounts of energy equipment and technology from the West would substantially worsen the USSR's prospects for raising oil and gas production in the longer-term.

We conclude that a marked reduction in the rate of economic growth in the 1980s seems almost inevitable. At best, Soviet GNP may be able to continue growing at a rate of about 4 percent a year through 1980, declining to 3 - 3 1/2 percent in the early and mid-1980s. These rates, however, assume prompt, strong action in energy policy, without which the rate of growth could decline to about 3 1/2 percent in the near-term and to 2 - 2 1/2 percent in the 1980s.

These are average figures; in some years performance could be better, but in others, worse, with zero growth or even declines in GNP a possibility if oil shortages and a bad crop year coincide.

Potential Impact on Defense The slowdown in economic growth could trigger intense debate in Moscow over the future levels and pattern of military expenditures. Military programs enjoy great momentum and powerful political and bureaucratic support. We expect defense spending to continue to increase in the next few years at something like recent annual rates

of 4 to 5 percent because of programs in train. As the economy slows, however, ways to reduce the growth of defense expenditures could become increasingly pressing for some elements of the Soviet leadership.

On Consumers The reduced growth potential means that the Soviet consumer will fare poorly during the next five to 10 years compared to recent gains. Under the projected growth rates, per capita consumption could grow no more than 2 percent a year in contrast to about 3.5 percent since 1965. As a result, there will be no progress in closing the gap in living standards with the West or, for that matter, with most of Eastern Europe. Moreover, rises in wages over the next ten years combined with a slower growth in the availability of consumer goods would result in higher prices, more widespread shortages, and increasing consumer frustration.

On Relations with the US Moscow's economic problems in the 1980s will affect its relations with the West, especially the United States. Since the USSR's ability to pay for imports from the industrial West in the early and mid-1980s will be strained, Moscow may seek long-term credits (10-15 years), especially to develop oil and gas resources. Much of the needed energy technology would have to come from the US.

Stresses upon the Leadership

These serious problems ahead seem most likely to prompt Soviet leaders to consider policies rejected in the past as too contentious or lacking in urgency. Some leaders might be persuaded that basic organization and management reforms in industry are necessary. But that will raise the spectre that such reform would threaten political control. Consideration of other options—such as accelerating investment at the expense of defense or consumption, or reducing the armed forces to enhance the civilian labor force—could also result in strong leadership disagreements. Soviet responses to these problems could be further complicated by the fact that leadership changes will almost surely take place during the coming period. Even a confident new leadership would have difficulties in coming to grips with the problems ahead

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Soviet Economic Problems and Prospects

Background

With the second largest economy in the world, the USSR has great crude economic strength—a wealth of natural resources, a labor force half again as large as that of the United States, and a tough, unchallenged leadership dedicated to continuous growth in economic and military power. During much of its development, the Soviet economy has grown at rates comparable to those of Western Europe but considerably faster than the United States. As a consequence, Soviet gross national product (GNP) has risen since 1955 from about one-third to roughly one-half that of the United States.

Soviet Development Strategy

Soviet growth strategy has been based largely on the enforced mobilization of capital and labor. By restricting the growth of consumption, the USSR has been able to devote a high and rising share of annual output to investment; in 1975, investment comprised nearly 30 percent of GNP, compared with 16 percent in the United States. In recent years a small but growing portion of new plant and equipment has been imported from the West. Growth of the labor force has been unusually rapid, and participation rates are the highest of any industrialized country. Moreover, large numbers of workers have been shifted from agriculture to industry and services, and substantial investment has been poured into education and training programs. Finally, rapid exploitation of relatively cheap and abundant natural resources, especially oil and gas, has played a key role in Soviet development.

An overriding objective of Soviet policy—the acquisition of a strong military capability—has dictated the pattern of industrial growth. The tradition of using national resources first for military goals is deeply rooted in Russian as well as Soviet history. Today there is considerable popular as well as official pride in the achievement of rough military parity with the United States. Indeed, military growth is what the Soviet economy does best and the arena in which it competes most effectively with the United States.

Precisely how the Soviet leaders view their specific needs for additional military power is not clear. It is obvious, however, that they recognize the possibility of general war and believe that having a capability to wage such a conflict is a necessary condition for averting one. Defense expenditures have been rising by 4 to 5 percent annually in recent years and have absorbed a steady 11 to 12 percent of GNP over the past 15 years.[1] Defense impacts heavily in high-technology areas, where it has a priority claim on manpower and output. For example,

[1] This share of GNP is based on the concept of defense activities as defined in US budgetary accounts. Under a broader definition—as the Soviets might account for their defense effort—the appropriate figure would be 12 to 13 percent.

in electronics, defense requirements account for most of the output of integrated circuits. Defense also takes a particularly large share of the products of major investment goods industries such as machine building (about one-third), metallurgy (about one-fifth), chemicals (one-sixth), and energy (about one-sixth).

The emphasis on industrialization characteristic of early Soviet history has been relaxed under Stalin's successors in favor of more attention to agriculture and consumer goods. Following decades of neglect, the Soviet people have experienced marked gains, with per capita consumption more than doubling in the past quarter century. Consumer gains have diminished in recent years, however, with the slowdown in overall economic growth. Moreover, now that basic needs for food, clothing and a few durables have been met, consumers want better quality and more variety in the products they buy as well as a host of services. But the economic system is better suited to providing a basic assortment of goods and services than to responding to the shifts in consumer demand induced by higher incomes. Unsatisfied demand has found expression in lengthening queues for quality goods and in a resort to black or gray markets.

Although a major industrial power, the USSR is still far behind in terms of technological development. Except in military production, Soviet manufactured products are generally poor in quality and often technologically inferior. Because of the poor quality of manufactures and an inability to provide a reliable flow of spare parts and services, Soviet exports to the West consist almost entirely of raw and semiprocessed materials—a trade pattern that is unique among industrialized countries. Meanwhile, the USSR has turned increasingly to the West for grain to offset harvest shortfalls and for machinery to modernize the economy.

Recent Performance

Since the 1950s the effectiveness of the Soviet development formula has been steadily diminishing. A slowdown in growth, which affected nearly all sectors of the economy, continued through the 1960s and into the 1970s (table 1). Even industry, which has always been favored in investment allocations, has not escaped. In 1976 the growth of GNP was only 3.7 percent—the same as the average annual gain during 1971-75—despite a record grain crop. Industrial growth was the slowest since World War II. Although the poor industrial performance in 1976 largely reflects the aftermath of the disastrous 1975 crop, the falloff was unusually sharp and has continued well into 1977. Severe problems were encountered in bringing new capacity into operation. In the consumer sector, widespread food shortages occurred throughout the year and continued into 1977. Queuing and expressions of popular discontent remain at unusually high levels.

The marked year-to-year fluctuations in GNP growth—usually because of wide swings in farm

Table 1

USSR: Indicators of Economic Growth

	Average Annual Rates of Growth (Percent)		
	1951-60	1961-70	1971-75
GNP	5.8	5.1	3.7
Producing sectors			
Agriculture	4.4	3.8	-0.6
Nonagriculture	6.5	5.6	5.0
Industry	10.2	6.4	5.9
Other	5.0	5.2	4.5
Principal end uses			
Consumption (per capita)	3.8	3.3	2.9
Investment	11.1	6.6	5.4
New fixed investment	12.7	6.9	7.0
Defense	NA	about 5	4-5

production—are an added headache for the leaders. Since 1960 annual GNP growth rates have been as high as 9 percent (1964) and as low as -0.1 percent (1963). Expensive programs intended to expand crop production in more weather-reliable areas have made little headway thus far. Moreover, the instability in agricultural output has occurred despite a long period of unusually favorable weather; between 1962 and 1974 approximately half of the increase in grain production can be attributed to better weather. Even under these relatively favorable conditions, however, the USSR has had to import substantial amounts of farm products.

The Problem of Productivity

To some extent, the general economic slowdown reflects the exhaustion of the factors that fostered rapid development, especially the abundant supplies of labor and cheap, widely available fuels and other natural resources. More importantly, it reflects a secular decline in the growth of overall productivity. Growth in output per man hour slowed by nearly one-half between the 1960s and the first half of the 1970s. The productivity of additions to the stock of plant and equipment also slumped. As a result, overall resource productivity (output per unit of combined inputs of labor, capital, and land) actually declined in 1971-75.

The reliance on mobilization of additional resources for the major share of economic growth has distinguished Soviet development from that of other modern industrial nations. The level of factor productivity is well below that of the US, Japan, and most of Western Europe; in agriculture, which still employs one out of every four Soviet workers, labor productivity is about one-tenth that of the United States. To a considerable extent, productivity levels mirror differences in levels of technology. Slow growth of productivity reflects slow progress in closing the technological gap with the West.

Over the past decade the Soviets have taken two important steps to try to boost productivity growth. First, they embarked on a spending spree in Western markets for machinery and equipment: imports of these goods rose ninefold, from $510 million in 1965 to roughly $5 billion in 1975. Second, the Soviets maintained high rates of growth of domestic investment and channeled a large share of it into agriculture and high technology industries, despite declining rates of return.

Falling returns on new fixed investment have led to recurrent campaigns to reduce the amount of unfinished construction and upgrade technology. Nonetheless, the amount of output produced per ruble of fixed capital has declined steadily, especially in agriculture (see figure 1).

