Soviet-Japanese Economic Relations

Sumiye O. McGuire
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PREFACE

This study analyzes the potential for increased economic relations between Japan and the Soviet Union, and this relationship's importance to each country. It examines both the economic and the political factors influencing trade and investment between the two countries, paying special attention to prospects for developing resources in Siberia and the Soviet Far East. This study's findings should interest those concerned about long-term U.S. policy alternatives regarding U.S.-Japanese relations and U.S. economic and security interests in the Pacific-East Asia region. This work was undertaken as part of The RAND Corporation's continuing research program, International Economic Policy, for the National Security Research Division. This program's principal focus is exploring the connection between international economics and national security issues.
SUMMARY

Numerous people have speculated that the historically cool relationship between Japan and the Soviet Union may be thawing because of Soviet overtures. First, the Soviet Union is apparently trying to enhance its position and increase its participation in East Asia and the Pacific Rim region. The geographic proximity of the Soviet Union and Japan and the complementary nature of their economies would seem to invite trade and joint economic ventures. Second, the Soviet Union has recently indicated an interest in improving its political relations with the West, and has modified both its foreign policy and its internal economic and political system. Third, Japan may view recent U.S. receptiveness to the Soviet push for détente and improved economic relations as a signal that the United States would not stand in the way of increased Tokyo-Moscow links.

An understanding of the potential for change in the relationship between Japan and the Soviet Union is necessary when considering long-term U.S. policy alternatives, both in the United States' relations with Japan and in determining its economic and security interests in the Pacific-East Asia region. Japan is a close U.S. ally, the second largest economy in the world, and a leader in many advanced civil and military technologies. This study examines the scope of future expanded economic relations between Japan and the Soviet Union. The results suggest that this relationship has been quite limited and is unlikely to improve substantially over the next five to ten years unless the Japanese government provides heavy financial support for the development of Siberia and the Soviet Far East. A major infusion of funds from Japan hinges on the resolution of the territorial dispute between the two countries over the southern Kuril islands. Without a resolution, the economic incentives for expanded trade and investment from Japan are small. This conclusion can be readily seen by analyzing both past trade patterns between Japan and the Soviet Union and the supply of and demand for each country's products.

Despite an apparent high degree of complementarity between the Japanese and the Soviet economies, the levels of trade and investment between the two countries have been quite small, representing less than half a percent of Japan's gross national product and less than 2 percent of Japan's total exports. Moreover, the composition of trade between the two countries does not reflect the extent of complementarity suggested by the global trade patterns of either country and has remained remarkably stable for the past decade. Japan's major global
imports are fuels and raw materials, but its primary imports from the USSR are wood, timber, and ores, rather than oil and gas, the USSR’s major exports. Similarly, the USSR’s major global imports are machinery and equipment, but its imports from Japan are dominated by steel products, including steel tubes and pipes, sheets and plates, and bars and rods. This trade pattern between the two countries reflects, in part, past cooperative agreements in which Japan agreed to provide credits for machinery, equipment, and supplies to develop resources in Siberia—especially the Soviet Far East—in exchange for future delivery of raw materials and resources, usually at prices lower than prevailing world market prices. The factors underlying these agreements—transport costs, alternative world suppliers, Japan’s longstanding strategy of diversifying raw materials sources, and political relations—continue to influence the trade and finance patterns. Japanese finance continues to be an important source of Western credit to the USSR, but ranks behind Western Europe in this area.

Although Siberia and the Soviet Far East hold most of the USSR’s raw materials and resources and thus are often viewed as the most promising regions for expanded trade and investment, several factors limit the potential. First, oil and gas, the dominant Japanese resource imports, are found in West Siberia, where the Soviet Union has invested heavily in setting up a transportation system to send output to Western and Eastern Europe. Shipping output to Asia would be expensive and place an additional burden on an inadequate transportation system. Japanese support of oil and gas development in East Siberia and the Far East is expected to produce only marginal increases in total Soviet output. Second, the costs of exploring for and developing new reserves of oil, gas, and other resources have been rising rapidly over the past two decades as the Soviet Union depletes its readily available, known reserves. It has had to move to increasingly inaccessible, climatically harsh regions where labor is in short supply and resources are geologically difficult to mine. A comparison of world prices and the increasing costs of producing new reserves readily shows the limited future returns to investment in any joint development projects. Third, Japan is seeking to secure its own alternative supply of resources, especially oil, by buying up petroleum sources and exploration rights around the world; it has increased the pace of this activity in the past year. Finally, several other producers—such as the United States, Canada, Australia, and China—are eager to sell raw materials and resources, including oil, timber, and coal, and would prove serious competitors to the Soviet Union.

On the demand side, the restructuring of the Japanese economy, from an economy based on resource- and energy-intensive industries to
one based on knowledge-intensive industries, has reduced Japan's needs for raw materials and resources, especially fuels. The country has also pursued a successful materials and energy conservation program. Its decreased demand for Soviet raw materials and resources could be moderated to the point where it moves toward buying resources in semimanufactured form. For example, Japan has made arrangements to buy aluminum products from the Soviet Union. This shift, however, will be a long-term, slow-growing process. In the near term, Japan's demand could rise as it changes its development strategy from one based on export growth to one based on domestic growth, but this increase would be cyclical.

Although prospects for new and large Siberian resource development projects look dim, Japanese investments and sales in the capital-goods sector could be mutually beneficial. Similarly, another mutually advantageous area might be Japanese investments in low-technology production facilities, such as consumer durables, metal manufacturing, and other types of assembly plants, and sales of related capital goods to domestic Soviet and international markets. These investments would represent an answer to many Soviet problems in meeting the demand for consumer goods and in improving manufacturing efficiency and quality control. Japan has been highly successful in setting up these types of facilities in the Asian nonindustrialized countries and Association of Southeast Asian Nations countries, especially for autos and consumer electronics. The major difficulty is the USSR's lack of hard currency and products to pay for Japanese goods and technology. The USSR is using countertrade and buyback agreements to make its purchases from Japan and other Western countries. These arrangements, however, are cumbersome and inefficient, even though Japanese trading companies have become adept at carrying them out. It has also borrowed to buy these products, but the Japanese government and banks are increasingly reluctant to extend additional loans to the Soviet Union. This reluctance is in part attributable to U.S. complaints that such loans are harmful to security interests, to Japan's linking of all economic agreements to settling territorial disputes with the Soviet Union, and to a possible reassessment of Soviet creditworthiness in light of claims that Soviet debt levels and servicing costs are rising and that its hard currency earnings could fall.

Political factors have been significant in determining the level and pace of change in economic relations between Japan and the Soviet Union. Two aspects of this change are particularly important. First, since the end of World War II, Japan and the Soviet Union have had a continuing dispute over the ownership of the islands north of Hokkaido—the Habomai Archipelago, Shikotan, Iturup, and Kunashir islands.
Japan has linked all economic agreements with the USSR to resolving this issue and to the signing of a peace treaty. In the past year, some progress has been made toward a possible compromise; the Soviet Union has agreed to discuss the issue with Japan, placing it on the agenda for official meetings and setting up a working group to discuss alternative solutions. The second political aspect is the importance Japan places on its relations with the United States and the limits that East-West relations have placed on Japanese-Soviet trade. Japanese policies toward the Soviet Union and the Socialist countries are closely linked to U.S. national security strategies and foreign and economic policies toward the Soviet Union. As a member of the Coordinating Committee for Multilateral Export Controls, Japan controls exports of military, nuclear, and high-technology, dual-use products embargoed for sale to the USSR and Socialist countries. It has usually followed the U.S. lead in using economic sanctions against the Soviet Union, suspending credits and limiting loans, for political objectives, although sometimes under some U.S. pressure.

