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Soviet Economic Dependence on the West

An Intelligence Assessment

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Soviet Economic Dependence on the West

An Intelligence Assessment

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Soviet Economic Dependence on the West (U)

Key Judgments

The dramatic surge in Soviet trade with the West during the 1970s resulted largely from a growing dependence by the USSR on foreign machinery, technology, and farm products. Hard currency imports grew ninefold, from less than 25 percent of total imports to nearly 40 percent. By 1980, imports from the West were equivalent to 15 percent of Soviet grain utilization and 10 percent of steel consumption.

During the 1970s Soviet exports to hard currency countries also climbed, led by energy and other raw materials. By 1980, 40 percent of all Soviet exports of fuels were paid for in hard currency. Western trade dependence on the USSR, however, was much less than Soviet dependence on the West. Imports from the USSR in 1980, for example, represented only 2 percent of imports by OECD countries. Because foreign demand for Soviet exports did not match Moscow's increased appetite for Western goods, a payments gap developed that was financed by large Western credits, both commercial and government backed.

Given Soviet reluctance to make systemic changes, the USSR's economic prospects for the 1980s indicate a continued—and perhaps even greater—need for Western goods and credits. Indeed, Western imports are particularly well suited to help alleviate the very problems that confront the Soviets during this decade—declining productivity and resource shortages:

- Likely imports are concentrated in sectors crucial to raising technological levels and productivity.
- Imported oil and gas equipment could help find and work reserves needed to offset depletion in existing fields.
- Food imports are crucial to maintaining living standards, essential for worker morale and productivity.

Without access to Western goods and technology, the Soviets would be forced to go it alone or rely more on CEMA sources. This would entail major losses in quality, reliability, and productivity. Moreover, valuable time would be lost because the Soviet economy's scarce stock of resources could not be stretched to accommodate a sudden demand for import substitutes. The Soviets probably would see time as the greatest loss because they believe that their economic problems will be toughest in the short and medium term and that the 1990s will bring some relief.

In any event, the USSR will face some difficult choices in attempting to maintain trade links with the West. As a result of an expected decline in oil exports, Moscow will be losing its major foreign exchange earner in the 1980s and will not have the cash to buy Western goods and equipment in the volume it has in the recent past. A hard currency bind surfaced in 1981 that already is beginning to force Moscow to trim import plans. The USSR can maintain import levels in the face of declining foreign exchange receipts only by dramatically stepping up its Western borrowing. But to do so would also raise the Soviet debt burden. In the absence of Western loans, Moscow would have no choice but to cut imports back drastically.

Any reduction in trade with the West would put pressure on Eastern Europe to help fill the gap. Although the trading patterns of Eastern Europe and the West with the USSR are similar—exports of machinery and manufactures in return for imports of raw materials—Eastern Europe would not be a viable substitute. The technological level of its goods, although higher than the USSR's, is still far below that of the West. Moreover, the East Europeans are experiencing economic problems of their own and do not have the industrial capacity to cope with increased Soviet demand. Nor are they in a position to provide any significant relief on the agricultural front. Indeed, many of the East European countries compete with the Soviets for world grain supplies.

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Soviet Economic Dependence on the West

Introduction

The 1970s witnessed a dramatic surge in trade between the USSR and the West [1] as the Soviet Union increasingly looked outside its borders for help in raising the technological level of Soviet plant and equipment, relieving industrial bottlenecks, and increasing living standards. This paper explores the degree of economic dependence that has developed over the last decade—a necessary first step in determining the potential for economic leverage—and projects the importance of this relationship to the USSR in the 1980s in light of the USSR's deteriorating economic performance. It provides the in-depth analysis of the USSR's foreign payments position summarized in *The Soviet Economic Predicament and East-West Economic Relations* [illegible] January 1982

The Development of the USSR's Trade With the West

Internal Soviet economic policy decisions as well as detente contributed to the surge in Soviet-Western commercial relations in the 1970s. As postwar productivity gains evaporated and domestic growth slowed early in the decade, Moscow turned to the West for equipment and technology to spur the economy. Expectations were also high in the West, where businessmen hoped to sell equipment and technology from underemployed capital goods industries and to develop a large and growing market for consumer goods in the USSR. The Politburo's decision to give full support to the Brezhnev program for upgrading the Soviet diet was taken as an added sign that more attention would be given to the consumer, which would in turn require large imports of Western agricultural products. The West also viewed the USSR as an important new source of energy supplies as well as a supplier of timber, various ores and metals, diamonds, and other raw materials

[1] In this paper, the West is defined as the USSR's hard currency trading partners

Table 1 Percent

USSR: Share of Hard Currency Trade in Total Trade [a]

	Soviet Exports			Soviet Imports		
	1970	1975	1980	1970	1975	1980
Total	17	23	31	23	38	38
Fuels	24	36	42	4	34	NA
Crude oil and petroleum products	26	40	43	10	72	NA
Natural gas	2	34	48	0	0	NA
Machinery and equipment	5	9	3	22	37	26
Ferrous metals	10	6	7	47	77	75
Chemicals	18	25	36	34	42	42
Wood and wood products	44	37	48	34	27	15
Agricultural products	14	24	25	27	42	66
Grain	5	1	0	73	87	90
Consumer goods	23	26	13	12	9	9

[a] The importance of hard currency trade in total trade is understated in Soviet statistics because of the favorable prices the USSR extends to the CEMA countries for exports and imports. In 1980, for example, exports to Eastern Europe would have been $7 billion higher had Moscow received world market prices for the goods it shipped there, but Soviet imports from Eastern Europe would have been $10 billion lower had world prices prevailed.

Source: Soviet foreign trade data.

The Soviet Perspective. Purchases from the West as a share of total Soviet imports rose dramatically, from 23 percent in 1970 to 38 percent in 1980 (table 1)—a nearly ninefold increase in value terms and a twofold increase in volume terms (figure 1). Purchases of machinery, ferrous metal products, and foodstuffs—especially grain—have dominated Soviet imports (table 2). Because a large share of Soviet purchases of capital goods was financed by Western credits, Soviet hard currency debt increased to an uncomfortably

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Table 2

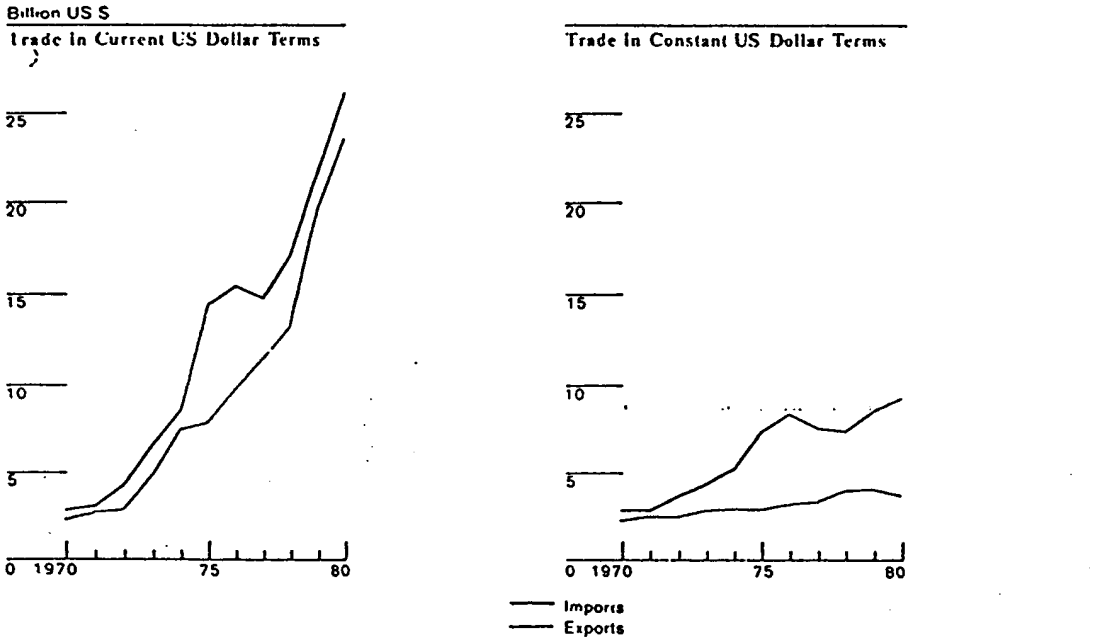
USSR: Hard Currency Trade

	Exports, f.o.b.						Imports, f.o.b.					
	1970		1975		1980		1970		1975		1980	
	Million US $	Percent of Total	Million US $	Percent of Total	Million US $	Percent of Total	Million US $	Percent of Total	Million US $	Percent of Total	Million US $	Percent of Total
Total	**2,201**	**100**	**7,835**	**100**	**23,498**	**100**	**2,708**	**100**	**14,257**	**100**	**26,017**	**100**
Of which:												
Fuels	493	22	3,887	48	15,095	64	8	NEGL	497	3	700 a	3
Crude oil and petroleum products	387	18	3,276	41	12,028	51	8	NEGL	497	3	700 a	3
Natural gas	13	1	220	3	2,706	12	0	0	0	0	0	0
Coal and coke	93	4	391	5	362	2	0	0	0	0	0	0
Machinery and equipment	140	6	560	7	1,388	6	927	34	4,593	32	6,039	23
Ferrous metals	129	6	167	2	246	1	279	10	2,567	18	3,469	13
Chemicals	67	3	256	3	765	3	208	8	742	5	1,565	6
Wood and wood products	365	17	712	9	1,476	6	84	3	214	2	203	1
Agricultural products	205	9	572	7	478	2	615	23	3,856	27	8,800	34
Grain	22	1	3	NEGL	0	0	101	4	2,323	16	4,400	17
Other	183	8	569	7	478	2	514	19	1,533	11	4,400	17
Consumer goods	76	3	215	3	152	1	260	10	436	3	745	3

a Estimated.

Source: Soviet foreign trade data.