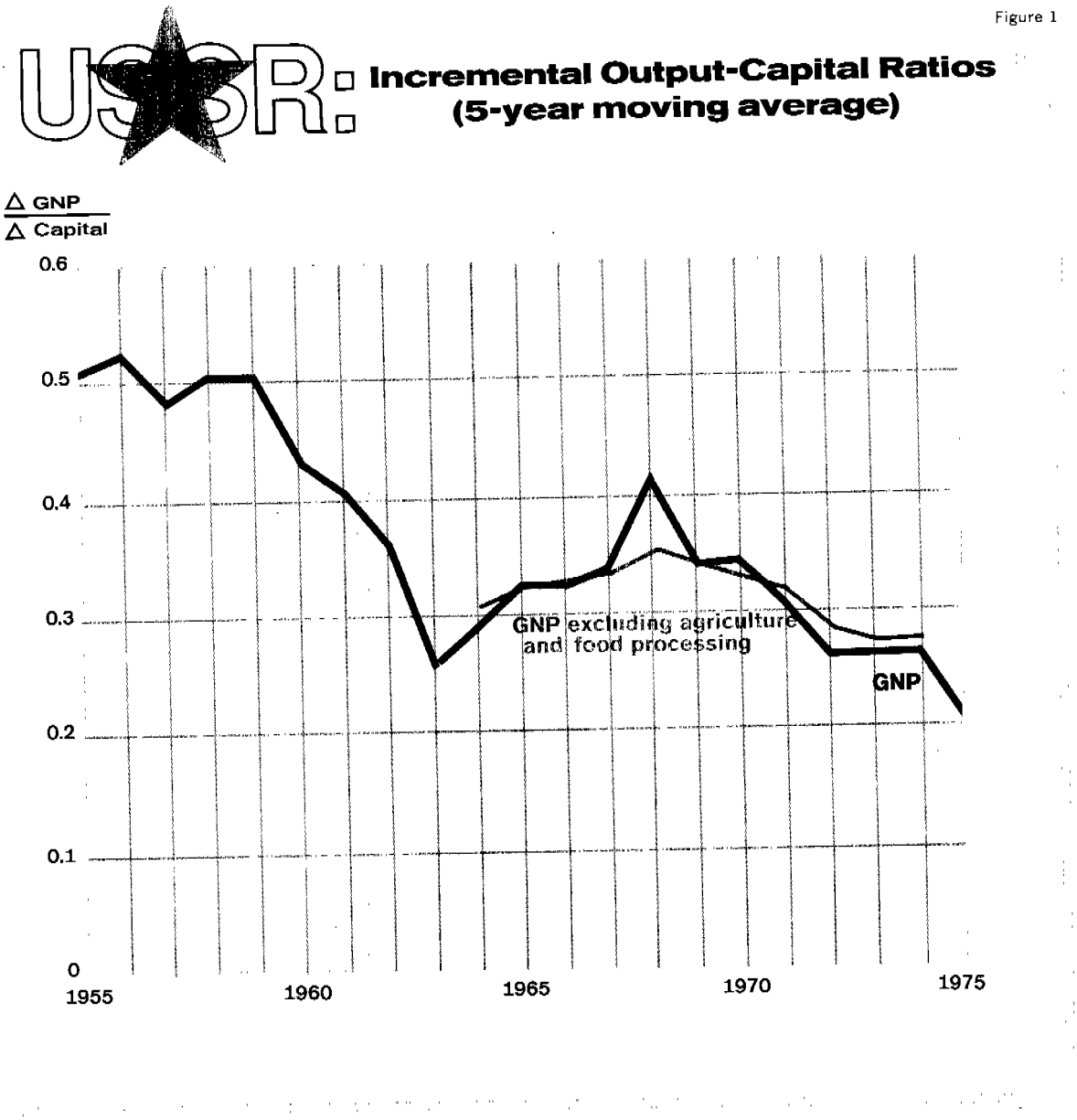
Changes in the Economic Environment

Future Soviet attempts to halt adverse trends in output and productivity must overcome resource problems quite different from anything experienced since World War II. In addition to the continuation of chronic difficulties related to low efficiency, several new problems will beset the regime. The rate of growth of the labor supply will be close to recent experience in the rest of the 1970s but will decrease sharply in the early 1980s. At the same time, the cost of obtaining raw materials will rise sharply. And in the case of crude oil, past improvidence will bring about a serious shortage. The USSR's economic problems will be further exacerbated if weather patterns return to the harsher but more normal conditions that prevailed before the mid-1960s.

Slowing of Labor Force Growth

The decline in birth rates in the 1960s, already reflected in a fall in the number of new entrants to the labor force, will become much more acute in the early and mid-1980s; the growth of the working-age population then will be less than one-half percent annually compared

Figure 1

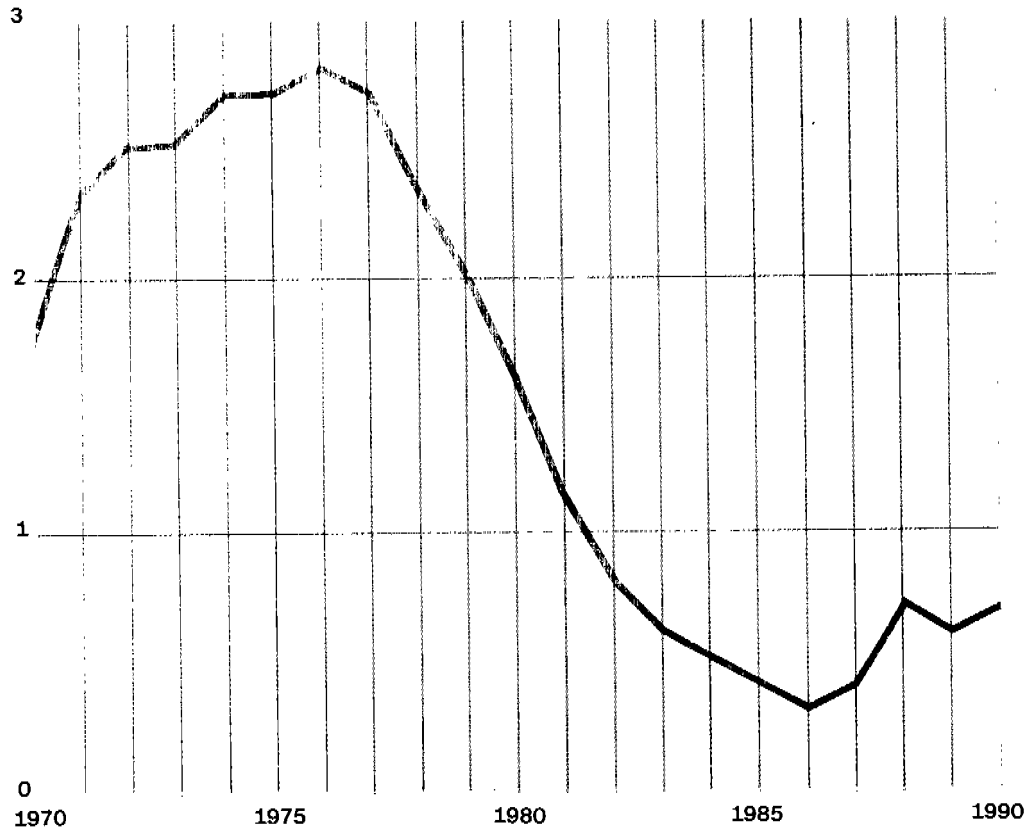


with an average of 1.7 percent during the 1970s (see figure 2). Moreover, the reservoir of redundant farm labor has already been siphoned off to develop other sectors, leaving a residue of largely elderly, unskilled farm workers who fail to provide agriculture with the efficient labor it needs. A further complication for the Soviet leadership is that most of the increase in the labor force in the late 1970s and nearly all of it in the 1980s will be among non-Slavic (principally Turkic) minority populations who have consistently avoided migrating from Central Asia to labor-short industrial areas in the European USSR.

Figure 2

USSR: Population of Working Age

(annual increment in million persons)



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Possibility of Less Favorable Weather for Crops

It is highly probable that normal weather conditions will return after more than a decade of mostly above average precipitation in the Soviet farm belt. About half of the increase in Soviet grain production since 1963 is due to a favorable climatic deviation that may have ended with the severe drought of 1975. If the climate in the principal grain areas returns to a more normal pattern, average annual production while above the average for 1971-75, probably will be well below both official targets and actual requirements. This would further complicate the USSR's foreign trade situation by

forcing the Soviets to increase grain purchases during a period of increasing hard-currency stringency.

Rising Costs of Fuel and Raw Materials

Fuels and raw materials will become more expensive for the USSR in the years to come. Ores, fuels, electric power, and timber are all being produced at increasing costs—largely because of the depletion of reserves west of the Urals and the costly effort to develop resources in Siberia and Central Asia for the use of existing industrial areas.

Ore extraction is becoming more difficult and costly. A steady decline in the quality of Soviet iron ore has forced the steel industry to allocate a growing share of its investment funds to new ore mining capacity, facilities to upgrade the ore, and sintering and pelletizing facilities to improve the quality of the iron charge for the blast furnace.

In the case of oil, the Soviets face both rising costs and declining output in the near future. Because the drop in crude oil output will have such a profound effect on the entire economy, the outlook for Soviet energy is discussed in more detail in the following section.

Energy

Although the USSR has vast energy resources, the supply of oil will be its most critical resource problem. New deposits of oil are not being found and developed rapidly enough to offset declines in older fields. As a result, production will begin to fall in the late 1970s or early 1980s. Production of other major energy sources is being pushed about as hard as Soviet industrial capabilities permit, even with the help of imported Western equipment. Thus, even with a major step-up in investment allocations to the fuel producing sectors, growth of domestic energy production will be sharply reduced in the 1980s.

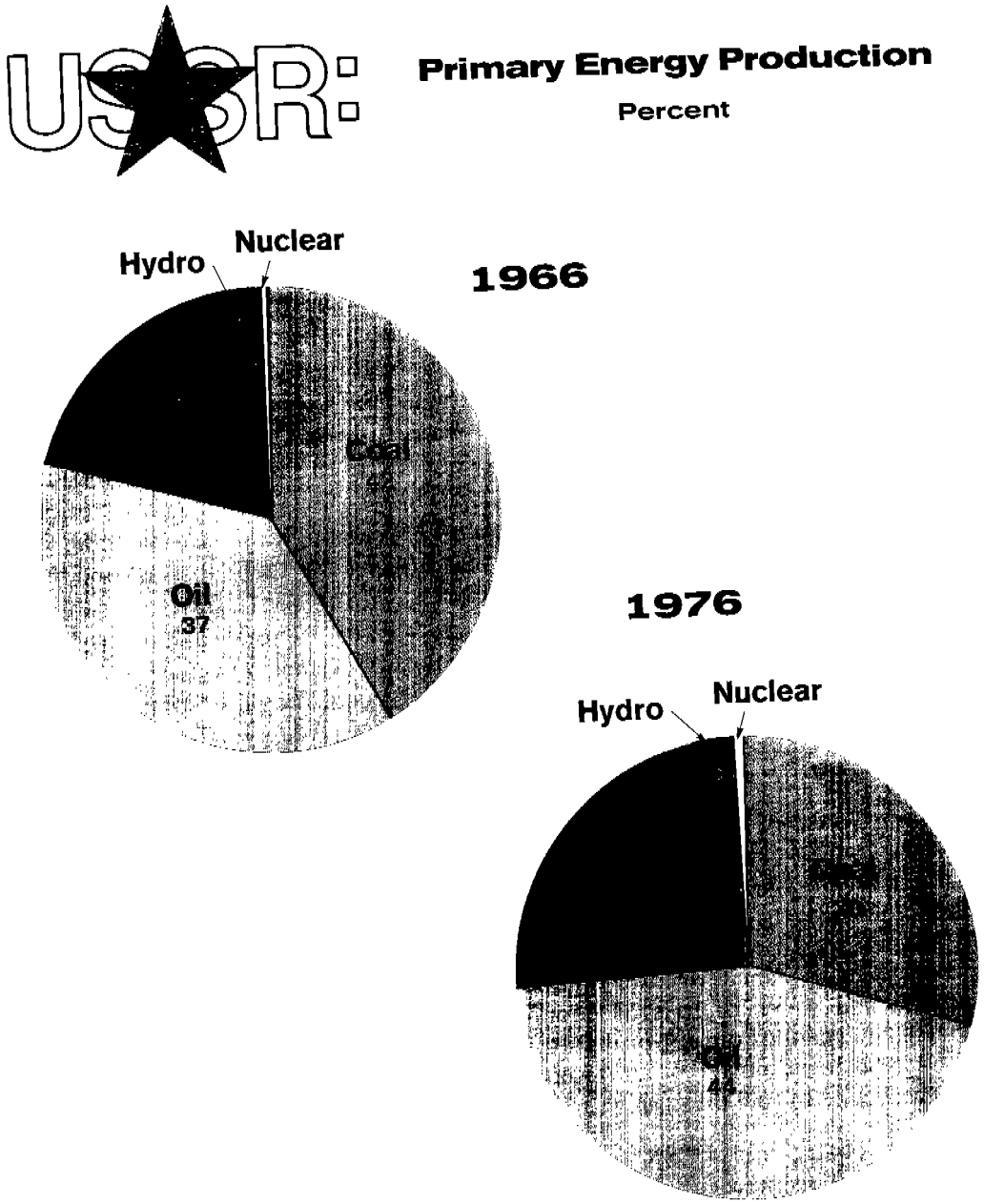
Oil production has grown rapidly (8.1 percent per year since 1960) but will soon peak, perhaps as early as 1978 and certainly not later than the early 1980s. As a result of this rapid growth, in 1976 oil accounted for the major share of total energy output—44 percent of the total, compared with 37 percent a decade earlier (see figure 3). Last year's production of 10.4 million b/d, however, was close to the estimated maximum potential of 11-12 million b/d. We expect oil output to fall to between 8 to 10 million b/d by 1985. In addition to the failure to find enough new deposits to offset depletion, production techniques now in use—such as excessive waterflooding—focus on short-term gains at the expense of maximum life-time recovery.