Unless General Secretary Mikhail Gorbachev makes a sudden and unexpected change in current Soviet policies, the territorial issue will likely remain unresolved for the next two to five years. Thus, the potential for a large expansion in trade and investment between Japan and the Soviet Union is small and is unlikely to create political problems in the near term. The USSR has taken its time in reaching rapprochement with other countries (the recent three-year normalization process with China is a good example). It has vacillated in acknowledging the existence of a territorial dispute and has added new arguments to support its claims to the islands, possibly setting up a situation for "major" concessions. Japan has claimed to be unyielding about requiring a peace treaty and resolution of the dispute, but has itself proceeded to sign minor agreements, such as those involving cultural exchange and scientific cooperation, with the Soviet Union. Even if the dispute is resolved, the high, rising costs of developing resources in Siberia and the Far East make investments in these regions increasingly unattractive. The marginal costs of exploitation appear so high that large investments in resource development are unlikely unless technological innovations reduce the production costs, new cheaply exploitable reserves are discovered, or resource prices rise dramatically—none of which appear likely. Short of this type of exogenous change or massive infusions of Japanese funds, resource development in Siberia and the Far East will likely take at least another 10 to 15 years.
ACKNOWLEDGMENTS

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I. INTRODUCTION

Although Japanese-Soviet relations have historically been cool, recent changes in the Soviet Union could affect these relations. Specifically, the plans for restructuring the Soviet economy, the increased openness of the Soviet system, and the improved political relations with the United States have led to speculation about an upswing in Japanese-Soviet relations. The Soviet Union has taken steps to increase its influence and legitimize its participation in Asian political and economic affairs. Changing Soviet policies toward East Asia and the Pacific Rim suggest likely shifts in its past hard-line policies toward Japan. Specifically, the Soviet Union has

- Normalized relations with the People's Republic of China (PRC), and General Secretary Mikhail Gorbachev has held a summit to formalize this relationship;
- Pulled forces out of Afghanistan, a major issue of contention with the USSR's Asian neighbors;
- Pressured Vietnam to take its troops out of Cambodia and reduced military support to Vietnam;
- Reduced troops in the Far East;
- Called for increased economic cooperation with Japan and South Korea in Gorbachev's September 1988 speech at Krasnoyarsk.

In addition, U.S. receptiveness to the Soviet push for détente and improved economic relations may be viewed by the Japanese as a signal that the United States would not stand in the way of improved Tokyo-Moscow links.

Understanding the potential for changes in the Japanese-Soviet relationship is important in considering long-term U.S. policy alternatives regarding U.S.-Japanese relations and U.S. economic and security interests in the Pacific-East Asia region. Japan is a close U.S. ally and is now the second largest industrial economy in the world. It is also a leader in many advanced technologies that have both civil and military applications. Japan's economic and technological advance, however, has often created rivalries with the United States; this economic competition is straining the political alliance. These frictions have been exploited by members of the U.S. Congress, as well as by Japan's bureaucrats and politicians, and certainly have been noticed by the USSR, which in the past has sought to place a wedge in U.S.-Japanese relations. Moreover, the USSR has shown clear interest in gaining
access to Japan’s advanced technologies, as well as in its large financial resources.

So far, Japan’s response to Soviet initiatives toward increased cooperation with neighbors in the Asia-Pacific region can best be described as positive but wary. Japan recognizes that the Soviet Union feels a need to correct its lagging Asia-Pacific policy, but the Japanese are awaiting concrete actions supporting Soviet proposals for peace and mutual economic cooperation. Meetings between the leaders of the two countries have not produced any agreements for cooperation to date. As far as the Japanese are concerned, no progress in Japanese-Soviet relations is possible without resolution of the ownership issue in the southern Kuril islands and the small islands (the Habomai Archipelago and Shikotan) north of Hokkaido, all of which the Soviet Union has occupied since the end of World War II.

Some analysts have even speculated (though possibly overstating the problem) that as frictions between Japan and the United States rise, Japan will begin looking for alternative markets for its money, technology, and capital goods. The Soviet Union is a likely market, especially since current problems in China keep the PRC closed:

In the coming era of mercantilism, money and markets count most. The Soviet Union and Japan can derive great benefits from commercial alliance. One has natural resources and untapped markets, the other has technology and capital; one wants to save, the other needs to spend. The Soviet Union and Japan are as natural a future match as America and Japan are a current match.1

This report’s objective is to analyze the potential scope for increased economic relations between Japan and the Soviet Union and this relationship’s importance to each country. The report reviews the composition and importance of trade and credit between the countries and examines the effects of past cooperative agreements on the volume of trade between them. It then analyzes the prospects for developing raw materials and resources in Siberia and the Far East, the most promising areas for expanded economic relations. It explores the possibilities of increasing Japanese trade and investment, given economic and legal changes in the Soviet Union and structural changes in Japan. The political factors that influence economic relations are also considered, including the role of the Coordinating Committee for Multilateral Export Controls (COCOM) restrictions on trade and the dispute over ownership of the territories north of Hokkaido. Finally, the report analyzes prospects for increased economic relations, taking into

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account the economic and political factors affecting trade and investment decisions and the likely events that might lead to an expansion in economic relations.
II. PAST AND CURRENT ECONOMIC RELATIONS

Levels of trade and investment between Japan and the Soviet Union have been quite limited. They largely reflect past cooperative agreements between the two countries wherein Japan extended credits to the USSR to buy Japanese machinery, equipment, and supplies in exchange for delivery of resources under development. This section examines past economic relations to gain perspective on the importance of this relationship to each country and the potential scope for expansion.

TRADE

At the aggregate level, the data on exports and imports of Japan and the Soviet Union suggest a great deal of complementarity between the two countries' production and trade. Japan's major global imports include fuels and raw materials; its major global exports are manufactured goods, mostly machinery and equipment. The Soviet Union's global imports are machinery and equipment and other manufactured goods; its major export is fuels (see Fig. 2.1).

Trade between Japan and the Soviet Union is, however, relatively small. Japan's trade with the USSR represents less than half a percent of its gross national product (GNP) and less than 2 percent of its total exports. Moreover, the composition of trade between the two countries does not reflect the complementarity suggested by the global trade patterns of either country (see Figs. 2.2 and 2.3). Imports by Japan of Soviet raw materials and ores, rather than fuels, have dominated bilateral trade until recently—raw materials imports fell from more than 55 percent of total imports in 1970 to 25 percent by 1987, while fuel imports from the Soviet Union show a 33 percent growth, rising from 13 percent of the total to 23 percent over the past 15 years. Despite this gradual change in the structure of Japan's imports from the USSR, trade data for 1987 show that raw materials and ores (mostly wood and lumber), rather than oil and gas, continue to be the major import items from the Soviet Union. Underlying these trade patterns are factors such as transport costs, alternative suppliers to each country, Japan's long-standing strategy of diversifying its raw materials sources to minimize dependencies, and political relations.
Fig. 2.1—Global exports and imports: Japan and the USSR, 1985

For example, the costs of shipping oil and gas from West Siberia to Asia is quite high, while the close proximity of the Far East keeps shipping costs of lumber low.
Fig. 2.2—Japan’s exports to the USSR

SOURCE: United Nations Bilateral Commodity Trade Databank.
Fig. 2.3—Japan's imports from the USSR
Similarly, Japanese exports to the Soviet Union are not overwhelmingly dominated by machinery and equipment. Rather, the USSR buys more metal manufactures than machinery and equipment from Japan. Exports of Japanese manufactured base metals have risen steadily, from 13 percent of total exports in 1970 to 39 percent by 1987. Exports of machinery and equipment, on the other hand, have remained a relatively stable one-third of total exports over this time period and represent purchases of machinery and equipment that are needed for the cold climate in the Far East and that could not be met by the Soviet machine-building sector. Eastern Europe continues to be the USSR’s major supplier of machinery and equipment.