Figure 1
USSR: Historical Trends in Merchandise Trade



high level in the mid-1970s (table 3), leading to more cautious borrowing and buying through the remainder of the decade

The USSR had considerable difficulty in assimilating the equipment and technology it bought from the West. In every sector, reports abound of construction delays and incomplete mastery of the new technology. Nonetheless, imports from the West unquestionably helped the USSR deal with some critical problems, particularly in certain manufacturing sectors:[1]

- In the 1970s, imported chemical equipment, accounting for about one-third of all Western machinery purchased by the Soviets, was largely responsible for doubling the output of ammonia, nitrogen fertilizer, and plastics and for tripling synthetic fiber production.
- The Soviets could never have accomplished their ambitious 15-year program of modernization and expansion in the motor vehicle industry without Western help. The Fiat-equipped VAZ plant, for example, produced half of all Soviet passenger cars when it came fully on stream in 1975, and the Kama River truck plant, which was based almost exclusively on Western equipment and technology, now supplies nearly one-half of the Soviet output of heavy trucks.

[1] See the appendix for a more detailed description of the contribution that imports from the West have made to various sectors of the Soviet economy

Table 3

Million US $
Except as Noted

USSR: Hard Currency Debt to the West

	1971	1975	1976	1977	1978	1979	1980 [a]	Projected 1981
Commercial debt	400	6,900	9,700	9,800	9,500	10,500	10,000	10,800
Government-backed debt	1,400	3,600	5,200	5,900	7,000	7,800	8,200	8,500
Gross debt	1,800	10,500	14,900	15,700	16,500	18,300	18,200	19,300
Assets with Western banks	1,200	3,100	4,700	4,500	6,000	8,800	8,600	7,000
Net debt	600	7,400	10,200	11,200	10,500	9,500	9,600	12,300
Debt service	300	1,800	2,300	3,100	4,100	4,000	4,900	5,000
Debt-service ratio *(percent)* [b]	10	18	17	19	21	15	16	15

[a] Preliminary.
[b] Debt service as a percentage of earnings from merchandise exports, sales of arms and gold, interest, invisibles, and transfers.

- Large computer systems and minicomputers of Western origin have been imported in large numbers (1,300 systems since 1972) because they (a) have capabilities that the Soviets cannot match, (b) use complex software that the Soviets have not developed, and (c) often are backed up by expert training and support that the Soviets cannot duplicate

Imports from the West also played a key role in supporting the energy and agricultural sectors. Because of Soviet deficiencies in drilling, pumping, and pipeline construction, the USSR bought about $5 billion worth of oil and gas equipment alone in the 1970s. Soviet purchases covered a wide range of equipment that will add substantially to future energy production. Submersible pumps purchased from the United States, for example, are estimated to have added roughly 2 million b/d to Soviet oil production in recent years. Similarly, the Soviet offshore exploration effort would not be nearly as far along as it is without access to Western equipment and know-how. Meanwhile, West Germany and Japan have provided most of the large-diameter pipe needed for gas pipeline construction

As for agriculture, Soviet grain imports averaged 14 million tons per year in the past decade. In 1981, grain purchases coupled with record imports of meat, sugar, vegetable oil, and soybeans and meal totaled nearly $13 billion, accounting for 40 percent of hard currency expenditures. Without Western grain, Soviet consumers would not have had the increase in meat consumption that they received in the early 1970s, and the fall in per capita consumption of meat would have been far worse in the late 1970s

Western imports have also contributed to Soviet defense capabilities. Some products of the imported equipment and technology are used by the Soviet military—for example, trucks from the Kama River plant. Other imports help in the production of important inputs for defense industries—for example, numerically controlled machine tools, specialty steels, and plant and technology to produce them. Finally, because most defense industries also produce for the civilian economy (table 4), purchases of Western machinery for the civilian sector help ward off the encroachment of civilian requirements on the production schedules of defense plants

The Western Perspective. Trade between the USSR and the West, though substantial (table 5), does not mean nearly as much to the West as it does to the

Table 4

USSR: Relationships Among Defense and Civilian Industries

Defense Industry	Principal Civilian Lines at Final Assembly Plants	Other Closely Related Civilian Production Technologies
Ballistic missiles	Metal consumer goods, machine tools [a]	None
Aerodynamic missiles	Metal consumer goods, excavating equipment [b]	None
Fixed-wing combat aircraft	Metal consumer goods, parts for agricultural machinery	None
Fixed-wing support aircraft	Civilian transport aircraft, metal consumer goods, hand tools	None
Helicopters	Civilian rotary-wing aircraft, metal consumer goods	None
Naval surface ships	Merchant and fishing ships, chemical storage tanks, parts for transportation and agricultural machinery	Pumps, machine tools, mining equipment
Submarines	Merchant ships, oil pipelines, parts for transportation and agricultural machinery	Pumps, machine tools, mining equipment
Tanks	Railroad rolling stocks and locomotives	Construction and transportation equipment
Other armored vehicles	Agricultural machinery	Construction and transportation equipment
Artillery	Agricultural machinery, motors, and machine tools	Construction and transportation equipment

[a] One ballistic missile plant produces machine tools.
[b] One surface-to-air missile plant produces excavating equipment.

USSR. Imports from and exports to the USSR represented only 2 percent and 3 percent, respectively, of OECD trade in 1980. The share of sales to the Soviet Union in the total exports of the major developed countries ranged from 0.7 percent for the United States to 2.3 percent for West Germany and even higher for Austria, Australia, and Argentina (table 6). The share of Argentine trade is high because of Buenos Aires' new role as a major grain supplier to the USSR

Western reliance on Soviet imports is substantial, however, for some commodities and certain industries. In 1979, the USSR provided 8 percent of West European energy supplies. Soviet petroleum deliveries accounted for about 10 percent of total West European oil imports. Within Europe, the shares ranged from an average of 5 percent for the EC countries to 14 percent for Austria and Sweden. In 1980, the USSR also supplied 15 percent of French and West German consumption of natural gas, 22 percent of Italian consumption, and 60 percent of Austrian consumption

Although the emergence of alternative Western suppliers and newer processing technologies has eroded the attractiveness of Soviet metals and minerals in recent years, the West still depends to some degree on these imports. About 8 percent of the chrome ore and 5 percent of the nickel imported by the West comes from the USSR. The USSR plays a major role only in the platinum-group metals trade, accounting for about half of such Western imports, with Japan and the United States receiving four-fifths of this amount.

Certain Western industries and companies rely more heavily on the Soviet market. For example, about 10 percent of West German and Italian iron and steel exports, 40 percent of West German welded pipe exports, and 10 percent of West German machine tool exports find a market in the USSR. One West German firm ships three-fourths of its output of large-diameter pipe to the Soviet market. In some cases, Western exports translate into large numbers of jobs [illegible] over 300,000 jobs directly or indirectly depend on exports to the USSR. In addition, the agricultural sectors of the major Western grain-growing nations have welcomed the Soviets as customers. In marketing year 1980/81 Argentina and Canada—the two grain exporters benefiting most from the US embargo—sold 85 percent and 31 percent, respectively, of their grain exports to the USSR. (C)

Table 5 Million US $

USSR: Hard Currency Trade With Selected Countries, 1980

	Exports	Imports	Trade Balance
Total	23,498	26,017	−2,519
Developed West	21,304	21,330	−26
Australia	9	1,194	−1,185
Austria	894	610	284
Canada	46	1,496	−1,450
France	3,453	2,326	1,127
Italy	3,235	1,438	1,797
Japan	1,463	2,730	−1,267
Netherlands	1,582	555	1,027
Sweden	546	496	50
Switzerland	686	620	66
United Kingdom	1,323	1,467	−144
United States	233	2,081	−1,848
West Germany	4,767	4,603	164
Others	3,067	1,714	1,353
LDCs	2,194	4,687	−2,493
Argentina	47	1,790	−1,743
Brazil	34	390	−356
Iraq	729	398	331
Libya	252	443	−191
Others	1,132	1,666	−534

Source: Soviet foreign trade data.

Soviet Dependence in a Macroeconomic Context

Moscow's continued hope has been that access to Western goods and technology would boost economic growth by stimulating productivity and helping to break critical production and construction bottlenecks. The leadership realizes that it needs all the help it can get to stem the continued slide in economic performance. Average annual growth of GNP fell to 1.1 percent in 1979-80—the lowest registered in any two-year period since World War II

The disappointment must have been bitter last year as the economy registered a third consecutive year with growth at 2 percent or less. Stagnation in the production of key industrial materials has crippled growth in machinery output; a third consecutive poor grain harvest has worsened Moscow's hard currency payments position; and persistent food shortages and increased prices for luxury goods are leaving many Soviet consumers with less on their tables and less in their pockets. Internal Soviet economic problems have been compounded by the heavy burden of economic support that the USSR has had to extend to its Communist allies, particularly Poland

Paradoxically, even as domestic difficulties mount, Moscow's enthusiasm for expanding ties with the West may be cooling. The aversion to the rapid growth of hard currency debt in the mid-1970s led to slower growth in imports and a curb on new borrowing. Western trade sanctions following the Afghanistan invasion also created uncertainty in Soviet minds about the wisdom of becoming overly dependent on East-West trade. The Polish crisis has reinforced the position of those opposing too much dependence on the West. The cautious formulation of the trade section in the Plan for 1981-85 contrasts sharply with the bullish trade prospects expressed in previous five-year plan guidelines. In remarks to the Supreme Soviet in November, State Planning Committee Chairman Baybakov stated that in the current five-year plan the USSR would concentrate a greater share of its total trade volume on socialist countries. He implied that the volume of non-Communist country trade would grow only 2.3 percent a year during 1981-85 compared with just over 5 percent in 1976-80

Another factor in the Kremlin's more subdued attitude toward trade with the West may be the expressed disappointment over the contribution of imported Western technology to industrial output. Some sectors have experienced difficulties in absorbing the new technology. Even in those areas where Western technology clearly has helped (computers, the automotive and chemicals sectors, and petroleum exploration), the diffusion to Soviet designed and equipped plants has been minimal. The leadership now seems increasingly aware that importing foreign technology is not a panacea for the economy and that policy should concentrate on improving the performance of the Soviet R&D sector and strengthening its ties with production sector

Table 6

Measures of the Importance of Soviet-Western Trade to Major Western Countries, 1980

	Exports to USSR as Percent of Trading Partner's Total Exports	Imports From USSR as Percent of Trading Partner's Total Imports	Percent of Trading Partner's GNP	
			Exports to the USSR	Imports From the USSR
Argentina *	15.0	0.2	0.8	NEGL.
Australia	5.1	0.1	0.8	NEGL.
Austria	2.7	4.2	0.6	1.3
Brazil *	2.1	0.2	0.2	NEGL.
Canada	2.1	0.1	0.5	NEGL.
France	2.2	2.7	0.4	0.6
Italy	1.6	3.0	0.4	0.8
Japan	2.1	1.3	0.3	0.2
Netherlands	0.7	1.6	0.3	0.8
United Kingdom	0.9	1.5	0.2	0.4
United States	0.7	0.2	0.1	NEGL.
West Germany	2.3	2.2	0.5	0.5

* Estimated.