All growth in oil output through 1980 is to come from West Siberia, where the inhospitable climate, difficult terrain, and vast distances greatly complicate operations. In 1976 approximately one-fifth of national production came from the giant Samotlor field on the Middle Ob' River. This field will reach peak production in the next year or so and will hold peak levels for no more than four years. Because of extensive waterflooding, it is already experiencing rapid water incursion (a water share of about 45 percent) and increasing quantities of fluid (water plus oil) must be lifted to recover a given quantity of oil. New fields are being discovered in West Siberia, but no giant ones comparable to Samotlor have been found.

The Urals-Volga region, currently the leading oil producer in the USSR, probably will be surpassed by West Siberia this year. In the mid-1960s, Urals-Volga accounted for about 70 percent of total oil output. After 25 years of production, many of these deposits are approaching exhaustion and output has recently leveled off and will soon fall. Sizable production increases were expected from the oilfields in the Mangyshlak Peninsula in western Kazakhstan, but because of improper waterflooding procedures and complex drilling problems output has not risen nearly as fast as anticipated.

The downturn in oil production seems inevitable, probably will be sharp but its timing is not as predictable. Although the discovery of new fields may arrest or slow the decline, such respites are likely to be temporary because depletion of existing fields is now very rapid and exploration and development of frontier areas is

Figure 3



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a slow and costly process. To stave off or slow the expected fall in production, the Soviets will need high capacity lifting equipment involving US technology—gas lift and electric submersible pumps. Without them, oil production will fall sooner than would otherwise be the case.[2]

[2]During 1972-77 the USSR has ordered more than $3.1 billion of Western oil field equipment and oil and gas pipeline equipment, and an additional $4.1 billion for steel pipe. US sales have totaled more than $550 million, of which $148 million was for downhole electric pumps. Over the next few years (1977-80) annual orders for such equipment will probably increase since Soviet pipeline construction will increase, and oil lifting equipment orders will rise sharply. Gas lift projects for Samotlor and Federov oil fields—now under negotiation—will involve Soviet purchases of $1.2 billion to $2.0 billion, depending upon the number of units and horsepower requirements.

We expect natural gas output to expand to an estimated 9.4 million b/d of oil equivalent by 1985—roughly double production in 1975—probably exceeding crude oil output in caloric terms. The key to growth will be the pipeline capacity needed to carry large volumes of gas from huge new West Siberian fields to the western USSR and Europe. The main bottleneck will be high-capacity compressors; most of these are imported from the West and have long lead times for negotiation, manufacture, and delivery.

Gas consumption will continue to increase substantially in industrial sectors that are already large gas consumers, particularly chemicals. While the possibilities for substituting gas for coal have been all but exhausted, gas could be substituted for oil in some industrial uses, notably as fuel for industrial boilers. Household use of gas will also increase but will not involve gas-for-oil substitution, since oil has not generally been used directly for heating or other purposes.

Coal production will grow slowly—probably at an average annual rate of 2 to 3 percent—during the next 10 to 15 years. The actual rate will depend largely on the speed with which the Soviets develop the eastern coal basins. This coal, though inexpensive to mine, is expensive to transport over long distances to the main consuming centers and much of it is of poor quality. An increasing share of output probably will be allocated to electric power production, in part to offset a decline in fuel oil supplies.

Beyond the mid-1980s, the USSR is undoubtedly counting on large new supplies of oil and the development of alternative energy sources—coal, natural gas, and hydroelectric power. Even if new major sources are developed, most of these lie east of the Urals, far from major industrial and population centers, and their development will take years, require massive capital investments, and incur continuing high transportation costs. Nuclear power will constitute only about 2 percent of national energy production in 1985.

Even under optimistic assumptions concerning future growth in output of nonoil fuels, and assuming the middle case of the projected range of oil output, annual growth of energy output would decline from 5.4 percent in 1971-75 to 4 percent in 1977-80, and 1 percent in 1981-85. The demand for energy will grow much faster than this. The relationship between growth in Soviet domestic energy use (DEU) and GNP has been historically very close. Assuming GNP growth at 4 percent during 1976-80 and 3 percent during 1981-85, historical relationships yield a total energy consumption of 29.7 million b/d, in 1985. Oil consumption would be about 10.1 million b/d[3] assuming current Soviet policies for fuel substitution: that is, there will be no unusual efforts to substitute other fuels for oil beyond a halt to building new oil-fueled thermal power plants and the substitution of coal for oil in some existing oil-fueled power plants.

The USSR cannot accept the consequences of a business-as-usual program. If Moscow continues its present energy policy, oil output would drop to 8 million to 10 million b/d by 1985 while consumption would rise to somewhat more than 10 million b/d. The implications of this shortfall for hard-currency earnings and Soviet ability to supply oil to Eastern Europe are disastrous. The implications for the economy if the shortfall were taken out of domestic consumption rather than by shifting from net exports to net imports are serious. Energy conservation is an obvious goal, but exceedingly difficult to achieve. Help may be sought from the West.

Prospects for the Economy

Leadership Intentions and Plans

Soviet plans and apparent intentions for the balance of the seventies reflect an intent to

[3] Growth in domestic use of oil is estimated at about 5 percent annually during 1976-80 and 3 percent per year in 1981-85. Both rates are a considerable reduction from the average of 7.1 percent in 1971-75.

adopt a new growth strategy and hopes that major breakthroughs in productivity can be achieved. The leadership may believe that current programs to improve efficiency will counteract the effect on growth of smaller increments to the labor force. We do not know what the Soviet leaders really expect in the way of economic growth beyond 1980. A 1976-90 long-term plan, promised for some time, has yet to appear. The harsh realities of the resource situation in the 1980s may explain the delay in part.

In a substantial departure from previous plans, the current (1976-80) Five-Year Plan projects a relatively low rate of growth—by historical standards—for industry (6 percent per year) and a marked slowdown in the growth of new fixed investment (about 3 percent per year compared with 7 percent per year in 1971-75). The current plan sharply curtails the growth of new construction starts in favor of: (a) investing in advanced machinery and equipment, (b) renovating and reequipping old plants, a quicker and cheaper process than building on greenfield sites, and (c) mechanizing activities such as materials handling, still done manually in large part. In this way the leadership intends to emphasize concentration and modernization at the expense of traditional patterns of expansive growth.

The leadership also plans to retrench in the consumption sphere. The current five-year plan recognizes that Brezhnev's program to raise per capita meat consumption to Western levels will suffer a setback because of forced herd reductions—the result of the poor 1975 harvest and the inefficiency of the Soviet livestock industry. This program has cost the USSR dearly in grain, which must be imported at the margin. The new plan calls for only a 14 percent growth in total meat output in 1976-80, compared with 23 percent in 1971-75. Thus, even if the plan is met, *per capita* meat consumption would be a little higher in 1980 than in 1975.

While goals for defense are not announced, the present upward momentum of Soviet defense programs is likely to continue. First of all, future Soviet military budgets will continue to be strongly influenced by programs already in motion. To maintain forces now in being will require large and unavoidable expenses. Weapons deployment programs now under way in both the strategic and theater forces and new weapons systems well advanced in their development cycles presage additional procurement commitments. When deployed, the new systems will contribute to higher operating and maintenance costs. Although new programs replace old programs, new weapons are more complex and, hence, more costly than those they replace. This systematic increase in unit costs means that maintenance and modernization of existing force levels leads to ever-increasing expenditure levels. Moreover, cost escalation appears to be much more rapid in the USSR than in the United States.

Institutional factors also support continued growth of Soviet defense programs. The Soviets consider expansion of defense industrial capacity as a major national goal. The natural alliance between defense industrialists and military leaders makes it difficult in the short run to make major cutbacks of investments in defense industries in favor of nondefense goals.

In sum, the scale and pace of Soviet weapons programs show no signs of abating at this time, nor are there indications of intent to slow the growth of military industry or to reorder national priorities so as to lessen the rate of growth of defense in favor of investment or consumer goods. We therefore expect a continuation of the current 4 to 5 percent annual growth in defense spending during the next few years.

Plans Still Overly Optimistic

Although less ambitious than previous plans in regard to productivity, the 1976-80 plan reflects unrealistic expectations about productivity growth. The problem can be seen in the accompanying tabulation.

Average Annual Rate of Growth of GNP, Inputs, and Productivity

	1951-60	1961-70	1971-75 Plan	1971-75 Actual	1976-80 Plan
GNP	5.8	5.1	5.8	3.7	5.0
Inputs	4.6	4.3	3.8	4.3	3.5
Manhours	1.3	1.8	1.6	1.9	1.5
Capital	9.4	8.1	7.1	7.9	6.5
Land	2.4	0.4	0.5	0.8	0.5
Factor productivity	1.2	0.8	1.9	-0.6	1.5

The implied productivity growth of 1.5 percent annually to meet planned growth in output in 1976-80 is twice the rate realized in the 1960s; in 1971-75, productivity actually declined, largely as a consequence of the bad harvests of 1972 and 1975.

At the same time, dependence on productivity gains is increasing because input growth is slowing down. In 1976, total inputs to the economy grew by 4 percent (see figure 4). By 1980, the annual growth in combined inputs dips to 3.25 percent, and by 1985 to below 2.5 percent.[4] Carried out to 1990, the calculation shows the yearly percentage increment of inputs to labor, capital, and land falling to little more than 2 percent.[5] The converse of the falling rate of growth in the supply of productive factors to the economy is the acceleration in productivity gains necessary to sustain growth of Soviet GNP. By way of illustration, a 5-percent growth in GNP requires productivity

Percentage Increase in Productivity Needed To Maintain GNP Growth at 5 Percent

1976	1980	1985	1990
1.0	1.7	2.5	2.8

to rise by the percentage amounts through 1990 shown in the tabulation. Nothing in past Soviet economic history suggests that an acceleration of this magnitude can be achieved.