The top ten Soviet exports to Japan, representing 90 percent of the total, and the top Japanese exports to the USSR, representing 50–70 percent of the total, show remarkably few changes in composition over the past 10 to 15 years (see Tables 2.1 and 2.2). Soviet exports to Japan remain predominately raw materials, with some shift by 1987 toward food and semimanufactured goods (for example, unwrought metals, cotton fiber). Japan’s exports of machinery and equipment

Table 2.1

<table>
<thead>
<tr>
<th>TOP SOVIET EXPORTS TO JAPAN</th>
<th>(Millions of U.S. dollars and percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
</tr>
<tr>
<td>Wood and pulp</td>
<td>201</td>
</tr>
<tr>
<td>Unwrought metals, other</td>
<td>42</td>
</tr>
<tr>
<td>Coal</td>
<td>44</td>
</tr>
<tr>
<td>Fish</td>
<td>5</td>
</tr>
<tr>
<td>Oil and products</td>
<td>33</td>
</tr>
<tr>
<td>Pig iron/iron ore</td>
<td>44</td>
</tr>
<tr>
<td>Unwrought aluminum</td>
<td>13</td>
</tr>
<tr>
<td>Cotton and other fibers</td>
<td>28</td>
</tr>
<tr>
<td>Unwrought nickel</td>
<td>20</td>
</tr>
<tr>
<td>Chemicals*</td>
<td>11</td>
</tr>
<tr>
<td>Share of total exports</td>
<td>(b)</td>
</tr>
</tbody>
</table>

SOURCE: United Nations Bilateral Commodity Trade Database.

*Includes organic and inorganic chemicals and fertilizers.

†Not applicable.

Table 2.2

**TOP JAPANESE EXPORTS TO THE SOVIET UNION**

(Millions of U.S. dollars and percentages)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>%</td>
<td>$</td>
<td>%</td>
<td>$</td>
</tr>
<tr>
<td>Steel Tubes and pipes</td>
<td>22</td>
<td>6.5</td>
<td>296</td>
<td>22.4</td>
<td>552</td>
</tr>
<tr>
<td>Plastics</td>
<td>23</td>
<td>6.7</td>
<td>93</td>
<td>7.0</td>
<td>172</td>
</tr>
<tr>
<td>Steel sheets and plates</td>
<td>21</td>
<td>6.2</td>
<td>82</td>
<td>6.2</td>
<td>122</td>
</tr>
<tr>
<td>Machine tools, metal working</td>
<td>14</td>
<td>3.8</td>
<td>31</td>
<td>2.3</td>
<td>72</td>
</tr>
<tr>
<td>Organic chemicals</td>
<td>7</td>
<td>2.1</td>
<td>36</td>
<td>2.7</td>
<td>77</td>
</tr>
<tr>
<td>Construction, mining machines</td>
<td>9</td>
<td>2.6</td>
<td>47</td>
<td>3.6</td>
<td>26</td>
</tr>
<tr>
<td>Textile machinery</td>
<td>2</td>
<td>0.6</td>
<td>15</td>
<td>0.9</td>
<td>25</td>
</tr>
<tr>
<td>Fork lifts</td>
<td>2</td>
<td>0.6</td>
<td>33</td>
<td>2.0</td>
<td>36</td>
</tr>
<tr>
<td>Other industrial machines</td>
<td>9</td>
<td>2.6</td>
<td>42</td>
<td>2.6</td>
<td>59</td>
</tr>
<tr>
<td>Steel bars and rods</td>
<td>1</td>
<td>0.3</td>
<td>155</td>
<td>11.7</td>
<td>244</td>
</tr>
<tr>
<td>Trucks</td>
<td>9</td>
<td>2.6</td>
<td>98</td>
<td>7.4</td>
<td>51</td>
</tr>
</tbody>
</table>

SOURCE: United Nations Bilateral Commodity Trade Databank.

have risen slightly, but its exports to the Soviet Union remain dominated by steel products—tubes and pipes, sheets and plates, and bars and rods.\(^2\)

**FINANCE**

Credit from Japan has been important in promoting trade with the Soviet Union. Limited information, however, provides only a broad outline of the extent and relative importance of Japan as a Western source of medium- to long-term credit to the Soviet Union. One study estimates that Japan has provided more than $2.5 billion in credit since 1967 to finance resource development projects in the Soviet Far East, and that the Soviet Far East represents some 80 percent of total Soviet-Japanese trade.\(^3\) These credits have been provided as part of past cooperative development agreements entered into by the two countries (these agreements are discussed below). Alternatively, U.S.

\(^2\)Note that a large proportion of these steel exports—that is, large-diameter pipes—require as sophisticated production technologies as many of Japan’s machinery and equipment products. West Germany and Japan are the world’s major producers of the large-diameter pipes needed for oil and gas pipelines.

\(^3\)Bradshaw, “Japan,” p. 195.
government officials during President Ronald Reagan's administration have claimed that Japanese banks are the largest lenders (representing 40 percent of loans) to the Soviet Union, followed by West German banks (30 percent) and U.S. banks (2 percent). According to some press reports, Japanese banks have historically been the major lenders until late 1988, when the Soviet Union began major credit-raising efforts. Japanese central bank officials have disputed these reports, but data are not available to verify these claims. What the percentages include is also unclear—that is, do they represent private lending only, private lending plus some government-backed loans, or total private and official loans? The Bank for International Settlements does not publish private lending data by country, and individual reporters consider this information proprietary. More recent data indicate a much smaller role for Japan as a source of Western credit. The data show that for only the most recent years, among hard currency lenders, Japan's proportion of private medium- to long-term credit to the USSR—at 15.3 percent in 1987 and 14.5 percent in 1988—is less than that of either France or West Germany. Compared to Western Europe as a whole, it is, of course, much less important (see Table 2.3).  

Several factors suggest that Japan will likely remain an important, but not the most important, source of Western credit to the Soviet Union, lagging behind West European countries. First, the Japanese government has been reluctant to participate in any new resource development projects currently being proposed by the Soviet Union and has tied all economic agreements to resolution of political disputes (see Sec. V for a full discussion). In any case, the Soviet Union has shifted its borrowing patterns from government-backed to private loans, reflecting in large part a change in borrowing costs. The proportion of officially guaranteed, tied loans to unguaranteed loans to the Soviet Union has dropped sharply from 66 percent of total lending in 1982 to

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5 The data on Japanese private lending to the USSR include Euroyen loans, as well as some loans guaranteed by the government through the Japanese Export-Import Bank, and therefore may overstate Japan's importance. The figures are understated in that they exclude loans by subsidiaries of Japanese or West European banks located abroad. The data also do not include credits provided by exporters.