Source: Western data.

A too cautious approach to trade with the West, however, probably is unrealistic. Soviet planners have consistently understated the contribution that imports from the West have made to the economy in the past. Western-supplied grain, for instance, currently accounts for 15 percent of utilization in the USSR. In any event, Moscow must realize that Western imports are exceptionally well suited to helping it with the problems peculiar to the 1980s—that is, negotiating the difficult transition to "intensive" development and coping with resource shortages

Specifically, Western imports could help:

- *Maintain some growth in the standard of living.* Food imports, especially grain and meat, will be crucial for consumer morale—with its attendant effects on productivity. Without substantial imports of farm products, per capita food consumption (expressed in value terms) could well stagnate in the 1980s.
- *Prevent fuel shortages.* Imported Western oil and gas equipment can help locate and develop the new oil and gas resources needed to offset depletion of existing oil deposits.
- *Remove some industrial bottlenecks.* Steel shortages, for example, are holding back the growth of the civilian machinery sector. Larger purchases of steel would help counter the effects of inadequate investment in new steel capacity.
- *Boost productivity.* Imports of Western plant and equipment seem small since they constitute only about 5 percent of total domestic investment. But the contribution of Western equipment to total output is proportionately larger since its productivity is higher than that of its domestic counterpart. Indeed, a renewed emphasis on machinery imports to supplement domestic machine building—the sector most crucial to technological progress—must be

especially tempting now when the growth of the labor force and of civilian machine-building output is sluggish and military requirements preempt a rising share of machinery production for civilian use.

- *Relieve pressure resulting from defense spending.* A continuation of high growth rates for defense despite the low economic growth rates projected for the 1980s could lead fairly quickly to stagnation in the civilian machine-building sector and living standards. Imports of Western plant and equipment, on the other hand, could bolster the civilian industrial base

Hard currency trade—which is expected to be more crucial in the 1980s than ever before—is even more important to the USSR than implied by the numbers. Although imports from the West are equal to only 1.6 percent of Soviet GNP,[1] the impact of a complete cutoff of trade would be substantially greater. The need for Western agricultural products, as pointed out earlier, is particularly vital. Several major development projects would be seriously delayed—if not abandoned—if imports were eliminated. Disruptions due to lost imports would not only hit those factories and sectors directly dependent on Western inputs but would spill over to other plants as well. Because the USSR's scarce stock of resources could not be stretched quickly to accommodate a sudden demand for import substitutes, the Soviet system would find it difficult to cope with a fall in East-West trade

Soviet Dependence in Key Sectors

Soviet reliance on Western imports varies widely from sector to sector. The degree of dependence in agriculture as well as the major branches of industry—energy, metals and minerals, chemicals, machinery and high-technology goods—is described in detail in the appendix. Our review considers (a) reliance on Western imports to date, (b) prospects for continued dependence, and (c) the impact if trade with the West—and specifically the United States—were curtailed

[1] This figure was derived by dividing Soviet hard currency imports in 1980 (converted from the ruble value by using the 1980 ruble/dollar foreign exchange rate) by the CIA estimate of 1980 Soviet GNP in current dollars. A set of dollar-ruble ratios was used to convert Soviet GNP from rubles to dollars

The sectoral analysis strongly suggests that:

- *Western imports have been instrumental in bringing certain sectors to their present stage of development, and that the wide gap that still exists between Soviet and Western technology allows the Soviets to profit substantially from continued trade with the West.*

The Soviet technological lag is particularly evident in the machine-building industry—the strategic base for accelerating technological progress. Imports of advanced types of Western machine tools are necessary to supplement the general purpose tools that still dominate Soviet output. Computer numerical control (CNC) machine tools, for example, are fairly common in the West but exist in the USSR only as prototypes. Similarly, the Soviet robotics industry is far behind its Western counterpart. Soviet enterprises currently producing robots do not have series production capabilities, and their products are primitive by Western standards

Meanwhile, the Soviets still pattern their major developments in large computers and minicomputers on US designs that are essentially two generations behind current US offerings

- *If denied access to Western imports, the Soviets could go it alone but only with substantial losses in quality, reliability, and productivity*

What is true for machine tools and computers is true to some extent in many other sectors, but particularly in those that depend on Western equipment and technology for across-the-board expansion and modernization. Chemicals, construction, earthmoving machinery, and telecommunications equipment are examples. The Soviets are relying on a broad range of imports from Eastern Europe and the West to upgrade these sectors

- *If deprived of Western technology and goods, the USSR could not adjust quickly or completely; valuable time would be lost, adding significant strain to an already stretched economy*

The Soviet energy sector is a striking example. The inability to use Western oil technology such as submersible pumps and enhanced oil recovery technology efficiently, for example, would significantly retard efforts to keep current fields producing and delay plans to exploit new ones. The losses in gas and oil production from a denial of working equipment and technology would probably amount to 2-3 million b/d (oil equivalent) in the mid- and late 1980s, of which the larger part would be gas. Construction of gas pipelines, the chief constraint on Soviet ability to expand gas production, depends heavily on imports of Western pipe and compressors, and Soviet capabilities for producing such equipment are stretched to the limit. In the longer run, the ability to use foreign technology is critical to developing offshore and deeper onshore reserves that are needed to increase oil output. Timing is equally important for obtaining Western equipment for exploring, lifting, and transporting natural gas. As for steel, the Soviets could eventually develop the capacity necessary for specialty steels and large-diameter steel pipe. But they need this steel now for their machine-building and energy sectors.

A similar analysis holds for Soviet agriculture. After three consecutive poor harvests, Moscow has been put in the position of having to import large amounts of grain (at least 30 million tons annually) for at least several years to boost per capita meat consumption and rebuild depleted stocks.[1] If the USSR bought no grain after 1981, average meat production could be cut by about 2 million tons a year, even if grain output returns to a trend level. An embargo on both grain and meat would reduce per capita availability of meat by roughly 20 percent. The loss of Western grain would force the USSR to choose between reducing herd numbers (and with it future meat production), implementing rationing, halting agricultural exports to client states, and/or drawing down strategic grain reserves. While the end result of a denial of grain and other agricultural imports from the West would not cause hunger, the per capita availability of quality foods would decline and the average diet would deteriorate.

- *If only US-Soviet economic relations were shut down the Soviets in the short run could generally switch to other Western and some East European products and technology, but only with losses of time and efficiency.*

The major exceptions are submersible pumps, superphosphoric acid (SPA), and corn. Submersible pump orders cannot be filled currently by foreign firms or US subsidiaries abroad; it would take about two years for production capability to start up overseas. The United States also is the only large-volume source of SPA. Soviet fertilizer plants purchased from France were designed specifically to use SPA of US origin. The suspension of US SPA shipments in 1980 forced Moscow to use less effective materials, thereby adversely affecting agricultural production in 1980 and 1981. Finally, Moscow cannot get all the corn it wants from non-US suppliers. Argentina is the only major grain-growing country with some capability to increase corn production; the EC, Canada, and Australia mainly grow wheat, which is usually more expensive and less suited for some of the balanced feed rations that the Soviets are trying to introduce.

The Role of Credits

Western willingness to extend credits to the USSR—an important factor in the rise of Soviet imports in the 1970s—will be a key element in both the scale and timing of Soviet imports in the 1980s. Western credits provided approximately 12 percent of the USSR's import capacity between 1971 and 1978. Thanks to the rapid increase in oil and gold prices, Moscow was able to sustain growth in Western imports in 1979-80 without an increase in its net debt.

The USSR, however, is encountering a hard currency bind and, with no relief in sight, faces even more of a crunch in the coming years. The only potential large export earner on the foreign exchange horizon is the Yamal gas pipeline, the first line of which will not begin operation until 1986 or later. Even then, earnings from the project will not come close to offsetting the decline that we project in oil earnings until 1990. Meanwhile, Soviet dependence on trade with the West is not expected to diminish, and may well increase. To cover projected grain needs, build the gas

[1] For a discussion of the status of USSR grain purchases, see "World Grain: Soviet Purchases and the Soybean Issue," *International Economic and Energy Weekly*

pipeline, and sustain the flow of other nonagricultural goods, the USSR would have to boost its hard currency imports and debt considerably more than the 1981-85 plan implies

To suggest the magnitude of the USSR's hard currency needs and constraints, we have constructed a balance-of-payments accounting model to project—in 1981 US dollars—trends in the USSR's hard currency foreign exchange accounts through 1990. The model, which consists of a series of standard accounting identities, projects overall payments trends with assumed values for key earnings items such as the volume and price of oil and gas, gold and arms sales and—in a reference case—import requirements

Our calculations assume that agricultural imports drop from their peak of $12.5 billion in 1981 to $11 billion in 1982 and to $10 billion a year in 1983-90. One or more bad harvests in this period could, of course, raise Soviet agricultural import needs considerably. We have also assumed that imports of machinery and equipment, other than for the Yamal pipeline, remain at $6 billion through most of the decade while imports of nonagricultural, nonmachinery items such as steel, pipe, and chemicals grow at the same rate in real terms as in 1976-80. Imports for the Yamal pipeline total $2 billion annually during 1982-88

Overall, imports that must be paid for in hard currency are projected to grow under these assumptions at an annual average rate of 3 percent during 1982-90, slightly faster than implied by Planning Chairman Baybakov in his plenum address last November on the 1981-85 Plan but not as fast as the annual 5-percent rate recorded in 1976-80. In view of the resource constraints that the USSR faces in the next several years, a slower rate of increase in import volume would make it more difficult for Soviet planners to deal with prospective shortages and raise the technological level of domestic fixed investmen