Some decline in GNP growth in the 1980s probably appears both inevitable and acceptable to planners and high party officials alike. Nevertheless, the Soviet leadership probably believes it can maintain a growth of GNP of at least 4 percent per year in the 1980s by pushing programs to raise efficiency. Even with some relaxation in goals for economic growth, however, the implied productivity targets are extremely demanding. This is especially so in view of threatened shortages of energy and other industrial raw materials.

Possibility of Material Shortages

Since the late 1950s, potential shortages of industrial raw materials could generally be ignored in assessments of Soviet growth prospects. This is no longer the case. In at least two key sectors—steel and fuels—unexpected shortfalls in production could wreak havoc on industrial output. Because Soviet planning is characteristically taut, the effects of shortages of widely used materials would reverberate quickly through the economy.

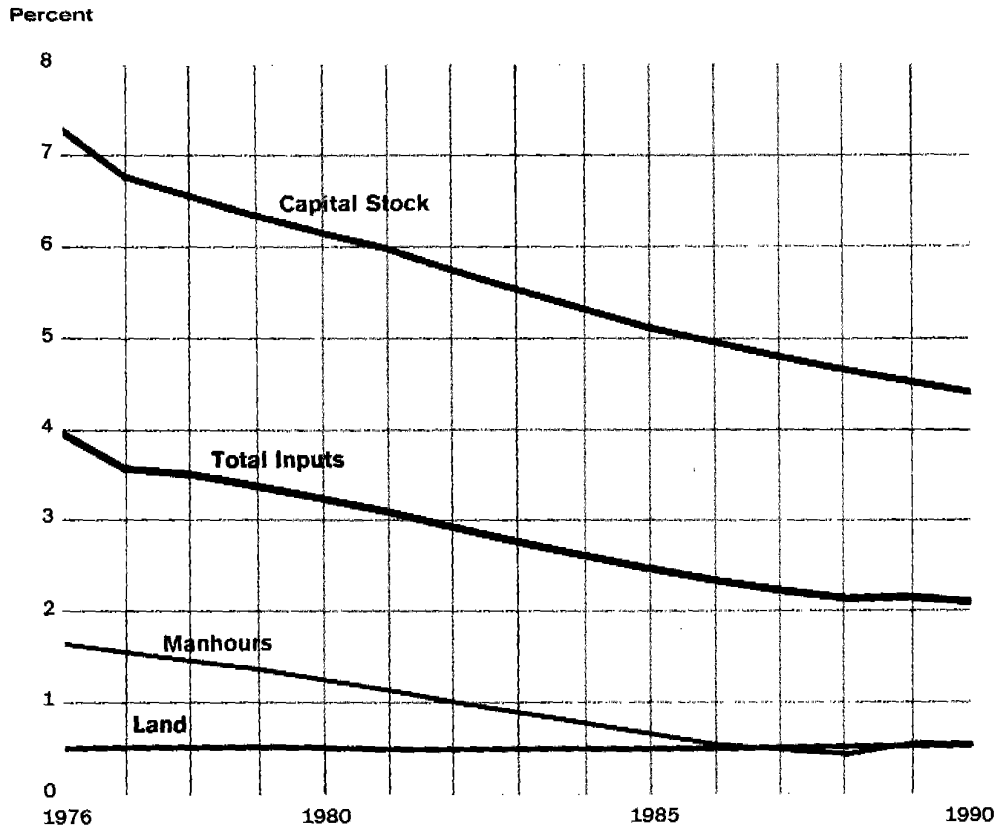
An immediate problem for Soviet planners is steel. Growth in output of crude steel, which averaged 5 million metric tons annually since

[4] This calculation assumes that in 1981-90 investment in new plant and equipment grows at the same rate as planned investment in 1976-80 (3.2 percent per year).

[5] Unlike in earlier periods, future opportunities for exceeding growth targets for labor and capital are slim. Much of the above-plan growth in labor in the past was due to higher-than-expected participation rates, especially for women. Since these rates have now reached realistic maximums, future increases in labor inputs will depend on predictable trends in the able-bodied population. Above-plan growth in capital stock has been achieved by holding retirement rates of old plant and equipment below slated levels. As discussed below, this policy can be continued only at a penalty on growth in productivity.

Figure 4

USSR: Annual Growth Rates of Inputs to the Economy, The Base Case



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the 1960s, dropped to 3.4 million tons in 1976 and imports from Western suppliers rose rapidly. In first quarter 1977, production was actually below the first quarter 1976 level. The lost production will not be easy to make up. Construction of new steel-making capacity has lagged badly. During 1971-76, less than 2 million tons of new capacity were brought on stream each year—only half the amount planned. As a result, retirements of older, inefficient facilities have been deferred and operating levels raised so high that routine maintenance suffers.

As noted above, fuel supplies may well dictate the pace of economic growth. If the plan-

ners do not adapt quickly to the expected abrupt decline in oil liftings, severe shortages will be hard to avoid and a recession could result.

What the Leadership is Counting On

With less reliance on investment and greater stress on efficiency, the 1976-80 plan requires the Soviet economic system to produce results quite different from any achieved in the past 50 years. Although a great deal seems to depend on better management, the measures proposed to improve economic management have little merit.[6]

The leadership is on firmer ground, however, in expecting that labor will be used more efficiently at the level of the individual factory and farm. Because of the wasteful use of labor in the Soviet economy, some efficiency gains can be achieved under concerted pressure. The tightening labor market could be the catalyst for a boost in labor productivity.

Indeed, the experience in industry during 1971-75 (a slowdown in growth of the workforce to 1.5 percent per year compared with 3 percent in 1966-70) suggests that the process of forcing out redundant labor has had some success. The average annual rate of growth of output per industrial worker has increased as employment growth declined. During 1976-80 industry is expected to add fewer than 1-1.5 million new workers. A decade ago, Soviet industry was adding more workers than this every year.

[6]The most publicized measure now under way is the program to group enterprises into large associations. Gains in efficiency resulting from such mergers have been small thus far, however. The associations must deal with the same inflexible plans as before, and their actions and rewards will be monitored by the same bureaucratic agencies. To encourage enterprises to improve product quality and adopt new technology the plan uses traditional methods—bonuses for meeting plans for innovations and for raising the quality of products to world standards. But since the measurement of quality or the utility of an innovation is controversial, the bureaucracy is likely to administer these incentives much as before.

Average Annual Percentage Increase

	Industrial Production	Industrial Employment	Output per Worker
1961-65	6.7	3.9	2.7
1966-70	6.7	2.9	3.7
1971-76	5.7	1.5	4.1

One concrete approach to raising labor productivity is the program to mechanize and automate labor-intensive auxiliary processes, such as loading and unloading operations. More than half of all industrial workers in the USSR perform manual work, and this share has been declining at a snail's pace—about one-half a percentage point each year. Success in mechanizing these processes depends on the ability of the domestic economy to turn out large quantities of labor-saving equipment, which often must be tailored to specific uses. Complaints are already being heard that many types of small-scale mechanization are not included in the plan and that resources for their production are not being provided. Thus, we believe that the contribution of mechanization to productivity will fall short of plan.

The USSR also hopes to raise the productivity of new investment. The plan calls for:

- A shift in the structure of investment in favor of equipment rather that buildings and structures.
- A reduction in the backlog of unfinished investment in new plant and equipment.
- More rapid assimilation and diffusion of imported and domestically generated technology.

The first two objectives, recurrent features of earlier Soviet plans, are even less likely to boost productivity than in the past. The changing sources of energy and raw materials and the uneven geographic distribution of labor force growth suggest that fixed investment should not be focused at existing sites. Moreover, a concen-

tration on project completions could lead to imbalances in production capacity.[7]

The impact of imports of Western technology over the next 14 years cannot be determined. The Soviets look to the West primarily for advanced technology and equipment to help in their modernization drive. In certain vital industries, such as chemicals and oil and gas extraction, Western equipment will continue to play an important role. The level of total machinery imports will rise for a time but may drop precipitously if crude oil exports are cut back.

The most difficult question concerns the indirect effect of imported equipment and technology. Imports from the West have accounted for about 5 percent of total Soviet investment in machinery and equipment over the last five years, and, once assimilated, directly influence a relatively small portion of the USSR's stock of fixed capital. The payoff would be much larger if the imports had a demonstration effect that spread quickly beyond the immediate point of application through research, engineering, and production. Slow assimilation and diffusion of technology have been widely noted in the USSR, and a series of decrees have endeavored to improve the performance of management, R&D, and educational institutions in this area. In view of the slow progress registered thus far, it seems unreasonable to count on a breakthrough over the next several years.

Against the efficiency gains that the Soviets may achieve in the management of labor, capital, and R&D resources some important opposing trends must be considered. The increasing costs of obtaining raw materials already have been noted. Transportation costs are rising, and in some cases like coal and ore, the raw materials must be upgraded at great expense. When the capital cost of supplying intermediate products rises, the productivity of resources in supplying final goods and services tends to decline. Moreover, the shift in investment needed to move the energy balance away from oil will increase capital requirements over a broad range of the economy, further depressing productivity.

All in all, we do not believe that the Soviet leadership can continue on its present course if a marked slowdown in growth is to be avoided. The resource situation and the ineffectiveness of the measures designed to raise productivity will force the leadership to develop new policies.

Some Options for the Leadership

Searching for ways to overcome the currents retarding Soviet economic growth, the planners will consider a range of options. They will have to do something about material supply and could adopt some fairly stringent measures with respect to manpower and investment. Serious economic reform, while certain to be on the agenda for discussion, is much less likely to be included in a policy package.

Material Supply

Turning to the problems raised by the possibility of critical industrial material shortages, the near-term options open to the leadership narrow down to conservation, increased imports, and reallocations toward preferred uses. For a commodity like steel, conservation has little short-run potential. Steel import tonnage has doubled since 1970, mainly in the categories in short supply in the USSR—large-diameter pipe, cold rolled steel, and high-quality tubing and electrical sheets. Planners have used a soft world steel market to offset domestic shortfalls in the past. Anticipated constraints on hard-currency availability, however, will severely limit Moscow's ability to obtain steel in the West in the 1980s. At the same time, there is some room

[7] As the Minister of Coal Industry told the 25th Party Congress: The CPSU Central Committee draft for the 25th Congress outlines the development of the Kansk-Achinsk Basin. But the five-year plan does not provide for resources for starting and construction of new projects. We ask the USSR Gosplan to allocate the necessary material and financial means, when it amends the 1976-80 plan, bearing in mind that it will take 10-15 years to create enterprises in new, sparsely inhabited areas.

for saving steel used in the production of the big ticket consumer durables that have been produced in increasing quantities in recent years. Nonetheless, over the longer term shortages of steel or other raw materials need not last if investments are directed wisely. Although costing more, materials such as iron ore, timber, and nonferrous metals can be made available.

Ensuring an adequate fuel supply will be much more difficult. The USSR can offset some effects of the anticipated decline in oil production by launching high priority programs to conserve energy and substitute other energy sources for oil. Such programs would be costly and take time. Success is, moreover, far from certain. Central control over fuel allocations is as strict as in any country in the world, but large sources of oil saving are more difficult to identify in the USSR than in the West. For example, the bulk of automotive transport in the USSR is for commercial and industrial use, whereas in the West much is for private use, and only about 3 percent of total oil is used directly by households in the USSR compared with 12 percent in the US. As a result, opportunities for oil conservation that would not hinder production are more limited in the USSR than in Western countries. A vigorous conservation program, however, would enable the USSR to avoid widespread domestic oil shortages—at least in the period before Soviet oil production slumps badly.