Table 2.3

WESTERN LENDING TO THE SOVIET UNION, 1987 AND 1988
(Percentages)

<table>
<thead>
<tr>
<th>Country</th>
<th>1987</th>
<th>1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>22.1</td>
<td>20.2a</td>
</tr>
<tr>
<td>West Germany</td>
<td>17.8</td>
<td>17.2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10.2</td>
<td>10.8</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2.2</td>
<td>2.1a</td>
</tr>
<tr>
<td>Switzerland</td>
<td>6.1</td>
<td>(b)</td>
</tr>
<tr>
<td>United States</td>
<td>0.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Japan</td>
<td>15.3</td>
<td>14.5a</td>
</tr>
</tbody>
</table>


Not available.

37 percent by 1987. At the same time, the private credit markets have viewed lending to the USSR favorably, providing large borrowings at progressively lower margins over the 1985–1986 period and becoming more cautious since 1987.7

In terms of private lending, Japan is unlikely to change its past lending patterns significantly in the near future; if anything, it may reduce its credit should the United States pursue the past policy of limiting credit to the Soviet bloc for national security reasons (see Sec. V for a discussion of this issue). Japan has not dominated the recent and much-publicized trade-related facilities set up to finance Soviet imports. According to press reports, its share is about the same as that of France, the United Kingdom, and West Germany, though larger than that of Italy, Austria, and Switzerland.8 These facilities are mainly lines of credit, rather than actual extensions of credit, to finance imports from individual countries, and in some cases are tied to purchases from specific sectors. The extent of lending depends on whether or not trade develops.9

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7See East-West Trade, pp. 40–45.
8See Clyde H. Farnsworth, “Rise in Allies' Lending to Soviets Divides U.S.,” New York Times, October 21, 1988, pp. D1, D4, for some estimates of the magnitudes of credit lines set up by these countries.
9See East-West Trade, pp. 42–45.
Japanese bankers would become less willing to increase loans and credits as the USSR's creditworthiness falls (for example, as a result of major increases in borrowing, which in turn raise debt-servicing costs, or of reductions in hard currency reserves because of energy price declines). Any forecasts about substantial increases in Soviet borrowing would, of course, be speculative. If the Soviet Union follows its past policies of financing imports through export earnings, it is unlikely to increase its borrowing in the near future. Of course, it could change this policy, for any number of reasons (such as drastically deteriorating terms of trade or domestic economic conditions). It continues to be considered an excellent credit risk, despite warnings from Soviet leaders about the dangers of increased debt exposure. Past Soviet borrowing has been light to moderate. When adjusted for exchange rate changes, both gross and net debt have remained essentially unchanged through the 1984–1987 period. The standard debt-related ratios—net debt to exports ratio, net interest payments to exports ratio, and the debt service ratio—indicate considerable room for expanding credit (see Table 2.4). One estimate is that the USSR could increase its credit by $15 billion over the next few years without running into problems; another, that it could raise credit by 50 percent.¹⁰

PAST COMPENSATION AGREEMENTS

The pattern of trade between Japan and the Soviet Union reflects, in part, past cooperative agreements between the two countries to develop resources in Siberia—specifically, the Soviet Far East. These

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<tbody>
<tr>
<td>Net debt/export ratio</td>
<td>63</td>
<td>53</td>
<td>39</td>
<td>35</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Debt service ratio</td>
<td>22</td>
<td>19</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>22</td>
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<tr>
<td>Reserves as a percentage of imports</td>
<td>29</td>
<td>34</td>
<td>38</td>
<td>41</td>
<td>49</td>
<td>58</td>
<td>58</td>
<td>52</td>
</tr>
</tbody>
</table>


cooperative agreements are basically a form of countertrade. In these agreements, which date back to the 1960s, Japan agreed to provide credits for capital and equipment in exchange for future delivery of raw materials and resources produced by the machinery and equipment, usually at prices lower than those prevailing on the world market. When they are signed, the agreements specify the value of the products (volume and prices) and set the time frame for delivery of output. These terms, however, are not necessarily contractually binding (as we will discuss later) and are renegotiable on a periodic basis. The agreements include projects to develop the forestry industry in the Far East, support prospecting for oil and gas off Sakhalin Island and for gas in Yakutia, develop Yakutian coal, and develop the chip and pulp wood industry. The largest amount of trade occurred during the 1970s, since many of the projects began to deliver products. The volume of trade, however, steadily declined, partly because of Japan’s 1980 imposition of economic sanctions against the Soviet Union for military intervention in Afghanistan. Trade has been recovering since 1986, but Japan has been reluctant to enter into new compensation agreements since falling prices of many raw materials and fuels make such long-term deals much less profitable than in the past.11

Since 1965, Japan and the Soviet Union have signed five major intergovernmental agreements:

- The Far East Forestry Resources Development Project;
- The Chip and Pulp Wood Development Project;
- Vostochny Port Construction Project;
- South Yakutian Coking Coal Development Project;
- The Sakhalin Continental Shelf Oil and Natural Gas Cooperative Exploration Project.

**Forestry Development Agreements**

Agreements to develop the Far East forestry resources have been renewed three times. In the first agreement, signed in 1968, Japan agreed to provide to the Soviet Union $163 million in credits, at 5.8 percent interest, to buy Japanese machinery and equipment (such as trucks, road-building machinery, timber-processing plants, logging equipment, and other materials). In exchange, Japan was to receive by 1974 a total of 7.6 million cubic meters of lumber and 0.2 million cubic

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meters of raw timber. For the second project, signed in 1974, Japan provided the Soviet Union with $550 million of deferred credits to pay for $435 million of Japanese machinery and equipment, $65 million in ships, and $50 million in other local costs, in exchange for 17.5 million cubic meters of lumber and 0.9 million cubic meters of sawed timber to be delivered by from 1975 to 1979 at annually adjusted prices. In Compensation Agreement-3, covering the period 1981–1986, Japan agreed to extend $1 billion of loans to the USSR in exchange for 12 million cubic meters of sawed wood and 1240 cubic meters of lumber. The meeting for the fourth agreement, which was expected to run from 1986 to 1996, was held in May 1988 to seek ways to expand timber trade, and terms are still under discussion. Negotiations have stalled, however, because of a shift in the Soviets' request about the type of machinery to be imported, from forestry development equipment to furniture-manufacturing equipment. The Japanese have balked, in part because they believe that forestry equipment exports will likely drop tangibly.

Although each agreement has outlined specific terms with regard to value of loans and lines of credit and the prices and volumes of product for future delivery, these terms have been renegotiated. For example, according to press reports, in spring 1986, when U.S. exporters began making major inroads into the Soviet share of Japanese timber imports, the USSR foreign trade organization not only dropped the cubic meter price of larch logs by 20 percent, but also agreed to reduce the foreign exchange rate by 30 percent on a yen basis from Y205 to Y180. These concessions marked the first time the USSR chose to consider price reductions to achieve its annual plan goals. In the fall of 1986, after a breakdown in negotiations a month earlier on volume and quality of logs delivered, the USSR proposed a reduction in shipments by 20 percent and an improvement in log quality.