Moscow cannot expect much help from merchandise exports in paying the rising import bill. The key variable in the calculation is Soviet oil exports whose earnings have increased sharply in the past decade as a result of spiraling world market prices. To cover the range of likely Soviet oil options, we have projected two extreme scenarios: (a) oil exports constant at about 900,000 b/d through 1985 and then dropping to zero by 1990; and (b) oil exports falling to 100,000 b/d by 1985 and to zero during 1986-90.[1] Because of soft demand in Western Europe for oil, prices are projected to fall in real terms over the next two years before leveling off for the rest of the decade. Gas exports, on the other hand, are expected to rise to $4 billion by 1985 and then jump to $9 billion as the Yamal pipeline goes into operation in 1986. In 1989, gas earnings will reach $12.5 billion if a second Yamal line is built. This assumption allows for a 25-percent increase in the real price of gas (currently undervalued in relation to other fuels) during the decade. In all, the gas project will add nearly $9 billion annually to Soviet hard currency earnings

Commodity exports other than oil and gas, meanwhile, are held constant at $9 billion a year throughout the period. While some individual export items (platinum-group metals and diamonds) will continue to be in demand in the West, most items in the USSR's export catalogue are products not well suited to Western markets (machinery) or for which Western demand has weakened (timber and other metals). If anything, our assumption may be optimistic. The volume of these exports in 1980 was lower than it was in 1978 (table 7), and further slippage occurred in 1981. Volume exports of wood and wood products fell more than 25 percent between 1976 and 1980. Real exports of machinery and equipment and of diamonds leveled off in 1978-80, and sales of ferrous metals and agricultural products fell sharply between 1975 and 1980. In light of the sluggishness forecast for the developed Western economies and in view of production problems in the USSR, we doubt that export earnings will rebound in the next several year

Nor are the prospects especially bright for earnings from other sources. For these projections we have assumed that Moscow will sell—at $400 per troy

[1] These exports represent sales to the West for hard currency. We assume that exports to Eastern Europe, Vietnam, and Cuba continue at a level of 2 million b/

Table 7 Million 1970 US $

USSR: Hard Currency Commodity Exports Other Than Oil and Gas

	1970	1975	1976	1977	1978	1979	1980
Total	1,801	2,281	2,430	2,313	2,994	3,160	2,821
Coal and coke	93	86	89	88	70	65	58
Machinery and equipment	140	277	319	314	514	566	507
Ferrous metals	129	182	174	123	142	141	134
Wood and wood products	365	361	449	427	405	380	328
Chemicals	67	159	129	143	196	324	403
Agricultural products	205	264	227	256	175	138	112
Diamonds	175	282	284	291	376	380	376
Other	627	670	759	671	1,116	1,166	903

Source: Estimates based on Soviet foreign trade data.

ounce—all of the gold produced each year in excess of domestic requirements, and that arms receipts will remain at the 1981 level of $5 billion a year.[4] Earnings from transfers and invisibles (including freight and tourism but excluding interest earned) are held constant at the current level of $1 billion a year. Interest earnings on Soviet assets in Western banks are projected to add another $0.9 billion a year to overall receipts. The level of interest earnings is based on the assumption that Soviet assets in Western banks remain at $7 billion a year through 1990, and that they earn interest of 13.5 percent a year.

For the projections of debt service, we assumed an average annual interest rate of 13.5 percent on new commercial debt and a rate of 7.8 percent on new government-backed debt and debt incurred for the Yamal gas pipeline. We assume that the average maturity for medium- and long-term commercial debt—which accounts for about two-thirds of total commercial debt—and for government-backed debt is five years. For the Yamal pipeline, we have built in a three-year grace period with repayments over eight years. Short-term debt is held at one-third of total commercial debt throughout the 1980s. Finally, net expenditures under "errors and omissions" are held at the 1980 level of 12 percent of merchandise exports.[5] This assumes that the Soviets provide no extraordinary hard currency assistance to Poland after 1981.

With the above assumptions, the model was used to determine financing requirements for maintaining an assumed 3-percent annual real growth in imports. Our projections (summarized in table 8) suggest that under the high oil scenario, gross debt would rise from a respectable $19 billion this year to $38 billion in 1985 and $98 billion in 1990 (in 1981 US dollars). Under the low oil scenario, debt would rise to $60 billion in 1985 and to $163 billion in 1990. Western credits would be needed to cover approximately two-fifths of the USSR's imports in 1982-90 under the first scenario, and three-fourths under the second.[6] In either case, the debt service burden, while probably still manageable in 1985, would in the late 1980s be considered far too heavy by both Western lenders and the Soviets.

Almost any alteration in financing terms would raise the cost to the USSR of doing business with the West. At present Moscow benefits substantially from subsidized credits extended by its major trading partners in Western Europe and Japan. Roughly 40 percent of the USSR's outstanding debt carries terms with interest rates which are 4 to 5 percent below commercial market rates. A denial of concessionary financing terms on the roughly $2 billion a year the USSR now receives in official financing, for example, would raise Moscow's debt service costs by an average of $100 million per year in 1982-90 (figure 2).

[4] Estimates of hard currency arms exports, which are prepared by the Office of Global Intelligence, are currently being reviewed and may be revised upward.

[5] "Errors and omissions" is a balancing item included in balance-of-payments analysis to account for unrecorded financial flows. For the USSR, the account includes such items as hard currency aid to Poland and credits extended to finance exports such as oil to European customers and machinery to LDCs.

[6] As a sensitivity check, the same high and low oil scenarios were run with imports rising by 2 percent annually rather than by 3 percent. Debt in the high oil scenario climbed to $37 billion in 1985 and $85 billion in 1990. In the low oil scenario, it reached $52 billion in 1985 and $150 billion in 1990.

Table 8

Billion 1981 US $
Except as Noted

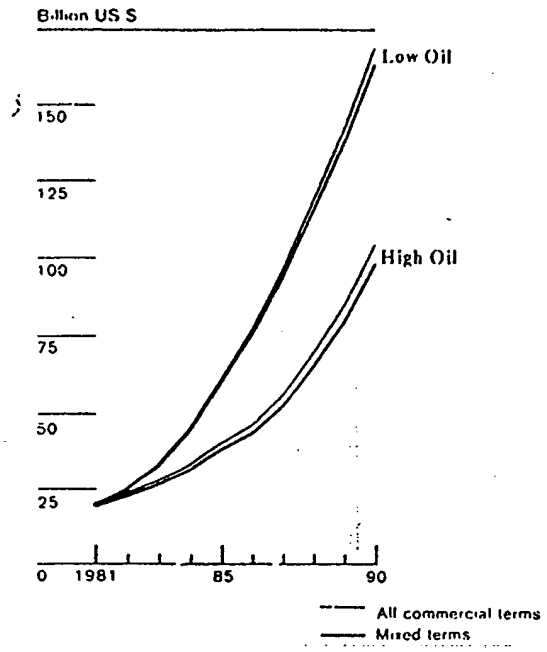
USSR: Hard Currency Payments If Import Volume Increases by 3 Percent Per Year

	1981	High Oil [a]		Low Oil [a]	
		1985	1990	1985	1990
Trade balance	−6.1	−11.2	−17.4	−19.7	−17.4
Merchandise exports	23.9	22.5	21.7	14.0	21.7
Oil	11.5	9.5	0.0	1.1	0.0
Natural gas	3.4	4.0	12.7	4.0	12.7
Other	9.0	9.0	9.0	9.0	9.0
Merchandise imports	−30.0	−33.7	−39.1	−33.7	−39.1
Receipts from gold	2.0	4.2	4.2	4.2	4.2
Receipts from arms [b]	5.0	5.0	5.0	5.0	5.0
Invisibles and transfers	1.0	1.0	1.0	1.0	1.0
Interest receipts	0.9	0.9	0.9	0.9	0.9
Interest payments	−2.0	−3.7	−9.6	−5.5	−17.4
Current account balance	0.8	−1.8	−15.8	−13.9	−23.6
Errors and omissions	−2.2	−2.2	−2.2	−2.2	−2.2
Unadjusted financing requirement [c]	2.8	4.0	18.1	23.7	26.7
Credits drawn [d]	5.6	11.2	31.2	22.0	47.1
Less principal repayment	−3.0	−4.6	−12.6	−6.4	−20.8
Gross debt	19.3	38.4	98.0	59.8	163.1
Debt service	5.0	8.3	22.3	11.8	38.2
Debt-service ratio [e] (percent)	15	25	68	47	116

[a] "High oil" assumes hard currency sales plateau at 900,000 b/d through 1985 then drop to zero in 1990; "low oil" assumes oil exports fall to 100,000 b/d by 1985.
[b] Estimates are currently under review by the Office of Global Intelligence.
[c] Totals may not add due to rounding.
[d] Includes a $1.5 billion drawdown of Soviet assets held in Western banks in 1981.
[e] Debt service as a percentage of earnings from merchandise exports, sales of arms and gold, interest, invisibles, and transfers.

Neither the Soviets nor Western bankers, of course, would permit such a massive Soviet financial burden to develop. Moscow instead would have to settle for lower import levels than assumed in our reference scenarios because any reduction in the volume of new Western credits would lower Soviet import capacity substantially. To estimate a more realistic import capacity, the model calculations were reversed so that imports could be projected with assumed values for future Soviet credit drawings. Three scenarios were constructed for each oil export profile: (1) a scenario limiting the USSR to 1980 drawing levels of $4.5 billion per year, all at commercial terms with interest rates at 13.5 percent; (2) a scenario limiting drawings to $2.5 billion per year at commercial terms; and (3) a scenario that assumes no new credits are drawn. In each case, financing for the Yamal pipeline project is unaffected by Western credit restrictions. These calculations are summarized in table 9 and in figure 3.