The greatest opportunity for oil savings lies in the substitution of natural gas and coal for oil generation of electricity. At present, about two-thirds of the residual fuel oil produced in the USSR is used in thermal power plants. Current plans provide that no new thermal power plants producing only electricity—as opposed to those producing both electricity and steam heat—are to use oil as a fuel, and that low-quality coal will be the primary fuel source. At the 25th Party Congress, Kosygin stated that a number of large power plants in the Urals and Volga regions would be converted to burn coal instead of oil. While conversion to gas is technically feasible, conversion to coal is impractical unless the plant was originally built to use both oil and coal.[8] Substitution of natural gas will be limited by the level of gas production and demands of competing users. Natural gas might be used in place of oil in some chemical processes. The USSR also has plans to begin to use gaseous fuels, or liquefied gas, as fuel for motor vehicles, and some savings in use of gasoline and diesel fuel can be affected by substituting lighter plastics and aluminum for steel in motor vehicles.

We judge that the USSR probably could save about 2.5 percent of the energy use projected on the basis of the historical relationship between GNP and energy demand. This is a highly subjective estimate, based on general knowledge in the absence of specific information. Such savings, if all focused on oil consumption, would enable the USSR to cut oil consumption to 9.4 million b/d by 1985, compared with 10.1 million b/d under a business-as-usual regime.[9] If production in 1985 turns out to be in the upper portion of our projected range (8 million to 10 million b/d), domestic requirements could be covered. Even then, however, the USSR would lose its exports of oil for hard currency and would have to cut back oil shipments to its client states in Eastern Europe. On the other hand, if production falls below 9 million b/d in 1985, successful conservation and substitution measures that reduced domestic demand to 9.4 million b/d would not prevent the USSR from having to import a great deal of oil on its own account.

Manpower Measures

In the past, failure to reach plan production goals has usually led the USSR to first try to put more labor into industry than a given plan

[8] Conversion of a plant originally designed to use oil would require construction of an entirely new boiler house and expensive coal and ash handling facilities.

[9] The estimates for energy (and oil) consumption in 1985 are based on an assumed rate of growth of GNP of 4 percent per year in 1977-80 and a little more than 3 percent per year in 1981-85. See the baseline case in table 2, page 17.

specified. The above-plan cadres usually have been skimmed from the farm labor pool. Since agriculture cannot spare many of the more mobile young people that it now has, the authorities are now likely to turn to the service sector. By restraining the growth of services, where labor productivity is relatively low, the manpower authorities can reallocate labor in a way that will raise average productivity in the economy as a whole. Such a policy, however, soon would conflict with the influential body of opinion that argues for greater worker incentives to raise productivity. Provision of more services is a major part of the program to enhance the quality of life in the Soviet Union.

As the manpower situation worsens, the authorities will have time to review and perhaps adopt policies to boost the rate of growth of manhours. Older workers could be retained by raising pension ages and lifting penalties for working after retirement.[10] More young workers would be brought into the labor force by changing education policies to restrict the number of full-time students. A reduction in the size of the armed forces would also make workers available. Inasmuch as the Soviets view military conscription as serving political, ideological, and educational purposes as well as military needs, such a cutback would probably take the form of a shortening of the term of service rather than a lowering of the participation rates. All of these measures taken collectively could postpone the impending drop-off in the rate of growth of the Soviet labor force. Still, nothing that the planners can do will prevent a long and pronounced decline in the annual additions to the labor force—a slide that would not bottom out until the mid-1990s (figure 2, on page 5).

[10] Statutory limitations on combined earnings of working pensioners tend to discourage continued employment among the relatively high-salaried professional and technical personnel. The earnings ceiling currently is 300 rubles a month; average monthly pay of engineering-technical personnel in industry is over 200 rubles a month, with older and more experienced personnel earning much more.

While reviewing ways of increasing the size of the labor force, the authorities will press efforts to use labor more efficiently. They should have some success in this area. The major contributing factors to "over-full employment" in the Soviet economy have been (a) a government policy ensuring jobs for all who want them, (b) a tendency on the part of managers to hoard workers, and (c) an aversion on the part of policymakers to the social and political consequences of technological unemployment. In a tight labor market, hoarding of labor will become increasingly difficult and technological unemployment less of a concern.

Possible Investment Strategy

Responding to productivity shortfalls by pushing up the rate of growth of fixed capital will not be easy in the short run. One straightforward approach would be to abandon the scheduled rise in the rate at which old plant and equipment is retired. The 1976-80 plan implies an increase in annual retirement rates from an average of 1.5 percent in 1971-75 to 2.4 percent in 1976-80. Holding retirement rates at the 1971-75 level would raise the rate of growth of fixed capital by a little less than 1 percentage point, although the penalties on productivity in terms of increased obsolescence would offset some of the positive effect of having more capital.

Alternatively, capital stock growth could be stepped up by increasing imports of machinery. We believe, however, that the USSR will have trouble reaching the goals for foreign purchases implied in the plan targets for growth in the volume of foreign trade, and therefore in the existing investment plan. In any event, because of the long lead time required between the placing of orders and the delivery and installation of new foreign machinery, accelerating the growth of the stock of plant and equipment by stepping up machinery purchases is not a viable near-term alternative.

A harder policy decision would be to reorient domestic capacity for producing machinery. As production of consumer durables is a small though increasing share of total machinery output, a large cut in production of passenger cars, refrigerators, electrical appliances, and the like would be required to have much impact on the production of machinery for investment. It is highly unlikely that such large—and politically costly—cuts in the output of consumer durables would be made.

A shift of defense industrial capacity to production of investment goods also would be unattractive to the leadership and difficult to effect within a time span of a few years. The Soviets consider defense industrial capacity at least as important as military forces in the field—indeed, more important in the long term. And they know that the Soviet economy is less effective than that of the US in marshalling technological resources in an emergency. Moreover, because of their specialized nature, such resources could not be transferred easily to civilian purposes on short notice. For these reasons, we believe it unlikely that the Soviets would divert weapons development resources or defense production capacity or abandon development or deployment programs currently under way. They may, however, be willing to stretch out research and development programs and production schedules and slow the rate of expansion of defense-oriented industrial capacity, thus releasing some material inputs and other resources that can be used for civilian production. Passing into the 1980s, the prospect of a long period of resource constraint could incline the leadership to take a harder look at defense. Arms limitation agreements that save more than marginal amounts of resources might then be given greater weight in Soviet policy than they appear to have at present. If such agreements were reached, savings convertible into investment could rise to a substantial level by 1990. (The consequences of an agreement leading to fairly deep cuts are explored further in this paper.)

Economic Reform

A thoroughgoing reform of the economic system could boost appreciably the efficiency and quality of production over a period of years. But the Politburo correctly perceives that reform threatens its political control. The most radical reform conceivably acceptable would be some kind of market socialism, which might also include a larger role for private enterprise in agriculture and services. The obstacles to reforms of this kind are thorny. Introduction of markets and expansion of private activity would entail compromises with ideology, and markets, if effective, would replace bureaucrats and hence incur resistance. Economic reforms would threaten the entrenched positions of both state and party bureaucracies and weaken the Party's grip on the economy. Moreover, the transition to markets could cause unemployment and severe disruption in the short run. Therefore, unless a serious breakdown in the economy occurs, changes in planning and organization are unlikely to be a factor in stimulating economic development through the 1980s.

Outlook for Economic Growth—Some Policy-Conditioned Projections

Since the development of the Soviet economy will depend increasingly on how the leadership responds to the emerging energy and manpower problems, single-value forecasts will not do. Therefore, we will present three projections of the growth of GNP—each tied to a particular set of economic policies that the leadership might embrace.[11] The first is a *baseline case.* It assumes that the USSR succeeds in avoiding economic dislocations attributable to shortages of fuel and other raw materials but does nothing to accelerate the rate of growth of

[11] See appendix for a description of the methodology used in projecting growth of GNP.

investment or to increase participation in the civilian labor force. The second case is a *business-as-usual* case in which the leadership fails to act decisively enough to prevent fuel shortages and other supply bottlenecks from disrupting production *and* does not adopt measures to spur investment or to offset the effects of demographic trends on the labor force. For a third, *best-case* scenario we assume both a timely reponse to energy and raw material problems *and* energetic policies to divert resources from consumption and defense to investment and pull more workers into the labor force.[12]

Base-Line Case

Should the USSR manage to prevent fuel and raw material shortages from interfering with production—while holding to present investment policies and accepting the impending decline in the rate of increase of the labor force—GNP growth will inevitably trend downward, following the resource curve in figure 4. Productivity gains probably would be about 1/2 percent per year, resulting in a rate of growth of GNP of approximately 4 percent per year in 1977-80 and 3-1/4 percent per year in 1981-85 (table 2). A higher rate of growth of GNP than the range shown in table 2 would demand a rebound in productivity growth that seems highly unlikely, given recent experience and the assumption of no fundamental change in economic policies. On the other hand, if supply bottlenecks do not appear, productivity should at least increase, even though slowly.

The base-line case underscores a key aspect of the USSR's economic future. Growth will almost certainly taper off even if the leadership finds a solution to the predicted decline in oil production. The rate of growth of GNP of 3 percent to 3-1/2 percent projected for 1981-85 is unprecedented in postwar Soviet history, and a

[12] These cases do not of course exhaust the range of possible policy combinations. We would argue, however, that the business-as-usual and best cases represent about the worst and best that the Soviets could do in influencing economic growth through 1985.

Table 2

Policy-Conditioned Forecasts of Soviet Growth

	Average Annual Percentage Rates of Growth					
	1977-80			1981-85		
	Factor Inputs	Productivity	GNP	Factor Inputs	Productivity	GNP
Base-line case (successful response to fuel raw material problems)	3½	¼ to ¾	3¾ to 4¼	2¾	¼ to ¾	3 to 3½
Business-as-usual case (fuel and raw material shortages)	3½	0 to ½	3½ to 4	2¾	-¾ to -¼	2 to 2½
Best case (successful response to fuel and raw material problems and vigorous manpower and investment policies)	3½	¼ to ¾	3¾ to 4¼	3¼	0 to ½	3¼ to 3¾

continuing fall in the rate of increase of inputs to the economy suggests that normal GNP growth could be less than 3 percent per year in the later part of the 1980s.

Business-as-Usual Case

If the USSR fails to limit the damage implicit in a downturn in oil production, GNP growth could fall off abruptly (table 2). The projection puts the transition in the 1981-85 period although oil production may drop in the next few years. In the business-as-usual projection, the effects of fuel shortages (perhaps reinforced by shortages of other raw materials) are represented by a decline in the *level* of the productivity of factor inputs. Factor productivity has decreased in certain years because of bad crops, but the pervasive and continuing effects of shortfalls in fuel supplies could easily shut down some of the USSR's productive capacity. Indeed, over the course of a year or two, before adjustments can be made, the effect on productivity might well be larger than we have projected.[13]

Realistically, business-as-usual could not last beyond the first fuel crises. The urgent conservation, reallocation, and substitution measures that would surely be enforced would ultimately bring relief. Nonetheless, if the first dislocations were felt in the middle of the 1981-85 period, GNP growth probably would not rise above 2-1/2 percent per year during the remainder of the 1980s.[14] The recovery in productivity would partly offset the steady decline in the rate of increase of inputs to the economy.