Chip and Pulp Wood Development

Two agreements have been signed to develop the Soviet wood chip and pulp industry. In the first agreement, signed in 1972, the Japanese provided $45 million of credit for Japanese plants, machinery, and supplies, and $5 million for consumer goods. The Soviets agreed to ship 3.65 million cubic meters of chip timber and 2.7 million cubic meters of pulp timber between 1972 and 1977, and 4.4 million cubic meters of chip timber and 2 million cubic meters of pulp timber between 1978 and 1981. The loan was made on a six-year deferred basis, with 12 percent down at 6 percent interest.\(^\text{17}\) In the second agreement, signed in 1985 for a period of ten years, the USSR agreed to buy $100 million of imports from Japan if Japan bought $500 million of chip and pulp exports.\(^\text{18}\) As part of this agreement, Japan Chip Trading Company, a consortium of 19 Japanese firms, agreed to double its previous purchases to 11.2 million cubic meters of product—8.2 million cubic meters of chips and 3 million cubic meters of deciduous timber.\(^\text{19}\)

Port Construction and Development

Japan and the Soviet Union agreed upon the Vostochnyy Port Construction Project in 1971. Development of Vostochnyy (as well as its sister port, Nakhodka) was important in handling the increasing volume of trade (especially container trade) between Japan and the Soviet Union and between Europe and Asia via the Trans-Siberian Landbridge. These locations were selected because warm sea currents keep them ice-free during winter. In this agreement, Japan’s Export-Import Bank provided $100 million of credit—$80 million of deferred payments for Japanese machinery and equipment and $20 million for the design and local construction costs—to develop this port. In return, Japan received wood chips, oil, coal, and iron ore at concessionary prices. Work was completed by 1976, after two one-year delays, which stemmed in large part from the Soviet bureaucratic decisionmaking process mandating that all decisions, big and small, be made by a central authority in Moscow. Two years after the project began, only 20 percent of the machinery and equipment ordered had been delivered; one year later, 75 percent had been delivered. In turn, the delays provided the Soviet Union with an opportunity to


renegotiate the repayment plan and, twice, to extend the delivery of compensatory products to Japan, for machinery and equipment already in place. As a result, having experienced greatly reduced profits on these long-term, low-interest loans, Japanese businessmen sought to include contingencies for these types of problems in any new agreements. During the tenth meeting of the Soviet-Japanese and Japanese-Soviet Committees for Economic Cooperation held in May 1986, the Soviet participants praised this project's success in increasing the efficiency of transporting traded commodities and sought to initiate a second-stage building project at Vostochny and Vladivostock. No apparent progress on this initiative has occurred.

Far East Coal Development

The South Yakutian Coking Coal Development Project began under a 20-year agreement signed in July 1974. Under the agreement, the Japanese government backed a loan of $450 million—$390 million for machinery and $60 million for consumer goods—to develop the mine and infrastructure. Repayment of the loan was scheduled for 1983–1990, with interest at 6.375 percent for the machinery and 7.25 percent for consumer goods. In exchange, the Soviet Union agreed to ship a total of 84.4–100 million metric tons of coal at an average rate of 5 million metric tons a year over the 20-year period at concessionary prices. Over this period, Soviet exports of coal to Japan have been priced at 10 to 15 percent below world market prices. An additional $135 million was invested in the Baikal-Amur Mainline (BAM) railway system by a group of Japanese businesses to improve access to the coal mine. Although delivery was scheduled to begin in 1983, the first shipment of 2 million metric tons of South Yakutian coal was delayed until 1985. At this time, the Soviet Union tried to sell double this volume, but the Japanese argued for 2 million metric tons, given the world glut of coking coal and the conflicting appraisals of the quality of South Yakutian coal. The Japanese agreed to buy 1.2 million metric tons of Kuznetski (West Siberian) coal at the previously negotiated price of

20Mathieson, Japan's Role, pp. 12, 30–39.
$51.80 freight on board (fob) per ton. In 1986, Japan imported 4.2 million metric tons—3.2 million metric tons from South Yakut and 1 million metric tons from Kuznets—of coal at a price $3.00 per ton lower than the 1985 price. By 1987, the Soviet Union expanded its exports of coal to 5.3 million metric tons but continued to argue with Japanese buyers about the quality of the coal from the South Yakutian mine and the Japanese noncompliance with contract volumes. In 1988, Japan increased its imports to 5.25 million metric tons, paying between $46.70 to $46.90 per ton and marking the first time that Japanese steel makers agreed with a foreign seller on both price and volume.

Far East Oil and Gas Development

In December 1974 and March 1975, Japan, the Soviet Union, and two U.S. companies, El Paso Natural Gas and Occidental Petroleum, agreed to begin exploring for natural gas in the Yakut Autonomous Soviet Socialist Republic (ASSR). Initial exploration costs of $50 million were shared equally between the Japanese and U.S. firms, and by 1978, official credits from Tokyo amounted to $4 billion. The Soviet Union was to supply 10 billion cubic meters of gas (or 7.5 million tons of liquified natural gas [LNG]) to Japan and the United States for 25 years. Final funding and financial terms were to be worked out when a minimum of 1 trillion cubic meters of gas had been confirmed. In 1978, the USSR claimed reserves of 825 million cubic meters. The U.S. partners pulled out when the Jackson-Vanik amendment passed and limited U.S. trade with the Soviet Union. Japan dropped the project in the 1980s as too costly—the project's huge cost would have required continued U.S. participation, both to limit the financial risk and to provide an alternative market for the natural gas.

In January 1975, Japan and the Soviet Union agreed to cooperate in exploring for oil and gas off Sakhalin Island, creating the Sakhalin Continental Shelf Oil and Natural Gas Cooperative Exploration Project. This general agreement delimits the exploration area, regulates exploratory ships and personnel in Soviet ports, and includes provisions for additional Japanese Export-Import Bank funds if development costs exceed Japan's 50 percent interest in contracted output.

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28Whiting, Siberian Development, p. 151.
The agreement gives Japan access to West Siberian oil reserves as well as to future Sakhalin reserves. The Soviet Union also demanded that Japan commit additional funds for exploring natural gas in Yakutia when the original estimate of Sakhalin reserves appeared too high. Following the signing of the general agreement, the countries signed a set of three operational contracts in October 1975. These contracts stipulated that

- The Japanese consortium Sakhalin Oil Development Exploration Cooperation Company\(^\text{29}\) would provide a five-year loan of $100 million for equipment and supplies, interest free, if oil was not discovered within five years; if oil was found, the Soviet Union would pay interest at 6 percent compounded at the end of five years, and agreed to sell 50 percent of the oil and an amount of gas to be determined later to Japan for a period of ten years after discovery;
- Japan would provide $22.5 million in credit for the Soviets' purchase and use of seismic survey equipment; the credit would be repaid at an interest rate of 6.75 percent per year, over three years, or 7 percent per year over five years;
- Additional credit of $30 million would be provided to the Soviet Union for local development, and would be repaid at an interest rate of 7.25 percent over five years.

These agreements entitled Japan to 50 percent of oil developed for production at an 8.4 percent discount from prevailing world prices for a period of ten years after all Japanese credits were repaid.\(^\text{30}\)

The exploration and development of oil and gas off Sakhalin, however, was delayed for several reasons. First, in 1978-1979, both sides argued over the definition of Japanese capital investment—whether it was risk capital to be repaid with some proportion of future output, or a loan with a fixed return and interest rate. Second, U.S. economic sanctions against the Soviet Union prevented delivery of necessary U.S. drilling equipment, which had already been ordered, until 1982. Finally, the Soviet Union refused in 1985 to release feasibility studies until the Japanese government guaranteed to find buyers for its natural gas. For their part, Japanese buyers refused to make commitments for an additional 10-20 years of natural gas supplies, especially under the

\(^{29}\)The consortium includes the Japan Petroleum Development Corporation (in which the Japanese government holds equity), Toyo Oil Development Company, Hokkaido Bank, Kanematsu Gosho, Sumitomo, Tomen, Nissho-Iwai, Nichimen Sogo, Overseas Oil Development Company, C. Itoh and Company, Marubeni Corporation, Indemitsu Oil, Kyushu Oil, Kyoda Oil, Daikyo Oil, MaruZen Oil, and the agent, Ataka Company.