Figure 2
USSR: Total Debt Under High and Low Oil Export Projections



In all three cases, Soviet import capacity is substantially below the level required to allow East-West trade to ease the USSR's economic problems appreciably in the 1980s. If Moscow can maintain existing oil export levels through 1985, it could probably postpone deep reductions in imports until after 1985, even if it received no new credits. If Soviet oil exports declined substantially before 1985, however, Moscow almost certainly would have to reduce its imports more rapidly. The Soviets would incur less debt but would also have much less access to Western goods and technology. Western credit restrictions in this situation would accelerate the decline in Soviet import capacity in 1982-85 but would not make much difference thereafter. After the mid-1980s the differences in debt service among the three scenarios begin to offset the differences in the volume of new credit drawings

In all of our scenarios, we have projected Soviet hard currency payments through 1990 in 1981 US dollars. Thus, we have assumed that export prices—except for oil and gas as noted above—and import prices move together. Because of the decline in real oil prices in 1982-83, Soviet terms of trade deteriorate in those years but improve somewhat throughout the rest of the decade due to the continued rise in real gas prices. The projections would be less pessimistic if Western economic growth—and demand—picked up enough to cause another round of increases in the real price of oil and other raw materials

Eastern Europe as a Backstop

Eastern Europe could provide the USSR little direct assistance if imports from the West are forced back. Eastern Europe is certainly in no position to fill Moscow's immediate needs for grain and meat or even the longer term requirements for raw and industrial materials. Nor is most of the large amounts of machinery and equipment that the East Europeans ship to the USSR anywhere near the quality or technological level of that available in the West

The USSR could, however, realize substantial gains if it were to cut back on economic assistance to Eastern Europe—notably the subsidization of exports of goods marketable in the West and the willingness to permit deficits in bilateral trade. Moscow reportedly has already notified the East Europeans that it intends to cut crude oil deliveries. A diversion to the West of 10 percent of oil deliveries now going to Eastern Europe would add $2 billion a year to Moscow's hard currency earnings. Nevertheless, political considerations may force the USSR to help Eastern Europe at the expense of its own economic interests. Not only will Poland's need for large amounts of aid continue into the foreseeable future, but some of the other East European countries are also experiencing economic difficulties

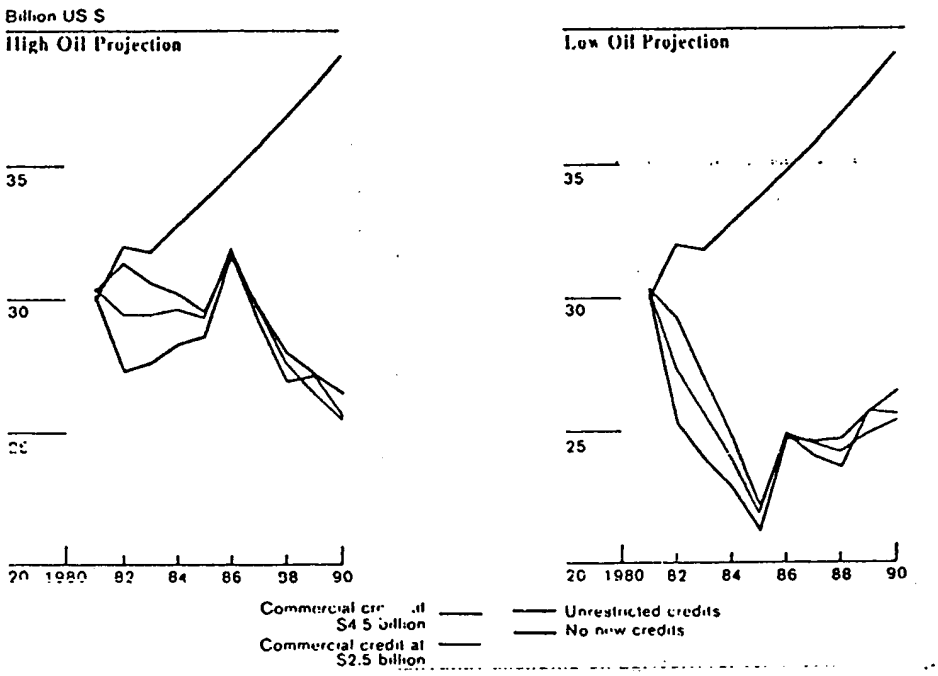
Table 9

Billion 1981 US $
Except as Noted

USSR: Estimated Import Capacity

	1981	High Oil		Low Oil	
		1985	1990	1985	1990
Reference case with unconstrained borrowing:					
Imports	30.0	33.7	39.1	33.7	39.1
Total debt	19.3	38.4	98.0	59.8	163.1
Debt-service ratio (*percent*)	15	25	68	47	116
With new credits limited to $4.5 billion at commercial rates:					
Imports	30.0	29.6	25.7	22.2	25.7
(As a percent of reference-case imports)		(88)	(66)	(66)	(66)
Total debt	19.3	30.8	34.6	30.8	34.6
Debt-service ratio (*percent*)	15	23	32	31	32
With new credits limited to $2.5 billion at commercial rates:					
Imports	30.0	29.3	25.5	21.9	25.5
(As a percent of reference-case imports)		(87)	(65)	(65)	(65)
Total debt	19.3	24.9	23.3	24.9	23.3
Debt-service ratio (*percent*)	15	18	22	24	22
With no new credits:					
Imports	30.0	28.6	26.5	21.2	26.5
(As a percent of reference-case imports)		(85)	(68)	(63)	(68)
Total debt	19.3	16.9	10.1	16.9	10.1
Debt-service ratio (*percent*)	15	12	11	17	11

Figure 3
USSR: Import Capacity Under Credit Restrictions



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Appendix

Soviet Economic Dependence on Western Trade, by Sector

Agriculture

The USSR has been a net importer of agricultural products over the past decade. Since 1978, however, the need for imports has been rising as a consequence of three successive bad harvests. In 1981, grain purchases and record imports of meat, sugar, vegetable oil, and soybeans and meal increased the Soviet hard currency import bill for agricultural commodities to almost $13 billion, well above the $8.8 billion in 1980 and the $5.5 billion in 1979. Agricultural imports in 1981 claimed an estimated 40 percent of total hard currency purchases; they claimed 23 percent in 1978, the most recent good agricultural year. Even with these imports, however, per capita availability of agricultural products fell short of the 1978 level by 3 percent

Grain. Grain—the USSR's largest farm product import—is supplied largely by the West. The USSR was a net importer throughout most of the 1970s, with grain accounting for 50 percent or more of hard currency spending on agricultural commodities in all but three years of the decade. The need for grain derives from the early years of the Brezhnev-Kosygin regime, when the leaders promised consumers larger supplies of quality foods, particularly livestock products. Meat availability has become a yardstick by which the Soviet consumer measures the change in his level of living. As a result, meat is important for worker morale and productivity

After three consecutive poor grain harvests, imports of grain will play a more critical role than ever before. A grain crop of 170 million tons (our December estimate) would be about 65 million tons below the Soviets' planned output. Moscow will try to cover as much of the shortfall as possible. We believe imports will move at close to maximum port capacity—estimated at 45 million tons a year—during the marketing year 1981/82 (1 July 30 June) even if the 1982 grain crop returns to a trend level of around 215 million tons. Moreover, the USSR will continue to need large imports—at least 30 million tons of grain annually—for at least the next several years, even with trend grain crops, merely to boost per capita meat consumption

If all Western suppliers were to suspend grain sales to the USSR before the 1982 harvest, Moscow would be forced to:

- Reduce herd numbers to alleviate some of the pressure on available feed supplies; this would lower the following year's meat production.
- Implement rationing and other conservation measures.
- Halt meat and grain exports to client states.
- Perhaps draw down strategic grain reserves

Denial of grain by the United States alone would have a far more limited effect, even in the short run, because Moscow could buy most of the grain it needs this year and next from other suppliers, as it did after the US partial embargo following the Soviet invasion of Afghanistan. The USSR would probably have to pay premium prices for some of this grain, however. In the longer run, Moscow could overcome a US embargo in terms of quantity by expanding its trade with the major grain exporters; non-Soviet grain purchasers whose traditional suppliers entered the Soviet market could be supplied out of US stocks

In terms of quality, however, achieving the desired mix of grain under a US embargo would not be possible. Most observers agree that the USSR prefers to concentrate its grain imports on wheat and corn in roughly equal proportions, and the United States is the world's major corn exporter. Of the other major exporters, only Argentina has the capacity and climate to increase corn production

Nongrain Commodities. During the 1970s, hard currency expenditures for nongrain agricultural products exceeded those for grain in only three years, but registered fairly steady growth. In 1980, purchases of

nongrain products--largely meat, butter, vegetable oil, sugar, and soybeans and meal—more than doubled from the 1979 level, and in 1981 they grew by another two-fifths. Without these imports, per capita availability of quality foods would have declined substantially, and the average diet would have deteriorated.

While a total Western embargo of these products would not cause hunger, it would probably increase the "starchy-staple" ratio, as it forced the population to consume an increasing share of calories from grain and potatoes. The already serious food shortages would become more widespread, and worker morale and productivity would suffer correspondingly. Because the United States supplies few nongrain products, a US embargo would have little effect

Imports of soybeans and soybean meal have become increasingly important as domestic output of oilseeds has declined and as the need to stretch feed supplies for livestock has grown. Soybean meal in particular is a concentrated source of protein and can substantially improve the nutritional balance and efficiency of livestock rations. Western restrictions on oilseed and meal exports to the USSR would delay improvement in feeding efficiency and slow the increase in meat output. Although most of their imports of soybeans and meal came from the United States during the late 1970s, the Soviets can fill their needs from other suppliers. They have already signed long-term agreements with Argentina and Brazil for 1 million tons of soybeans annually through 1985. Brazil will also provide 400,000 tons of soybean meal annually over the same period Western Europe also became a major exporter of soybean meal to the Soviets last year (it produces the meal from US soybeans)

Oil and Gas Equipment

During the 1970s the USSR bought about $5 billion worth of oil and gas equipment from the West—about $800 million worth from the United States alone. (These figures exclude large-diameter pipe, discussed on page 19.) The Soviets continue to purchase Western equipment to minimize the fall of production in declining fields, to increase output elsewhere, and to help locate and develop reserves

Serious technical problems face the Soviet petroleum industry—in drilling, oil production, and pumping equipment, in pipeline construction, and in the development of remote oil and gas fields. Natural gas production is growing rapidly and is being counted on to sustain the nation's energy output and hard currency earnings when oil production falls. But these hopes are threatened by inadequacies in the Soviet capacity to produce large-diameter pipe and compressors.