[13] In the projection for 1981-85, factor inputs increase by 2-3/4 percent per year. If the "normal" rate of growth of productivity were 1/2 percent per year, output would increase by 3-1/4 percent per year. The fraction of total capacity made idle by fuel shortages would have to increase by only 1 percent per year to bring GNP growth down to 2-1/4 percent per year—the rate shown in the projection.

[14] The lower end of the range of GNP growth in the business-as-usual case shown in table 2 (2 percent) would also be associated with the lower end of our projected range of energy output.

Best Case

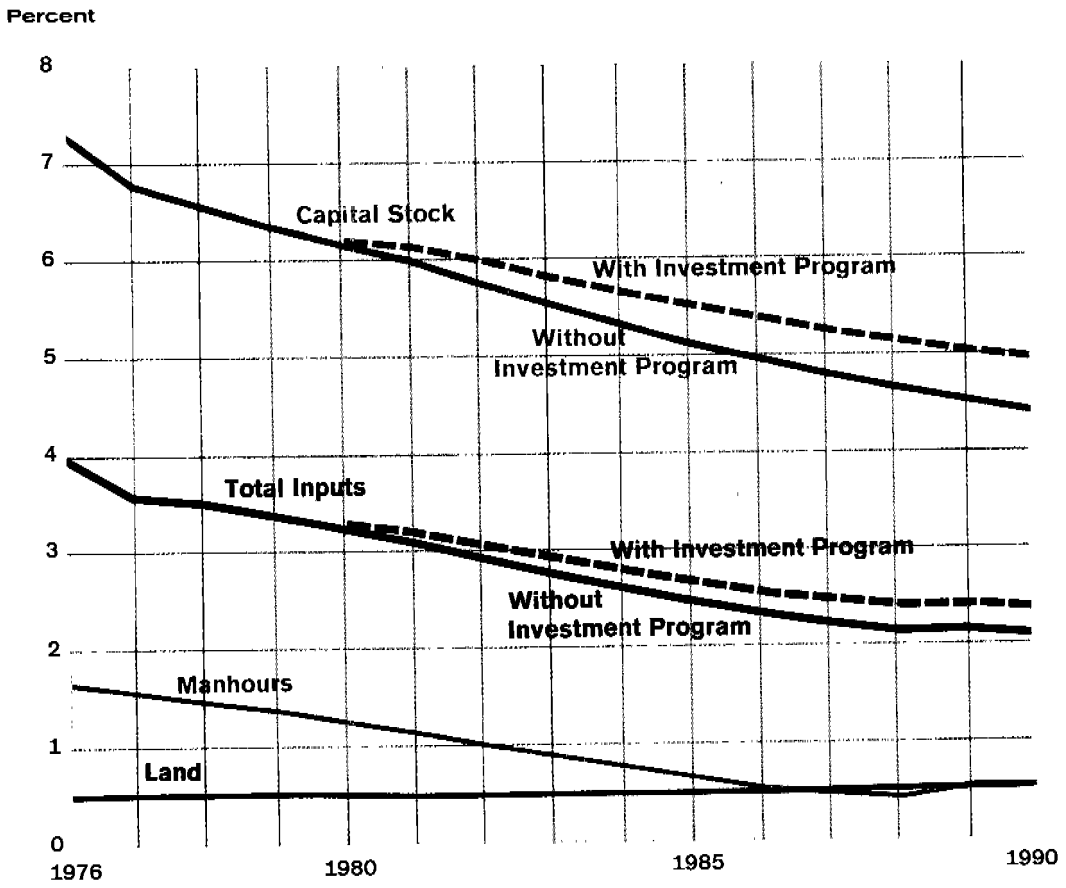
Because Soviet growth potential falls steadily from now through the early 1980s, the leadership will come under increasing pressure to devise new policy initiatives. The leadership's choice of policies and the success of these policies can only be guessed. We believe, however, that assuring an adequate supply of energy is by far the most desirable path that the USSR can follow. As in the base case, we assume that energy is not a constraint. Next, the USSR will very likely search hard for more investment and labor resources if its hopes for productivity are disappointed. To test the possibilities in this direction, we have specified two combinations of policies that the Politburo might adopt in the next few years, to take effect in the 1980s:

(a) The first set of measures focuses on investment. By freezing the level of military investment (acquisition of hardware and new construction) at the projected 1980 level, sums ranging from 1 billion rubles in 1981 to 10.5 billion rubles in 1990 could be added to new fixed investment. At the same time, the authorities would probably try to take something from the consumers as well. Consumer durable production, for example, could be cut back from present levels by amounts increasing from 1.0 billion rubles in 1980 to 2.8 billion rubles in 1990. The effect of these policies on inputs to the economy is shown in figure 5. Through 1985, the growth of capital stock and total inputs rises only marginally. Even in 1990 the increase in combined inputs as a result of the higher investment is only 0.2 percentage points higher than in the base case.

(b) As a second option, we assume that the leadership *supplements* the investment program described above with a strenuous attempt to increase the labor force in 1981-85. Beginning in 1981, the armed forces are pared back gradually, from 4.5 million men in 1980 to 3.5 million men in 1985, about the level of the

Figure 5

USSR: Annual Rate of Growth of Inputs to the Economy Under Different Investment Assumptions



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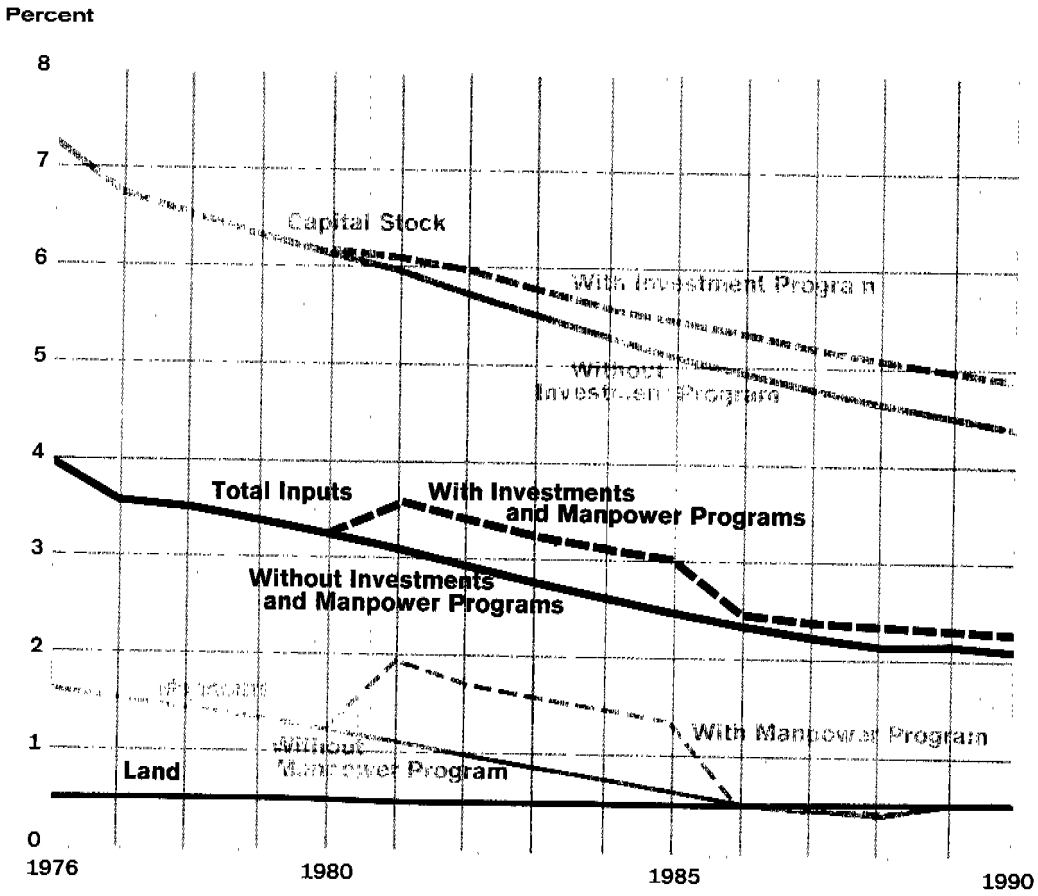
mid-1960s. To raise civilian participation in the labor force, the USSR could push more 16 to 19 year-olds into the economy by reducing admission quotas for secondary, vocational, and higher schools. By 1985 the implied participation rate for this age cohort rises to 65.3 percent, still somewhat lower than that prevailing in the late 1950s and early 1960s before the advent of universal secondary education. To induce higher employment in the older age groups, the leadership would have to raise the retirement age or induce retirees to return to work. The result of this double option—depicted in figure 6—is an average boost to the

Figure 6

USSR: Annual Rate of Growth of Inputs to the Economy Under Different Investment and Manpower Assumptions



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rate of input growth of about one-half of one percentage point during 1981-85. Nonetheless, about 6 million more people would be working in 1985 under this option than in the base case. After 1985 the employment growth rate drops back to about the same level as the base case. Employment, however, continues at a substantially higher level than in the base case.

The economy's response to such measures (table 2) might seem paltry to the planners. The two options combined boost GNP growth by

about 1/4 percent per year in 1981-85 compared with the base case.[15] Before 1980, the investment and manpower policies have not taken hold, so the projected growth is the same as in the base case. After the mid-1980s the effect of the manpower policies on growth has been spent, while the impact of raising investment allocations is too small to make much difference to the growth of inputs. The trend in productivity therefore determines the course of the economy in the late 1980s, leading to GNP growth of perhaps 2-1/2 to 3 percent per year—again, as in the base case. Projections, by no means precise, depend on assumptions regarding productivity. We believe the Soviets will be lucky to achieve productivity gains averaging one-half of one percent per year and that drawing in younger, untrained workers and retirees would lower the rate of increase of productivity, compared with the base case.

General Assessment

These illustrative projections of Soviet economic growth do not exhibit much of a range, aside from the case in which the leadership fails to react quickly enough to forestall serious shortages of energy and basic materials. For example, as indicated above, such shortages could occur, from the demand side, if there is little or no energy conservation or, from the supply side, if the output of energy falls to the lower end of the expected production range. Under these conditions growth in GNP might be limited to as little as 2 percent per year in 1981-85.

Somewhat surprisingly, a comparison of the alternative policy packages suggests that the leadership cannot have much influence on the rate of growth of consumption either. Consumption is the residual claimant in the distribution of GNP in the different scenarios and by far the largest claimant. Since none of the three choices—leaving investment and defense untouched, boosting investment, or increasing investment and the labor force—alters GNP growth much, the growth of consumption varies between the base and best cases by not more than 1/4 to 1/2 percent per year throughout the 1980s. Thus, it is doubtful that the Politburo would be interested in this sort of defense-investment-manpower trade off.