\(^{30}\)Mathieson, *Japan's Role*, pp. 82-101; Whiting, *Siberian Development*, p. 137.
sluggish market conditions prevailing at the time. The USSR further tied its demands for guaranteed purchases of natural gas to its signing of agreements to buy Japanese petrochemical plants.31 The drop in oil prices in 1986 led to further delays until July 1987, when Japan agreed to suspend interest payments on the $181 million in loans already extended for exploring oil and gas deposits. By November 1987, the USSR agreed in principle to buy all natural gas; Japan agreed to buy all crude oil. Unofficially, they agreed to develop natural gas at Chayvo and crude oil at Odoptu. Japan proposed investing $4.55–$5 million more to develop the fields. Additional feasibility studies will be undertaken, and shipments to Japan of approximately 20,000 barrels per day will likely begin in 1992—three years behind the original schedule.32

Nongovernmental Agreements

Outside of the intergovernmental agreements, Japanese firms have negotiated individual compensation and barter agreements with the Soviet Union, sometimes with financial support from the Japanese Export-Import Bank. These agreements may involve simple exchanges of product—raw cotton for cotton and synthetic yarn33—or more complex long-term contracts for the sale of complete plants. In the latter case, Japanese firms typically design and construct the plant, supply the machinery and equipment, and train Soviet personnel to take over when the plant is commissioned for a lump-sum payment. In exchange, the Soviets agree to pay for the plants with future delivery of raw materials or semifinished goods at concessionary prices. Examples include the following:

- In the early 1970s, several chemical plants were constructed by Japanese engineering companies, which agreed to receive ammonia and fertilizer from the plants as payment.
- Petrochemical engineering equipment and plants were provided by Japanese firms in exchange for synthetic fibers and plastics.

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Japanese companies supplied metal manufacturing plants and steel products in exchange for iron ore; some firms have entered into cooperative agreements with the USSR to exchange iron and steel technologies, especially production techniques. Licenses for steel technologies have been bought and sold by both sides.

Japanese firms put up consumer durables manufacturing plants—compressor plants, electrical motors manufacturing, household appliance manufacturing—and accepted products—such as raw cotton, aluminum ingots, and fertilizers—as payment.34

The specific details about many of these barter and trade agreements are not readily available from either side. For the Soviets, publication of information about its products, or about the production of some products, has stopped for no stated reasons. For example, publication of statistical information on production of nonferrous metals ceased in the 1970s. On the Japanese side, firms have been reluctant to provide information that could give competitors an advantage or create controversy about technology transfer, especially with products embodying advanced technology.35

Recent Developments

More recently, press reports have described two joint venture agreements between the Soviet Union and a combination of Japanese, U.S., and West European firms to build large chemical and petrochemical complexes. Each requires very large capital investments and provides 51 percent ownership to the Soviet Union and 49 percent ownership to each consortium. The joint ventures are to build and operate the petrochemical complexes, rather than turn them over to Soviet management. The first joint venture, a partnership between the USSR and Occidental, Montedison, Enichem, and Marubeni, is located in Tenghiz, near the Caspian Sea. The cost, an estimated $5–$6 billion, is to be financed equally by the consortium and the Soviet Union, with the Western partners putting up the financing and the Soviet Union providing the raw materials. The plants are to produce polypropylene, polyethylene, sulfur, and plastics. In the second venture, Combustion Engineering, McDermott International, Mitsui Group, and the Mitsubishi Corporation have joined forces to build and operate complexes, at a cost of $20 billion, in Surgut and Tobolsk. Rubber, special

34Mathieson, Japan’s Role, pp. 144–221.
35Mathieson, Japan’s Role, p. 181.
chemicals, and additives for gasoline will be produced. In both cases, 45–50 percent of output will be exported, and the Japanese partners are most experienced in sales to third markets.36

The Japanese trading companies are important members of these joint ventures and are especially needed to sell Soviet products in third markets. Over the past decade, these firms have sought to increase their role as intermediaries for Soviet trade as their traditional role in managing Japan’s exports and imports has diminished. This diminished role stems in part from increased overseas investment by Japanese firms, which has reduced the need for these marketing and distribution middlemen. Decreased bilateral trade between Japan and the Soviet Union has also been an additional factor in reducing their business with Japanese firms, but they have recognized the opportunity to act as intermediaries for Soviet goods in other markets, providing the Soviet Union with a means for meeting domestic demands for scarce necessities without eating into the limited hard currency reserves. These firms are expert in packaging and transporting goods, and knowledgeable in working out transactions in the lesser-used currencies that the Soviets may hold. Moreover, an agreement between the Soviet government and a small consortium of Japanese shippers has given these firms control of shipments over the Trans-Siberian Landbridge from the Far East to Europe since 1971; they have been given exclusive rights on shipments from the Far East across the Soviet Union.37 Examples of these intermediary activities include selling Urals oil to third countries for infrastructure development, trading Australian and New Zealand meat and dairy products for Soviet coal and lumber, shipping Japanese equipment to Thailand to process USSR gems in exchange for sending Thai sugar to the Soviet Union, and arranging the sale of Thai goods for Soviet fertilizers and machinery and equipment.38


III. SIBERIAN RESOURCES: PROSPECTS FOR SOVIET DEVELOPMENT

INTRODUCTION

Given that past economic ties between Japan and the Soviet Union have been heavily concentrated in Siberia and the Soviet Far East and that this region is in close geographic proximity to Japan, it is often seen as the most promising area for expanded economic relations. Siberia and the Soviet Far East, with more than half the land area of the country and approximately 11 percent of the country's population, hold the bulk of Soviet natural resources. This region has more than 50 percent of the country's minerals and forests and some 90 percent of its energy resources. Indeed, Siberia contains one of the largest stores of industrial resources left in the world today. Yet most of Siberia's resources have not been exploited—or, probably, discovered. Only approximately one-tenth of the total area has been properly surveyed. Some analysts believe that exploiting this resource endowment is key to Soviet development and growth.1

Despite its huge Siberian resource endowment and given its current resource constraints, the Soviet Union is unlikely to undertake the large investments necessary to develop this region without the help of other countries. Whether or not Japan—or, for that matter, any other country—decides to participate in Siberian joint development projects depends largely on the profitability of investing the necessary funds: Either major advances in the technology of construction and mining in cold, harsh climates must greatly reduce the costs of exploitation, or the world prices of the resources must rise high enough to cover the relatively large development costs in East Siberia and the Far East.

To make some judgments about the profitability—or the costs and benefits—of Siberian development, an assessment of resources available and the costs of developing these resources relative to world prices is necessary. Because of difficulties in the data's availability and reliability,2 the approach taken is qualitative. This section reviews the


2Production costs in the USSR are unavailable for most products, or are on a consistent time-series basis. Published data are not necessarily comparable to Western measures of costs; they do not represent market prices of inputs and are not based on
Soviet resource endowment, the location of these resources, and the internal Soviet infrastructure. It evaluates the factors that have raised the costs of exploiting its resources, including the region's harsh environmental conditions, the rising input requirements as reserves are depleted (and the related expenses), and transportation problems. It then examines Western estimates of costs of developing resources—specifically for oil and gas—to gauge the profitability of new undertakings. This type of background information and analysis has not received complete consideration in previous studies of Japanese-Soviet economic relations. The analysis suggests limited Japanese interest in helping to develop these resources and hence, little potential for expanded economic relations between Japan and the Soviet Union in this area.