The USSR will need to import a broad range of Western petroleum equipment to help overcome its energy problems. The list could include equipment for exploration, drilling, production, offshore operations, oil refining, gas processing, and pipeline construction.

Exploration Equipment. The Soviets already have found most of the relatively shallow, easily located, accessible oil and gas deposits. They specifically need Western seismic and well-logging technology to boost oil reserves in the 1980s. Because there is usually a 5- to-6-year lag between discovery and production, Western equipment ordered today is unlikely to have much impact on oil production before the late 1980s.

A multilateral embargo could severely constrain Soviet exploration. Unilateral controls by the United States may have little or no effect. Foreign firms can supply most Soviet needs with little or no degradation in quality. But we do not believe that the Soviets can improve their own exploration technology (that is, geophysical hardware and software) rapidly enough to affect production before the 1990s

Drilling Equipment. The Soviets plan to nearly double the amount of drilling for oil and gas in 1981-85 and to increase it further in the late 1980s, but their drilling productivity is poor by international standards. Western rigs, drill pipe, tool joints, drill bits, blow-out preventors, and drilling-fluid technology already provide substantial aid to Soviet drilling efforts. The Dresser drill-bit plant, expected to be in operation soon, will enhance Soviet oil production by the late 1980s beyond what the Soviets could do themselves. Western assistance in bringing the plant on stream would have a considerable effect on the rate and

quality of production over the next few years. Although the United States is the world's leader in the production of drilling equipment, producers in Japan and Western Europe could eventually supply the Soviet market. A unilateral US embargo may therefore not have much bite.

Production Equipment. The Soviet oil industry faces rising fluid-lift requirements in the 1980s, as the amount of water produced along with the oil increases. According to Soviet plans, a large additional volume of fluid—well over 6 million b/d—must be lifted in 1985 simply to maintain production of oil at the 1980 level of about 12 million b/d. To handle the high volume of fluid, the Soviets plan to double the number of wells producing oil with the help of submersible pumps and gas-lift equipment

Imported equipment is important for this effort because the capacity and quality of Soviet-made submersible pumps and gas-lift equipment are low. US producers now have a monopoly in producing high-capacity pumps, but if these remain embargoed, other Western suppliers could enter the field within about two years. Each high-capacity US pump produces on the average about 1,000 to 1,500 b/d of oil under Soviet conditions. The Soviets probably hope to import about 100 such pumps annually (in the 1970s they imported a total of 1,200). The water-cut problem in Soviet oilfields is getting worse, and a program to produce a good high-capacity submersible pump domestically has not yet been successful

In addition to high-capacity pumps, Western equipment playing a significant role in Soviet oil development includes gas-lift equipment, well-completion equipment, wellhead units, and Christmas-tree assemblies. The USSR also has an increasing need for Western enhanced-oil-recovery technology. Enhanced recovery projects have long leadtimes, however, and the effect of Western assistance would be relatively small and felt only after 1985

Offshore Equipment. The Soviets' least explored prospective areas for new petroleum discoveries are offshore, and their oil and gas production in the late 1980s and beyond will depend heavily on the exploration and development of continental shelf areas. The Soviets already have received substantial assistance from the West, and continued assistance could speed development in the Caspian area. A US embargo applied unilaterally may make little difference. COCOM restrictions would have very little effect after 1985, because nations who are not COCOM members would be able to provide equipment by then. Firms in Finland, Singapore, Mexico, and Yugoslavia can already supply most of the USSR's current offshore needs and could supply all by the late 1980s. Production of the few drilling components now produced only in the United States could be quickly introduced abroad

Oil Refining and Gas Processing Equipment. The Soviets intend to expand their secondary refining and gas processing industries substantially in the 1980s. Although they are relying primarily on their own production or on equipment imported from Eastern Europe, future expansion will require Western inputs.

Gas Pipeline Equipment. Although the CEMA countries produce most of their own oil pipeline equipment, the USSR relies extensively on the West for gas pipeline equipment—large-diameter pipe and valves, compressors, and pipelayers. The USSR imported 10-12 million tons of line pipe in the past decade at a cost of $4-5 billion. Pipelines are the principal bottleneck in Soviet gas production, and a COCOM embargo on pipe, compressors, and pipelayers would be a major setback to the industry

High-quality large-diameter pipes and valves are currently produced only in Western Europe and Japan.* Although the Soviets have recently built a plant to manufacture large-diameter pipe, they have yet to master production of pipe of this size. Pipelayers capable of handling this pipe are produced only in the United States and Japan, although Fiat-Allis in Italy probably could begin production in a year or so. Large

* Although the Soviets produce pipe up to 1,420 mm (56 inches) in diameter, little is for natural gas pipeline service. Most Soviet pipe is spiral welded and lacks the high-strength, low-alloy metallurgy of Western steel for Arctic pipeline service. Most of the large pipe imported by the USSR is fabricated with a single longitudinal weld made by the submerged-arc process

turbine compressors of the type sought by the Soviets for the Siberia-to-Western Europe pipeline are built in the United States and the United Kingdom. Smaller units are built by firms in France, Germany, Italy, and Japan; none of these has yet attempted to make a 20-to-25-megawatt unit, although a French firm has the necessary licensing

A multilateral COCOM embargo on gas pipeline equipment could reduce gas production substantially by 1985 and by even more after that. Unilateral restrictions on US equipment in this area, however, may have minimal impact. The United States does not produce the pipe or valves sought by the USSR, and pipelayers and compressors can be supplied from abroad. Foreign production of industrial compressor turbine shafts, rotors, and stators (now subject to US control) could begin in time to prevent a delay in completion of the pipeline

Minerals and Metals

The USSR does not rely on the developed West to satisfy its requirements for any minerals or metals except steel and molybdenum. (Molybdenum is a critical alloy with a wide range of military and civilian applications.) The United States sells no steel to the USSR but is a major provider of molybdenum. The Soviets buy only small amounts of tin, cobalt, and tungsten through metals dealers in the major Western capitals; the bulk of Soviet purchases are made directly from the major less developed producing countries

Steel imports will be needed for several years to overcome inadequate investment in steel capacity. Imports of large-diameter pipe will be especially important for the Siberia-to-Europe gas pipeline. Denial of these Western supplies would hit the energy and machine-building sectors particularly hard in the coming years. Since Western Europe and Japan supply almost all of these goods, a denial limited to US products would have little impac

The USSR also needs continuing access to Western metallurgical technology if it is to reduce its dependence on imports of Western specialty steels. The French are helping to build the important Novolipetsk steel plant, which will produce 7 million tons of specialty steels per year when it comes on stream (1986 at the earliest)

Soviet imports of molybdenum increased sharply in the 1970s (from 3,000 tons in 1970 to 13,000 tons in 1980), to a point where purchases now exceed annual domestic production. Concern about growing dependence on the West may be responsible in part for the Soviets' recent interest in obtaining new supplies from Mongolia. If they were denied supplies before the connection could be made, however, they probably could buy through a chain of brokers fairly easily or use East European trading organizations acting as purchasing agents for Soviet customers

Chemicals

The Soviets have bought sizable quantities of Western chemical equipment and related process data for more than two decades. In the 1970s alone, purchases amounted to at least $9 billion, or about one-third of their total orders of Western equipment. During most of the 1970s the Soviets concentrated heavily on plants for the production, handling, and storage of fertilizers. Since 1978 the trend has been toward orders of equipment for producing plastics, synthetic fibers, and rubber products. The US share of Western chemical equipment imported by the USSR was small throughout the decade—only about 7 percent—because Moscow generally has viewed US firms as providers of process technology and engineering design rather than equipment

Soviet purchases of chemical equipment have increasingly been associated with product buy-back or "compensation" deals, under which Western firms agree to long-term purchases of Soviet products that are usually manufactured in the Western-equipped facilities. Soviet exports of such manufactured chemicals to the West for hard currency amounted to $765 million in 1980, 11 times the 1970 level; earnings from buy-back deals now account for one-third or more of Soviet hard currency earnings from chemical exports. In spite of the growth in such exports, the USSR remains a net importer of chemicals. Imports from the West totaled nearly $1.6 billion in 1980

With Western assistance, the Soviet output of ammonia, nitrogen fertilizers, and plastics has doubled in the past decade, and output of synthetic fibers has tripled. Soviet use of Western technology has been especially critical in the production of ammonia. Large plants based at least in part on Western technology provided all of the nearly 11 million tons of ammonia capacity introduced during 1976-80. Since 1969 the Soviets have ordered 45 ammonia plants that use Western technology and/or equipment; 30 of these have used US technology. This Western help has allowed the USSR to become the world's leading ammonia exporter—about 2 million tons in 1980 (less than 100,000 tons in 1975). Exports of other chemicals are not as substantial, but the West Europeans already have begun to complain about the dumping of Soviet polyethylene and polyvinyl chloride in their markets

Soviet plans call for continued substantial orders for Western chemical equipment and/or technology to produce urea, pesticides, ethylene, benzene, and downstream petrochemicals. They also call for 14 additional ammonia plants during 1981-85. In view of deficiencies in Soviet pesticide development and a current stress on achieving a better balance in development between pesticides and fertilizers, the USSR also probably will seek Western pesticide production equipment. Plans to develop large chemical complexes in West Siberia probably will include purchases of Western equipment for producing fertilizers, plastics, manmade fibers, synthetic rubber, and a number of petrochemicals

In addition to equipment, Moscow will have to buy chemical products from the West, including phosphate materials, plastics, dyes, pesticides, manmade fibers, and catalysts. To this end it has already signed several major trade and technical cooperation agreements with Western firms. Among the most important are a $6.5 billion 10-year reciprocal trade agreement signed in late 1980 with France's Rhone Poulenc. The French firm will supply equipment and technology, pesticides, fertilizers, and animal feed in exchange for such energy-intensive chemicals as naphtha, ammonia, methanol, and possibly crude oil. A similar $1.5 billion 10-year reciprocal trade deal signed in early 1980 with Italy's Montedison requires the Italian firm to supply seven chemical plants (together valued at $800 million) in return for raw materials, fertilizer, and petrochemicals. Other, smaller trade agreements signed with UK and Japanese firms will guarantee the Soviets supplies of oil-recovery chemicals, pesticides, dyes, plastics, and catalysts

Denial of Western chemical equipment and technology would slow future increases in Soviet production of consumer goods and chemical-based industrial materials, would hurt agricultural production, and would delay progress toward a more efficient chemical industry with enhanced export capabilities. Without Western equipment, the Soviets would have to import many more chemicals than they currently do—or cope with more serious shortages than they already have.