On the other hand, the slower growth of GNP associated with persistent shortages of energy, and possibly other basic materials, would permit a growth in per capita consumption of only about 1/2 percent per year in 1981-85 and an absolute decline for the balance of the 1980s, compared with an increase in per capita consumption of about 2-1/2 percent a year in 1981-85 and 1 to 1-1/2 percent thereafter under a successful energy policy.

Under these conditions, the inevitable rise in wages over the next 10 years combined with the slower growth in the availability of consumer goods will result in inflationary pressures and increasing frustration for the consumer. The Soviet consumer is relatively content as long as some improvements are made. However, if he is forced to experience an extended standstill in living levels, this could affect substantially incentives and productivity and cause public unrest. As a result, it is clear that to maintain an economy healthy enough to preserve domestic stability, the leadership must avoid a raw materials crunch.

Implications for Foreign Trade

The USSR's growing economic problems will hit imports from the West especially hard. Although such imports are small in relation to Soviet GNP (1.6 percent in 1976), they have been increasing rapidly. Imports of machinery and steel have been especially important to the Soviet economy, and, with increased stress on

[15] Production of energy at the high end of our projected range combined with strenuous conservation programs could support a growth in GNP of 3-3/4 percent per year, the upper end of our range in the best case scenario.

raising productivity the need for Western goods will become even greater. The problem is that the USSR will not have the foreign exchange to meet these increased demands. The expected fall in crude oil production threatens to squeeze severely Moscow's capacity to import Western manufactured goods.

Under any but optimistic scenarios for oil production, and in the absence of a high priority campaign to save oil domestically, the USSR will shift from earning to spending hard currency in its oil trade. The difference between selling 1 million b/d (as in 1976) and buying 2.7 million b/d[16] (the projection for 1985 that assumes no unusual conservation efforts) is $17 billion in 1977 prices, more than the USSR's total 1976 hard-currency imports. A substantial rise in real oil prices,[17] which is likely to occur at the very time when the USSR is becoming a net oil importer, would further increase the hard-currency drain. To offset such a shift, nonoil Soviet exports would have to more than quadruple in real terms in eight years—an impossible task.

Thus, Moscow will take steps, if necessary, drastic ones, to protect its ability to continue importing high quality manufactures and high priority foods from the West. Such steps would include all-out attempts to push nonoil exports, and reductions of oil exports to Eastern Europe.

Potential for Increasing Exports

The USSR will probably find it impossible to offset the hard-currency shift in oil trade by expanding hard-currency earnings from other sources. If exports behave as they have in the past, Soviet nonoil exports should increase at an average annual real growth rate of about 5 percent.[18] Exports of wood and wood products (the second largest hard-currency earner, at $700 million in 1975) are expected to grow 5 to 10 percent annually in real terms. Soviet timber harvesting problems will inhibit larger increases. Diamond exports, valued at $500 million in 1975, should maintain their strong upward trend. Coal and coke exports ($400 million in 1975) probably will not grow substantially until the 1980s when new Siberian mines are opened. Exports of platinum-group metals, which have fluctuated annually by as much as $200 million, were valued at over $200 million in 1975; they should increase over the long term in part because of their use in pollution control devices. Prospects for manufactured goods, valued at over $600 million in 1975, are bearish; the Soviets themselves admit that export prospects are poor.

[16] Comprising 1.6 million b/d for reexport to Eastern Europe and 1.1 million b/d for domestic consumption (the difference between projected consumption of 10.1 million b/d and projected production of 9 million b/d). An earlier CIA study, "The International Energy Situation: Outlook to 1985" (April 1977), estimates combined Soviet and Eastern Europe oil imports in 1985 at 3.5 to 4.5 million b/d. This range is consistent with the base line forecast made in this paper on the assumption that the Soviet Union makes no special new effort to save oil. There is a difference in coverage, however. The earlier estimates include Romania and Yugoslavia while those in the current study do not because these two countries, unlike the others in Eastern Europe, are not considered Soviet clients for this purpose; that is, the USSR would not be expected to make up their energy deficits. There have also been some changes in the forecasts about oil demand in the USSR and Eastern Europe but these largely cancel out. If Romania and Yugoslavia are included, the current base line forecast is 3.9 million b/d or close to the midpoint of the range in the earlier paper.

Unlike the earlier estimate, the present forecast considers the possible impact of additional energy savings due to new Soviet policies. With additional energy savings of 2.5 percent, all in the form of oil, the USSR and Eastern Europe would need to import 2.5 million b/d in 1985, or 2.9 million b/d including Romania and Yugoslavia.

[17] That is, the price of oil rises relative to prices of exports and other imports.

[18] Export projections refer only to nonoil merchandise exports. Gold and arms are treated separately below. The projections are based on (a) historical relationships between Soviet exports and Western industrial production and (b) likely trends in Western industrial production.

New export earnings from compensation agreements already signed will boost annual export growth by several more percentage points from present levels. Natural gas exports to Western Europe will rise from $200 million in 1975 to more than $2 billion (1976 prices) by 1985. Exports of chemicals—especially ammonia—wood and wood products, coal, and metals will add another billion dollars to Soviet exports by 1985. Another new source of hard currency is uranium enrichment services, which should add $200 million to $300 million annually to hard-currency earnings beginning in the early 1980s.

In light of the above, an average annual growth rate of 7.5 percent seems appropriate for nonoil exports paid for in hard currency. An all-out Soviet effort to expand such exports (again excluding gold and arms), combined with more favorable economic conditions in the West, could boost annual export growth to roughly 10 percent.

Earnings from gold sales should increase steadily, but rapid expansion will probably be limited by market conditions in the West. Investment decisions already made indicate a continued Soviet commitment to increase gold production, which is expected to rise from about 350 tons in 1976 to 420 tons by 1980. Even if the USSR should market most of its gold production, we estimate that annual earnings in real terms would increase only about 5 percent in 1977-85. In 1976, Soviet gold sales were approximately $1.4 billion. The USSR also could boost production and/or sell off a portion of its estimated 1,870 ton gold reserve in an effort to boost earnings. Soviet willingness to markedly expand sales will be tempered, however, by the adverse effect heavy Soviet sales would have on the market price for gold.

Hard-currency earnings from arms sales are substantial (an estimated $1.5 billion in 1976), and have potential for growth. With a continuation of the recent trend towards higher prices for more sophisticated equipment and a rising share of sales for cash, real earnings might increase as much as 10 percent annually in 1977-85.

Although Moscow will wish to continue financing a major share of machinery and equipment imports through medium- and long-term credits, it will find it increasingly difficult to do so after 1980. Nevertheless, existing commitments and relatively easy credit conditions in the West suggest that the USSR should be able to increase drawings on export credits by up to 5 percent (in real terms) annually in 1977-80.

By 1980 at the latest, the expected decline in Soviet oil exports will cause increased apprehension in the West about Moscow's ability to increase its foreign exchange earnings and manage its debt. Substantial new credits are likely to depend upon Soviet willingness to undertake large compensation deals, particularly in the energy sectors, that provide assurances of future export capacity. In any case, growing debt service will virtually eliminate any favorable impact that more credits could have on import capacity.[19] By 1980 repayments on past debt will exceed new drawings.

Soviet oil consumption policies will have a far greater impact than the availability of new credits on Soviet import capacity in the 1980s. An oil conservation program that by 1985 results in a 2.5 percent reduction in overall energy use and some substitution of other fuels

[19] Import capacity is defined as Soviet ability to finance imports of commodities other than oil or grain from the West. Soviet need for grain from the West is assumed to have first claim on available hard currency for imports, depending on harvests. In these projections grain imports are assumed to vary between $1.5 billion and $2.5 billion annually.

for oil seems plausible. Together such programs would result in the savings of 700,000 b/d of oil by 1985, roughly $3 billion in 1977 prices.

More important will be Soviet policy decisions regarding exports of oil that do not earn hard currency. In 1976 such foreign sales came to 2 million b/d, two-thirds of which went to Eastern Europe. Declining oil production will probably cause Moscow to terminate oil exports to such customers outside of Eastern Europe. More importantly, it will force Moscow to weigh carefully the tradeoffs between continued economic support to Eastern Europe and trade with the West. Soviet oil exports to Eastern Europe are scheduled to rise to 1.6 million b/d by 1980, a diversion of over $7 billion (in 1977 prices) from hard currency oil markets.

We expect that Eastern Europe will be forced to share the burden of the Soviet oil shortfall. If the Soviets cut deliveries during 1981-85 so that by 1985 deliveries were only one-half the 1980 level, the East Europeans would have to turn to the West to make up the shortfall. The East Europeans are already buying 200,000 b/d from hard-currency countries valued at about $900 million annually (roughly 5 percent of total hard-currency imports); by 1985, assuming that the East European countries take no additional conservation measures, their hard-currency oil imports could rise to 1.5 million b/d. That would cost the East Europeans $7 billion annually at 1977 prices, and more if the price of oil increases—as we expect. An oil import bill of this magnitude (about one-fourth of estimated hard-currency imports) would cut into Eastern Europe's ability to obtain critically needed industrial materials and equipment—a gloomy prospect in view of Eastern Europe's dependence on such imports to sustain growth.

The East Europeans will take steps to ease the oil crunch but these will have limited effect. A boost in exports to the West and massive conservation programs would help but, in turn, would require more imports from the West.[20] In the final analysis, the East Europeans would be forced to cut economic growth. A decline in growth from our projected 1981-85 rate of 3.5 percent to 2.5 percent would reduce oil demand by 400,000 b/d and the oil import bill by almost $2 billion. The reduction in economic growth would force the East Europeans, and ultimately Soviet, leaderships to engage in a delicate balancing act between maintaining export levels and satisfying consumer expectations.

Soviet Hard-Currency Import Capacity

The range of uncertainty regarding future oil production and consumption and the extreme sensitivity of import capacity to alternative estimates make it difficult to pinpoint future import capacity. The interrelated nature of the assumptions, however, narrows the range of forecasts. For example, if Soviet oil production falls quickly and early and if the world oil prices rise rapidly, Moscow would probably stress conservation efforts and be under pressure to make substantial cuts in exports to Eastern Europe. Conversely, a slower decline in oil production coupled with a slower rise in world oil prices would reduce the need for such measures.

Our projections of future import capacity were derived by combining several assumptions.

- Moscow pushes oil conservation beyond

[20] Both Eastern Europe and the USSR would have to rely heavily on Western supplies for specialized machinery and equipment for conserving energy.

current plans, achieving a 2.5 percent savings in overall energy use by 1985.

- Nonoil exports, excluding gold and arms, increase between 7.5 percent and 10 percent annually in 1977-85.
- Gold and arms sales will grow in real terms by 5 percent and 10 percent per year, respectively.
- Oil production falls to between 8.5 and 9.5 million b/d in 1985.
- The real price of oil remains at current levels in 1977-80 and rises by up to 10 percent a year in 1981-85.
- Soviet oil exports to Eastern Europe in 1981-85 either remain at the scheduled 1980 level of 1.6 million b/d or are progressively reduced to one-half the 1980 level.