The resources considered are those in which the Soviet Union is a leading producer (among the world's top three) and that are located in Siberia—West Siberia, East Siberia, and the Soviet Far East. Siberia in this study refers to the area east of the Ural Mountains and north of Kazakhstan (see Fig. 3.1). The major landmark between West and East Siberia is the Yenisey River. East Siberia is separated from the Far East by the Lena River and Lena Plateau. These three areas are defined as separate economic regions in the USSR.

SIBERIAN RESOURCE ENDOWMENT

Soviet development strategy has been based not only on West Siberia's geographic proximity to the European USSR, but also on the nature of the resources located in West Siberia versus East Siberia and the Far East and the environmental conditions in each region. It has concentrated much of its resource development efforts in the European USSR and the warmer, southern regions of West Siberia. West Siberia holds most of the proven energy resources in the Soviet Union—more

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Western cost-accounting principles. Moreover, converting ruble values to dollar values is fraught with problems, including the lack of a market-determined rate of currency exchange. The last subsection of this section discusses these problems more fully.

than 60 percent of oil and gas reserves and more than half the coal produced in Siberia. East Siberia and the Far East hold a small percentage of the country's proven energy reserves and have a large proportion of other types of resources that the USSR has been seeking to develop as it depletes its known and accessible deposits of raw materials and resources. These resources include coal, timber, ferrous and nonferrous metals, and other valuable minerals.⁴

Although in the past, the USSR gave high priority to the energy sector and increased the proportion of investment going to this sector, it now recognizes that there are many other claimants to funds and that there is a need to hold the line on energy investment. Over the next several years, investments will likely be cut. The USSR's past investment strategy has linked West Siberia economically to the European USSR and Europe, and has put in place the infrastructure necessary to ship oil and gas output to these areas and away from Asia and Japan. In contrast, East Siberia and the Far East remain less integrated with the mainstream of Soviet activity, lacking good transportation linkages. Soviet efforts to integrate these regions with the rest of the economy have produced only modest results. These regions, especially the Soviet Far East, look as much to Japan and Asia as to the European USSR as markets for their output.

Energy

As the world's second largest producer of energy (after the United States) and largest producer of oil, the Soviet Union has been able to meet domestic demands and to obtain 60 to 70 percent of its hard currency earnings through the sale of oil and gas. Although it has experienced declines in oil output from older, larger fields, it has brought on line a number of new, though smaller, wells. In addition, natural gas output has been rapidly increasing and will likely become the largest source of fuel in the USSR. In contrast, coal production has not grown rapidly.⁵

Oil and Natural Gas. West Siberia produces most of the Soviet Union's oil and gas output, Japan's largest resource imports. It is, however, the region farthest from Japan. It is viewed as the major source of fuel and energy resources in the 12th five-year plan


(1986–1990). West Siberia currently provides more than 66 percent of the country's total oil output, and petroleum experts expect it to produce some 70 percent by the year 2000. The Soviets have succeeded in raising West Siberian oil production in 1986 and reversing the decline that began in 1983 (see Table 3.1). This increase has been accomplished by bringing several small- and medium-sized fields into production in new and difficult-to-develop areas in the northern regions of West Siberia, as well as by getting idle wells back into production and increasing the use of secondary recovery methods (such as gas lifts). This effort has necessitated a significant boost in manpower, capital, and equipment—an addition unlikely to occur again in the near term since production costs have risen and world oil prices have collapsed. One study estimates that incremental output achieved by moving to smaller, less productive fields required two to three times more capital investment. Although the current five-year plan calls for continued expansion of oil production in West Siberia, how well this region can meet planned projections is unclear since output from older fields continues to decline. At a minimum, the region faces rapidly rising extraction and transportation costs (issues we will discuss later). Analysts estimate that oil production costs in the USSR have doubled between 1970 and 1985.

West Siberia also supplies most of the country's gas (see Table 3.2). Natural gas production has grown at a faster pace than has oil over the past 15 years and will likely surpass oil in its contribution to the economic output of the nation.

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11Theodore Shabad, “Geographic Aspects of the New Soviet Five-Year Plan, 1986–1990,” Soviet Geography, Vol. 27, January 1986, p. 5. The plan also calls for developing fields in the northern part of the European USSR (the Kara and Barents seas) and the Caspian region of Kazakhstan. Some analysts believe that these fields are unlikely to add significantly to total production in the plan period because of the geological complexities and uncertainties of these areas, especially around the Kara Sea and the Caspian depression. Successful development will likely require either advanced technologies or large investments—or both (see Leslie Diener, “The Soviet Oil Industry in the Twelfth Five-Year Plan,” Soviet Geography, Vol. 28, November 1987, pp. 635–639). Possibly, however, by the end of the next (13th) five-year plan period, these fields could prove to have important reserves of oil and gas (see Sagers, “News Notes,” pp. 429–430).
Table 3.1

GEOGRAPHICAL DISTRIBUTION OF OIL PRODUCTION IN THE USSR
(Percentages)

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<td>(9.86 mbd)</td>
<td>(12.06 mbd)</td>
<td>(12.32 mbd)</td>
<td>(11.91 mbd)</td>
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NOTES: Soviet oil statistics include both crude and condensate (natural gas liquids). The Bashkir ASSR, with some 29 million tons (211.7 million barrels), is included in the Urals. MBD: million barrels per day.
^Amount less than 0.1 percent.
*Not available.
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**NOTE:** BCM: billion cubic meters.

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*Not in production.*
*Not applicable.*
USSR's fuel balance in 1989. This rapid increase stems largely from the development of two major fields discovered in 1969, Urengoy and Yamburg, and two other giant fields discovered in 1965, Zapoliarnoe and Medvezh'e. Urengoy, the largest field, provides the Soviet Union with more reserves than any country in the world, except for Iran. The Soviet Union has focused its development efforts on the Urengoy field, which began producing gas in 1978 but reached its designed production capacity in 1986. Yamburg is projected to provide output growth to 1990. These two fields supply almost 50 percent of total output. After 1990, plans call for development of gas fields north of the Urengoy and Yamburg deposits, on the Yamal Peninsula. Development expenses of resources in the northern regions, already high relative to costs in other parts of the world, will likely rise substantially because of the harsh climatic and geographic conditions and the related rise in costs of materials, equipment, and manpower and the increasing requirements of technology.

Although located closer to Japan, East Siberia and the Far East contribute only a small proportion to total Soviet oil and gas output and produce little for export. Past Soviet press reports have claimed huge discoveries of reserves in East Siberia, but these reports have turned out to be exaggerated or unsubstantiated. In East Siberia, the most promising areas of oil and gas are in the Irkutsk Province—in the Nepa-Botuobuya region and in the nearby Vilyui River basin—where gas is currently being produced commercially and oil production is scheduled for 1989. According to the U.S. Geological Survey, the undiscovered, conventionally recoverable resources are 6-40 million barrels per day (b/d) (0.3-2 billion metric tons). Four other promising fields are under development, and the area will likely produce only 2000 b/d of oil (90,700 metric tons) by the end of 1990. Developing this region will require a substantial commitment of funds in future five-year plans because additional seismic surveys are needed before

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14Much smaller than West Siberia's giant Samotlor oil field, which by itself had initial reserves far greater than 40 million b/d (2 billion metric tons per year).

development can begin, the region’s complex geology makes exploitation technically difficult, and the climate adds to the problems. The expected payoff through 1995 is small, limiting potential Japanese interest in joint development.