The US role is especially visible with regard to Soviet efforts to upgrade its domestic fertilizer industry. The United States is the only large-volume source of superphosphoric acid (SPA)—a chemical that the Soviets' "liquid complex" fertilizer plants purchased from France were designed specifically to use. The suspension of US SPA sales in 1980 delayed the liquid complex fertilizer program by more than a year because most of the available substitute material was of a lower grade and was unsuitable for use in the program. Shortages of SPA probably reduced agricultural production in 1980 and 1981. (The United States resumed SPA sales in mid-1981.) Any future denial of SPA would force the Soviets to find alternatives. These might include:

- Installing evaporators to concentrate merchant-grade phosphoric acid (which is more easily obtained) to SPA.
- Altering the design of the liquid complex fertilizer plants to use merchant-grade phosphoric acid.
- Importing additional phosphate materials.

All these alternatives would require more time and outlays of hard currency

Denial of US chemicals other than SPA would have little impact on the USSR. In 1980 the United States supplied, in value terms, only 0.1 percent of the pesticides, 2 percent of the plastics, and 4 percent of the manmade fibers imported from the West. (Two

years earlier the comparable US shares were about 10 percent, 5 percent, and 6 percent.) Denial of pesticides, plastics, dyestuffs, manmade fibers, and catalysts by the entire West, however, would affect Soviet agriculture and industry, as well as the consumers. Domestic output of these chemicals is inadequate in both volume and quality. A cutoff of Western plasticizers (which facilitate the preparation of plastics and increase their flexibility and toughness) would create problems in Soviet plastics processing. A cutoff of pesticides, especially herbicides, would reduce some crops, particularly corn and sugar beets. In the long term, the Soviets could expand their own production of these chemicals and/or arrange specialization agreements with East European countries, but during the adjustment process their production would be less efficient

Machinery

Motor Vehicles. In the mid-1960s, when the USSR's ambitious 15-year program for modernizing and expanding motor vehicle production was begun, the USSR could not provide the necessary investment. Specialized machinery for mass production was in short supply, and most Soviet-built production equipment did not meet modern world standards for efficiency, reliability, and accuracy. Planners turned to the West for massive help, spending an estimated $3 billion for automotive production equipment and technology between 1966 and 1980

Although substantial quantities of machinery were purchased for passenger car plants, the truck industry received the lion's share of the imports. About one-half of Soviet hard currency investments were for the Kama Truck Plant alone. The United States provided Kama with automated foundries—among the most advanced in the world—and automated diesel engine machining and assembly lines. The Likhachev Truck Plant (ZIL), a major producer of trucks for the military, was another major recipient of Western truck manufacturing technology. Machinery for these and other Soviet motor vehicle plants was supplied by U.S., Japanese, and West German firms

With the completion of the 15-year program last year, investment in the automotive industry probably will return to lower levels. Modernization of existing facilities will continue, but no new truck or passenger car plants are called for in the current Five-Year Plan period (1981-85). Thus a Western denial of technology and goods for this sector would have only minor impact in the immediate future. The Soviets have on-the-shelf plans to install new capacity for heavy trucks, however, which could be activated after 1985, creating a large new demand for Western production technology

Construction Equipment. Plans for a number of important programs have been delayed because construction and earthmoving equipment has not been available in sufficient variety or quantity to build plants. Soviet industry, for example, did not even begin production of a 75-ton off-highway truck until the late 1970s, more than 10 years after its planned production date. Even now, heavy-duty diesel engines from Czechoslovakia are used to power the vehicles. Plans to produce heavy industrial tractors and bulldozers have been delayed by faulty tractor and engine designs. The USSR also lacks the capacity for production of transmissions, suspension systems, and heavy-duty axles (capable of supporting weights of 50 tons or more)

The USSR plans to produce its own equipment with imported plant and technology. Under a recent contract with Fiat, Italians will supervise construction of a turnkey facility to produce earthmoving equipment. Negotiations are under way for the purchase of production technology for industrial tractors and engines. The USSR currently is building a plant using US technology to produce electric wheel drives. Soviet officials have also expressed interest in obtaining licenses and production help in setting up production facilities for US tractors. For several years, however—until these programs are completed—the USSR still will need to buy a substantial amount of construction and earthmoving equipment from the West

Denial of Western goods would seriously disrupt Soviet plans to become more self-sufficient and would force them to use less efficient equipment. The East European countries manufacture some of this equipment--Poland produces a heavy-duty bulldozer, for

example, and Romania produces a 100-ton off-highway truck—but their production is too small and the product mix is too limited to meet Soviet demand. At the same time, dependence on US equipment and technology is not especially significant. Fiat of Italy and Komatsu and Sumitomo of Japan, in particular, now match—or have the technological capability to match—US-produced off-highway trucks, industrial tractors, and earthmoving equipment.

Mining Equipment. Soviet industry provides most additions to the USSR's park of mining and earthmoving equipment. Nevertheless, imports have been important, especially where higher capacity machines are required. Between 1972 and 1980, the Soviets imported about $1.6 billion worth of mining and earthmoving equipment—about one-third of the total from the United States and most of the remainder from Japan and West Germany. Imports consist primarily of heavy-duty dump trucks, excavators, bulldozers, and mining drills. Western-supplied mining equipment has been less important to the USSR; most of this equipment is provided by Eastern Europe—notably East Germany, Czechoslovakia, and Poland

The South Yakutia coal mines have been the Soviets' largest mining project, in terms of the amount of equipment imported for it. Earthmoving equipment, particularly bulldozers, is also vital to gold-mining operations in the Magadan, Irkutsk, and Lena regions, as well as to other coal- and ore-mining efforts. In most cases, the Soviets produce the equipment, but not in the quality or capacity required. Development of the vast open-pit Siberian coal mines, as well as continued development of mines elsewhere, requires enormous earthmoving and hauling capability

We believe that the Soviets will continue to depend on Western equipment in the 1980s. Increased imports of large-capacity dump trucks, for example, could speed the development of the Ekibastuz coal-mining complex, where hauling capacity, not mining capacity, is the chief constraint. Since most of the equipment can be supplied by Japanese or West European producers, the denial of US equipment by itself would not do much damage to the USSR. Without access to Western equipment, the Soviets would encounter problems. The biggest impact would be the grounding of some of the existing machinery by the lack of new spare parts. These would be mainly short-run problems, however; in time the Soviets could increase imports from Eastern Europe or shift their own production lines.

Machine Tools. The USSR is the world's largest producer of both conventional and numerically controlled (NC) machine tools. Much of the output, however, consists of general purpose machine tools that are relatively easy to produce in large quantities, rather than special-purpose and complex types. Moreover, many models of machine tools are kept in production well past obsolescence—in some cases up to 20 years. These practices yield economies of scale that lower the cost of producing machine tools but sacrifice diversity in the product mix

Because of its historic emphasis on capital goods production, including military durables, the USSR uses large quantities of machine tools, especially for metal cutting. In many cases, heavy machinery can be produced only by metal-cutting techniques, and a large stock of general purpose metal-cutting machine tools is needed to supply the needs of a huge repair and spare parts sector (itself the result of poor quality in original equipment). Moreover, because the machine tool park is so large, a substantial quantity of machine tools is needed just to replace the aging and obsolescent portion of that park

In recent years, the production of machine tools has fallen short of requirements. Output of metal-cutting machine tools actually has fallen in the past five years. A few new plants were activated during the 1970s for the production of automatic transfer machinery for the automotive industry, but little new capacity has been added in most areas of machine-tool production. Conventional Soviet machine tools are ruggedly built but lack the reliability, precision, and flexibility of their US counterparts. Advanced machine tools, such as numerically controlled types, are less advanced than those in use in the West because of a basic lag in electronics

In 1965 the USSR began a major effort to increase domestic production of NC machine tools and, hence, to raise the general level of machine-tool technology. Indeed, by 1977 Soviet NC tool output exceeded that of the United States by nearly 50 percent. This jump was accomplished by the same policy that helped retard technological advance in the production of conventional tools: namely, the concentration of resources on a few simple models of limited usefulness rather than on a variety of custom-made models. Throughout the 1970s, Soviet NC technology was by and large limited to two-axis point-to-point machines. Some three-axis contouring models were developed, but production was limited and their quality was suspect. Computer numerical control (CNC), which was being increasingly used in the West by 1980, exists in the USSR only in prototypes. Soviet development and production of NC tools has been impeded by the poor quality of controller, electromechanical positioning, and feedback devices and by the relatively backward state of minicomputer technology.

Technological deficiencies and production gaps in both conventional and NC machine tools prompted the USSR to turn to imports to meet its needs. Imports of Western machine tools exceeded $4 billion over the past decade. Three-fourths of these imports were conventional types of machine tools. Some were needed to supplement domestic production (automated lathes); some to acquire levels of precision and productivity superior to that available domestically (US gearcutting machinery); and some because the Soviets had no domestic counterparts (closed-loop, multiaxis NC machine tools). The USSR also buys a substantial volume of machine tools from Eastern Europe, even though they are less advanced than those purchased from the West. East Germany, for example, exports up to half its annual output to the USSR, and other suppliers include Czechoslovakia, Hungary, and Yugoslavia.

Nearly 80 percent of total machine tool imports from the West during the past decade have originated in Western Europe, especially in West Germany and France. Non-COCOM countries such as Austria, Switzerland, and Sweden have also been small but important suppliers. (MAAG of Switzerland is one of the world's top producers of precision grinding machinery.) The United States and Japan have each supplied approximately 10 percent of total Soviet imports. The United States supplies mainly transfer lines and gearmaking machinery for the automotive industry and precision grinding equipment for the bearing industry.