Under these assumptions, Soviet import capacity in real terms will peak in 1980 at between $16 billion and $19 billion and will fall by 1985 to between $3 billion and $11 billion (see figure 7).[21]

The fall in import capacity will force the Soviet leadership to make hard decisions regarding trade with the West. We judge that:

- Imports related to energy conservation and production will take precedence, as failure to obtain such equipment and technology would only exacerbate Soviet oil problems and increase Soviet hard-currency expenditures for oil over the longer run.
- Imports of consumer goods and nonessential foodstuffs probably will be cut drastically.
- Imports of plant and equipment designed to increase future export capacity will have priority second only to energy-related imports, and Soviet reliance on compensation deals guaranteeing future export earnings will increase.
- In order to encourage Western participation in compensation agreements and to insure that energy resources are exploited efficiently and rapidly, the USSR may have to acquiesce to Western demand for profit sharing, equity ownership, and onsite management control.

[21] Under a likely set of assumptions with respect to oil production and consumption, export growth, credit availability and other factors, combined Soviet and East European hard-currency import capacity in the 1980s will decline—from an estimated $36 billion in 1980 to $26 billion in 1985 (midpoints). This is $1 billion less than the USSR and Eastern Europe imported in 1976. These figures assume an increase in the real price of oil of 10 percent annually in 1981-85.

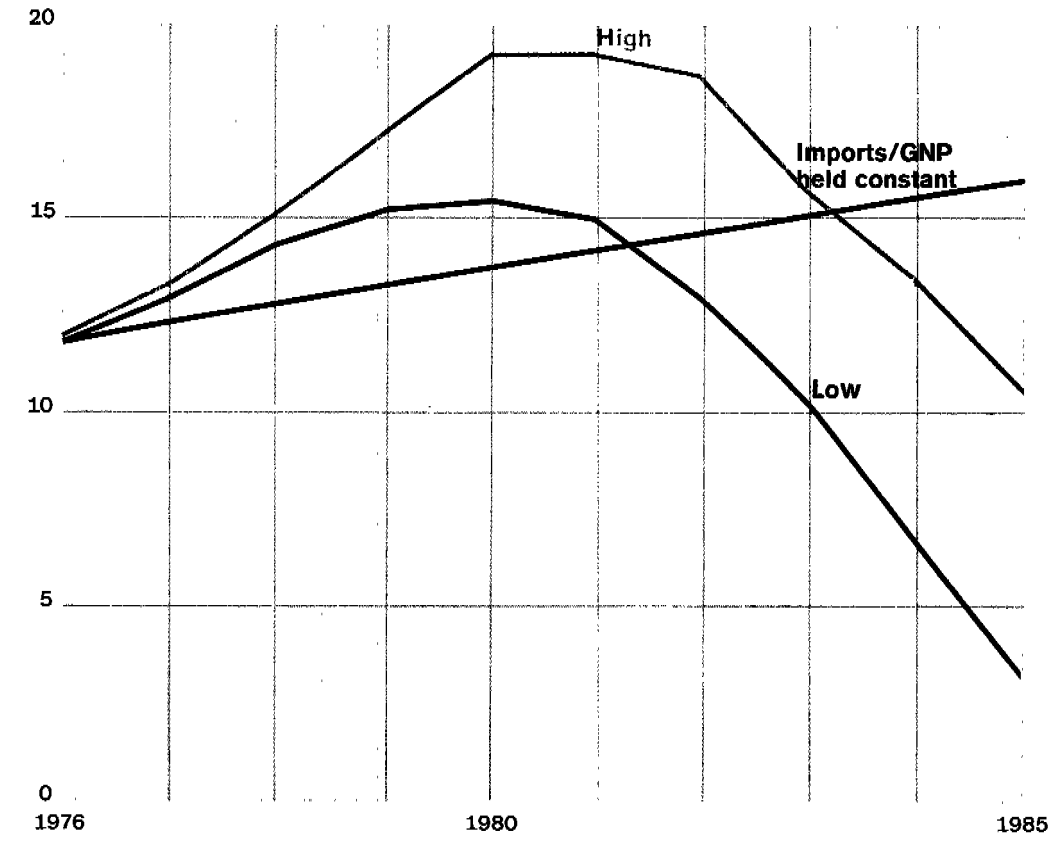
Political Implications

Soviet economic problems over the next 10 years or so will become highly complex and not susceptible to quick and easy solutions. As Soviet leaders obtain a better perception of the resource problems ahead, choices among economic policy options will become abrasive issues in leadership politics. For example, a conspicuous lack of success in coping with the energy problem could lead to a policy crisis and pressure for changes within the leadership.

Soviet responses to economic problems will be severely complicated by the fact that stability in the political leadership, which has been quite high over the 13 years since Khrushchev's fall, is almost certain to weaken during the coming period. Brezhnev's vigor and stamina are recurrently in question; his senior colleagues are his age or older. The controlling group has been timid in its approach to economic reform, and its timidity has grown with time; the 1965 reforms were only partially implemented, and

Figure 7

USSR: Capacity to Import Hard Currency Goods and Services Other Than Oil and Grain [1]



1 An oil price of $12.50/barrel for 1977-85 is used under the high scenario while for the low scenario $12.50/barrel was used for 1977-80, with an annual increase of 10%, thereafter.

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the new constitution's emphasis upon centralization and party control testifies to Brezhnev's conservatism on these matters.

Cautious economic policies are likely to continue during a period of transition to a post-Brezhnev leadership. After a new leadership has finally established itself, it is more likely that policy options, which were considered and rejected in the past as too contentious or lacking in urgency, will be given a chance. For example, new leaders might be persuaded that basic organization and management reforms in industry and an expansion of the private sector in

agriculture are necessary. They might also consider other options—such as accelerating investment at the expense of defense or consumption, or reducing the armed forces to enhance the civilian labor force.

The leadership may be spurred to action by the growing potential for consumer unrest as this sector is squeezed by both defense and investment in the competition for the nation's resources. Consumer expectations for an improved diet already have been disappointed because of the poor harvests of 1972 and 1975. An unfavorable climate change combined with a hard-currency shortage could require a degree of belt-tightening unknown since the Khrushchev years. Having just experienced a decade of relatively rapid growth in levels of living, and expecting continued growth in the next decade, Soviet consumers will be doubly disappointed. They have, of course, learned to bear disappointments before, and the key unknown factor is whether another round will finally impact adversely on incentives and labor productivity.

Economic pressures that might elicit a major political reassessment will depend not only on domestic factors but also upon external developments, especially Soviet perception of the international "correlation of forces." Western economic health, North-South and Atlantic relations, OPEC and oil prices are among the most important factors that will enter into the equation.

The West's recent economic troubles enabled the East to gain in the growth sweepstakes in the early 1970s but, because of a lower-than-normal demand for the East's exports, also increased the Bloc's debt to the West. Despite better Bloc export prospects arising from Western recovery, most of the problems related to a further expansion of economic relations with the West, including the debt accumulated, will remain.

In the meantime, the decline in Soviet hard-currency import capacity—coupled with a continuing need for imports of Western grain, key industrial materials, technology, and equipment—will lead the USSR to look to new sources of foreign help. As indicated above the only viable option would be massive Western government-backed, self-liquidating credits for large joint ventures such as those proposed for the Yakutsk and North Star LNG (liquefied natural gas) projects. West Germany, Japan, and other Western industrial countries can provide substantial amounts of capital, technology and equipment, but US participation in such projects would almost certainly be required both because of unique technology and to spread financial and political risk.

The Burden of Eastern Europe

In deciding how much of the burden of rising costs and declining oil production Eastern Europe should bear, the USSR will have to be careful not to push its allies too hard to gain economic relief for itself. Reducing its oil exports to Eastern Europe will force these countries to spend scarce foreign exchange to buy more oil in the West at the expense of equipment and industrial materials vital for economic growth.

Moscow would see economic benefits from an expansion of East European trade with the West and to join potentially helpful international organizations such as the World Bank and International Monetary Fund. Western direct private investment may have to be accepted to help Eastern Europe deal with its hard-currency problems.

Communist Oil Policy in the Middle East

One major modification of Soviet policy in the Middle East which has already begun is likely to become increasingly important as time goes on. This is the degree of emphasis given by the Soviet leadership to using arms sales, particularly in the Middle East, as a hard-currency

earner, as distinguished from using them as a loss leader for purely political purposes. As the economic function of arms sales becomes more and more vital to Soviet interests, the Soviets are likely to become proportionately avid in seeking customers possessing hard currency or its oil equivalent. This new economic interest—superimposed on the old political interest in using arms sales to supplant Western influence—is likely to reinforce Soviet disinclination to enter into international agreements restricting such sales.

APPENDIX

Forecasting Soviet Economic Growth

The forecasts of Soviet economic growth rely on a combination of econometric techniques and analytical judgments based on previous trends and patterns in Soviet economic perforance. Central to the analysis in this report is the aggregate production function. A production function is a relation between inputs—usually capital, labor, and land—and the resulting output or production. Production functions of one kind or another are often used for economic forecasting. In forecasts for the USSR, both the general form and the precise characteristics of the relationship between output and inputs have been assumed or specified by analogy with Western practice.

Although a variety of production functions were investigated, the aggregate production function used in this paper was the generally accepted Cobb-Douglas form: $Q=AL^bK^cD^{1-b-c}$

where: Q = GNP
L = labor in man-hours
K = capital stock
D = land
A = combined factor productivity

The coefficients b, c, and (1-b-c) represent the distribution of labor costs (wages, other income, and social insurance deductions), capital costs (depreciation and a 20-percent charge on fixed capital net of depreciation), and an assumed land rent. The fact that these coefficients sum to one involves an assumption of constant returns to scale, that is, proportional increases in all inputs will yield proportional increases in output. The distribution of these factor costs in production was derived from the 1970 GNP accounts for the Soviet Union. The share of labor was computed at 55.8 percent, of capital at 41.2 percent, and of land at 3.0 percent.

The combined factor productivity term, A, is in effect a residual factor. It includes all increases or decreases in production which are not explained by increases or decreases in the primary inputs of capital, labor, and land. This term incorporates primarily new technology, qualitative improvements in management, production engineering, health and education of workers, and organization, changes in output mix or material inputs, good luck, and anything else not accounted for by quantitative changes in the primary inputs.

The quantitative changes in primary inputs used in the production functions computed for the study are graphically portrayed in figures 5 and 6.

For the period through 1980, the GNP forecast utilizes planned increments to inputs and the assumption that factor productivity will follow past trends quite closely. The forecast growth rate of 4 percent per year 1976-80 is consistent with an aggregation of individual forecasts for the various sectors of the economy (for example, industry and agriculture), derived from a variety of econometric and analytical techniques.

For the period 1981-85 the forecast is based on the assumptions about the growth of inputs and combined factor productivity since no plan is available for these years. Labor growth is based on analysis of projected demographic trends. Growth of capital stock is more difficult to predict because of changing Soviet strategy for capital formation. The growth rates of

capital portrayed in figures 5 and 6 assume that investment continues to grow at the relatively low rate planned for 1976-80 and that some success is achieved in reducing the growth of unfinished construction. The growth rate of land is held at the rate planned for 1976-80 and reflects the effect of Soviet land reclamation programs.