Present COCOM controls restrict sales to Communist countries of only the more advanced types of NC machine tools and of some specialized machine tools for military production. Most Soviet machine tool purchases have been noncritical, but the USSR also has purchased advanced equipment when COCOM member nations have chosen to interpret an ambiguity in COCOM definitions in its least restrictive sense and to downplay the strategic implications of the machine tools being sold. The Soviets have also tended to respond quickly to changes in COCOM regulations. When restrictions on three-axis machining centers and boring mills of small size and limited accuracy were relaxed in 1977, for instance, the USSR quickly increased its purchases of such equipment, especially the more sophisticated models available in West Germany and Japan.

The Soviets apparently intend to continue to import machine tools, especially advanced types of NC machine tools and machining centers. They probably believe they need them to raise the level of productivity in industry. US restrictions, in isolation, would have little effect on Soviet purchases, since much of the advanced NC machine tool technology is now diffused throughout the industrialized world and available from foreign suppliers.

Industrial Robots. The robotics industry in the USSR is in its infancy, with production in recent years limited to about 350 units a year. None of the enterprises currently producing robots has a series production capability. By the end of 1980, the USSR had an estimated 1,500 to 2,000 robots in use—well below the 5,000 that had been planned. Moreover, many of these were of foreign origin.

By Western standards, Soviet industrial robots are relatively primitive. Most are first-generation machines that perform either a single repetitive function

or an unvarying sequence of functions. They lack the microprocessor controls, large memories, and advanced sensors needed for pattern recognition and adaptive operation. More complex robots are under development, but only a few experimental models have been made.

Pending the development of a viable domestic industry, the Soviets have turned to imports for a low-cost supply of reliable industrial robots. More than 500 robots have been purchased from Hungary, and an unknown number from Japan, France, and Italy. The USSR also has been looking to foreign suppliers for design and manufacturing technology

Although the Soviet robotics industry may expand dramatically in the next few years, substantial imports probably will be needed for some time

Renault of France and the USSR plan to jointly develop miniature robot drive units and industrial robots for serial production. Without Western help, the Soviets would face serious delays in developing their robotics industry. Currently, they need robots to help improve productivity in mass-production industries. The United States leads the world in advanced robot technology, but the Soviets' most pressing need is for simpler types for routine applications, such as repetitive welding operations in car manufacturing. They may well prefer Japan to the United States as a supplier of robots, since Japan has a greater production capacity and more experience in practical applications

High-Technology Products

Computers. Despite impressive gains in the number, variety, and performance of Soviet computers over the past decade, the technology gap between the USSR and the West is large and growing. The Soviets have patterned their major developments in large computers and minicomputers on US designs that are essentially two generations behind current US offerings. In addition, their implementation of these designs has been imperfect, hampering progress in closing the gap.

Reliability of Soviet computer systems is still a serious problem, due in part to the poor quality of imported materials and in part to a lack of modern production and test equipment in computer plants. Especially serious has been the inability of the USSR or its East European partners to supply the large numbers of high-speed, high-capacity magnetic disk auxiliary memory devices that are essential for the operation of modern data processing computers. Proper software and other support (such as maintenance and spare parts) also have been deficient or absent altogether.

In the field of computers, the USSR has had an extensive cooperation agreement with the countries of Eastern Europe since 1969. The East Europeans have been supplying native computers, peripherals, and parts, but their computer industries generally suffer from the same problems that plague the Soviets and are unable to meet Soviet requirements

These weaknesses in the CEMA computer industries have induced the Soviets to "buy Western." Since 1972 they have imported more than 1,300 computer systems valued at $400 million, as well as $70 million worth of add-on peripheral equipment and spare parts. The vast majority of computer systems imported—95 percent of the units and 64 percent of the value—have been minicomputers, generally for use in research and development. The relatively few large systems purchased have been for high-visibility, high-priority projects such as the Kama River Truck Plant, the Moscow regional air traffic control system, and the Olympic Games system.

The USSR imports large systems and minicomputers from the West for several reasons. Western systems may have performance capabilities the Soviets cannot match, may use complex software that the Soviets have not developed, and may be supplied with expert training and support that the Soviets cannot duplicate. Buying Western minicomputers is also attractive because domestic production is so limited and because software packages available with Western models are more versatile

The United States has a unique capability only at the leading edge of the technology--the very high-speed, high-capacity scientific computers and the most advanced peripherals and microprocessors. The USSR prefers US products, however, even in the categories of lower level minicomputers and large computers that are routinely approved for sale to the USSR. A major US advantage is that any one of several manufacturers can provide a complete range of hardware, software, and support.

Soviet users are also familiar with US products because their own designs are based on them

COCOM controls on computers are extremely complex. In general, however:

- Low-performance computers, including most minicomputers, may be exported at the discretion of the exporting country without submission to the membership.
- Somewhat more powerful computers, including many high-speed, high-capacity computers, are subject to a procedure requiring a pro forma submission to the membership. The members have agreed in advance to approve their export if certain conditions are met.
- The most powerful computers require unanimous agreement of member countries for sale to proscribed destinations.

In the minicomputer arena, literally dozens of firms are technically able to compete with the United States for Soviet business. They are located in COCOM countries (Japan, the United Kingdom, France, West Germany, Italy, Canada, Norway, the Netherlands, and Denmark) as well as in countries like Brazil, Austria, Switzerland, and Israel. Controls on minicomputers are ineffective because of this general availability and the provisions authorizing exports at the discretion of the exporting country.

Larger computers of the type that COCOM has agreed in advance to approve also are available from other COCOM countries. They are built in Japan by Fujitsu and Hitachi, in the United Kingdom by ICL, in France by CII, and in West Germany by Siemens. The United States could not prevent other COCOM countries from exporting their own large computers—unless (1) it were willing to renege on its prior agreement not to object to exports by others and (2) other member countries were willing to acquiesce to US objections.

Unilateral US action thus may not markedly restrict the Soviets' acquisition of Western computers. Most of their business in minicomputers and large computers could be readily transferred to other countries, in and out of COCOM. Japanese industry, for example, can supply systems of completely domestic origin over the full size range. The United States could prevent sales of the most powerful computer systems—those requiring agreement in COCOM—by exercising its veto. However, such computers have never been approved for sale to the USSR in any quantity.

In the case of some foreign systems, the United States can exercise some control on sales to the USSR because parts and peripherals are of US origin. Foreign manufacturers could design their own products, if necessary.

The USSR will no doubt continue its occasionally successful efforts to acquire the most powerful Western computers illegally—whether legal sales are halted or not. If they are, the Soviets might attempt to increase their illegal acquisitions if they could also acquire the related software and support applications. East European countries would be unlikely to divert legally acquired computers to the USSR for fear of discovery and sanctions. However, they might be willing to help the USSR acquire computers (as they have other items) if their own involvement in the transaction were not overt.

Microelectronics. Rapid advance in microelectronics requires a broad range of parallel advances in the technologies of production and test equipment, materials, assembly, and packaging. The Soviet electronics industry has not made those advances—in large part because of its strong military orientation. Paradoxically, the military priority claim on resources does

not encourage rapid technological advances. The philosophy behind Soviet military hardware design generally requires use of the "tried and true" in the development of new weapon systems.

During the past decade, the USSR has acquired a full range of microelectronics-related technology, materials, and equipment from the West totaling several hundred million dollars. These purchases have included unembargoed items, embargoed items legally approved for export by COCOM, and embargoed items acquired illegally and clandestinely. The overwhelming majority are embargoed items that have been obtained illegally by diversion. This method has some limitations, however. Illegal chanels do not easily convey a manufacturer's installation, training, or maintenance services or provide easy access to spare parts—and this reduces the effectiveness of the equipment in Soviet facilities.

Most of the equipment that has been acquired illegally originated in the United States. In the past few years, both Japan and West European countries have become important suppliers of diverted equipment to the USSR. Firms in Italy, Switzerland, the United Kingdom, and West Germany have diverted basic materials and technologies, and firms in these countries, plus France, have diverted some advanced production equipment. No single European country can supply Moscow with the spectrum of US or Japanese microelectronics technologies, but Western Europe as a whole can meet a significant percentage of its needs.

Even though the United States is no longer the sole supplier in any single area of microelectronics technology, the Soviets still prefer US equipment. They have found some non-US products to be poor substitutes, and the United States can supply the full range of state-of-the-art technology from basic materials through final test.

If technology and products currently available to the Soviets through legal channels were denied through stringent new export policies, the Soviets would try to compensate by accelerating illegal purchases. So far, COCOM attempts to arrest the flow of illegal purchases have been unsuccessful.

Telecommunications. The function of the Soviet common carrier telecommunications system resembles that of the Bell System and the independent telephone companies in the United States. It provides communications services to government, the military, commerce and industry, and the general public. Like the other industrialized countries, the USSR has experienced a rapid growth in demand for these services. The Soviet common carrier system cannot fully satisfy the demand in either quantity or quality. The USSR is therefore engaged in a major ongoing effort to expand and modernize it.

Although the USSR is one of the world's major producers of communications equipment, its production capacity is inadequate, and the technological level of domestically produced equipment is not equal to world standards. The USSR therefore supplements domestic production with imports from East European and non-Communist countries. The United States is not a major supplier.

The USSR buys communications equipment such as radio relay links, switching equipment, and transmission equipment from Eastern Europe for use in its common carrier system. Some of these items are indigenous East European products, while others result from joint development efforts with the USSR. A few items are manufactured in Eastern Europe under license from Western companies. The United States has no way of preventing these sales to the USSR.

The USSR also imports communications equipment from COCOM countries, as well as from such countries as Sweden, Yugoslavia, and Finland. Even in the case of COCOM countries, controls are not effective. Most types of equipment needed by the USSR are either not on the control list or subject to procedures that authorize exports at the discretion of the exporting country. The United States thus does not now have the opportunity to veto transactions.

One case where COCOM controls do apply involves a $172 million contract for the sale by a French company to the USSR of computer-controlled telephone

switching equipment, together with a turnkey facility for its manufacture. The facility would give the Soviets a serial production capability for modern telephone exchanges of a type they cannot make now. The technological level of the equipment exceeds that currently required for the communications system, but Soviet interest in it is reasonable. Switching equipment has an operating life of decades, so it is appropriate to anticipate future requirements.

France apparently now agrees with the US contention that the proposed transfer of manufacturing technology should not be allowed to proceed. Nevertheless, if the sale is stopped, the Soviets could obtain less sophisticated switching equipment and production technology currently not subject to COCOM restrictions.