In the Soviet Far East, approximately 50,000 b/d—less than 0.5 percent of total Soviet oil output—is being produced off Sakhalin Island with Japanese and U.S. financial and technical assistance. Additional oil and gas offshore fields have been discovered, but according to a U.S. geological expert, are unlikely to yield much output before 2000 given the current level of investment. Exploration for additional reserves is continuing in the Far East’s Magadan Province, bordering on the Sea of Okhotsk, and the Chukotsk Autonomous District, which extends to the Bering Strait, but no commercially viable reserves have been discovered in these regions to date.

Coal. Although the USSR is the world’s third largest producer of coal (behind China and the United States), with an estimated 45 percent of world reserves, it exports little of its production, in part because of its depletion of known deposits and the high costs of shipment. It has been seeking to exploit new deposits as it depletes its known reserves, most of which are located in eastern regions (an estimated 73 percent). This search has been driven in part by its reemphasis on coal use after the Chernobyl nuclear accident in 1986. Coal fulfills some 25 percent of the country’s energy requirements and currently comes from three major areas: the Ukraine (Donets Basin), Kazakhstan, and Siberia (see Table 3.3). Donets Basin remains an important source of coal to the populated and industrial European USSR, despite having provided a falling share of total output and having experienced declining ore quality and deteriorating conditions in its underground mines. The Soviet Union has sought to replace the

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17Eastern Siberia,” p. 50.
19Eastern Siberia,” p. 49.
20Coal represents only 8 percent of total fuel and raw materials exports and 4 percent of total exports; oil comprises 63 percent of fuels and raw materials exports and 34 percent of total exports.
21As the upper layers have been depleted, deeper mines have been exploited. Seeking deeper deposits is becoming increasingly difficult and uneconomical. By the early 1970s, the average depth of mines was more than 2000 feet, and a growing number are more than 3000 feet deep. Fewer and fewer productive layers remain in these mines; to exploit them, custom-designed, advanced-technology machinery is necessary. Moreover, these newer mines produce lower-quality coal with high sulfur and ash content (see Leslie Dienes, “Soviet Energy Policy and Fossil Fuels,” in Jensen et al. [eds.], Soviet Natural Resources, pp. 287–288; Matthew J. Sagers, “News Notes,” Soviet Geography, Vol. 30, April 1989, pp. 328–338; Hewett, Energy, pp. 83–88).
depletion of this high-quality coal deposit by expanding the use of strip-mining and accelerating the development of its vast reserves east of the Ural Mountains—in Kazakhstan and Siberia.22

Declining coal quality and transportation problems have created difficulties in pursuing this replacement strategy and in increasing either the use of coal as an energy source or the export potential of coal. The coal’s quality is declining in all mines, especially in mines from Kazakhstan, the third largest coal basin. Because transporting it long

Table 3.3

GEOGRAPHICAL DISTRIBUTION OF COAL PRODUCTION IN THE USSR

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Percentages

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NOTE: Figures in parentheses are rough estimates.
Donets Basin, shown in entirety under the Ukraine, is partly in the RSFSR.
Not available.

distances is uneconomical, most of its output is used as fuel in nearby power stations in Kazakhstan, the Urals, and West Siberia. Moreover, the large Siberian deposits are far from industrial centers in Europe, East Asia, and Japan and are in harsh climates. The high-quality coal of West Siberia’s Kuznetsk Basin is closest to the industrial European USSR, but its shipment doubles its cost and only meets a small proportion of total demand in the region. East Siberia’s Kansk-Achinsk field, with an estimated reserve of 450 billion tons, has poor-quality lignite, which has a tendency to combust spontaneously and is therefore difficult to transport. The deposit closest to East Asian and Japanese markets is the South Yakutian Basin mine at Neryungri in the Far East. This mine has been developed with Japanese cooperation and is the most expensive to produce in the country. The lack of adequate transportation infrastructure in Siberia—West, East, and the Far East—has placed enormous burdens on the existing rail system. The Soviets are investing in additional rail transport and will likely reduce the per-ton costs of transportation by 40 percent. They are also planning to burn coal to produce electricity for long-distance transmission. In addition, they are experimenting with converting coal to slurry for shipment via pipelines, although this alternative must overcome a number of technical problems, including freezing.  

The coal industry, however, is facing added problems of low official prices and little capital investment. It has been operating at a loss for several years because official prices do not cover production costs; in 1987, the loss was 4.13 rubles per ton (double the loss in 1986). Coal is receiving only modest increments in investment funds relative to the oil and gas industries. Major infusions of capital are necessary to upgrade the industry before planned output increases are realizable.  

Timber and Wood. The Soviet Union’s large forestry reserves differ by region in composition, age, and volume. Past overcutting has depleted forests in the European USSR, which now has stands of young or immature conifers (the species in highest demand) and major stands of deciduous trees (which lack a domestic market). Siberia’s surplus of mature and overmature forests is in remote and relatively inaccessible regions; these forests range in age from 150 to 250 years, far exceeding the average age (101–116 years) of all USSR stands. These older stands often have low annual growth and provide poor-

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quality timber with serious defects. Forests in East Siberia and the Far East are dominated by larch, a variety undesirable for lumber and plywood but used for telephone poles, packing wood, and wood pulp. Larch comprises 75 percent of the forested area in the Soviet Far East and 66 percent of the growing stock.

The Soviet Far East, with more than a third of the country’s forested area and a quarter of its growing stock, exports approximately 25 percent of its timber production. Forest products represent more than 50 percent of its total exports. The future development of this region’s forestry sector is expected to depend on sales to foreign markets in East Asia and on foreign cooperation (joint ventures, counter-trade agreements, and other types of bilateral arrangements). Major domestic markets are too distant to serve easily. Japan will likely remain a major buyer of the Soviet Far East’s forestry products and currently imports approximately 11 percent of total Soviet timber exports and 70 percent of the Far East’s chip production.

Past and current Soviet economic plans have given the forestry sector low priority, despite calls by Soviet leaders (including Gorbachev) for increased production of higher value-added forest products and despite proclamations in the plans about the need to improve product mix and structure, quality control, and labor productivity. The current five-year plan emphasizes renovating existing plants and improving product mix rather than undertaking new development projects or expanding logging and sawmill activity. These basic forest operations have been slowly declining over the past two decades. Moreover, the 1990–2000 plan will not likely change the composition of production, and roundwood exports will likely continue to be an important earner of hard currency.

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27Nonetheless, the Far East still remains dependent on other regions of the country for many types of forestry products. See Barr, “The Forest Sector,” pp. 283–302, for a good review of the state of the forestry sector in the Far East. This article provides data and analysis previously unavailable.

Metals and Nonmetallic Ores

The Soviet Union produces a variety of ferrous metals, nonferrous metals, and nonmetals. Although Japan has been moving away from basic industries (as the next section discusses), these products represent a relatively important proportion of bilateral trade between the two countries. Specifically, iron, aluminum, nickel, and other nonferrous metals are among the top Soviet exports to Japan (see Sec. II, Table 2.1); Soviet production, consumption, and foreign trade of this group of products, however, is difficult to analyze because the USSR has restricted statistical reporting on these products (except for ferrous ores and metals) since the mid-1970s.29

Most of the large, proven reserves of ferrous ores and related metals (including iron ore, manganese, and chromium30) are found in accessible regions of the country—in the European USSR and Kazakhstan. Production of iron ore, however, has been relatively stagnant over the past decade, with the largest reserve areas producing a falling share and declining ore grades. As it depletes its richest and most accessible iron ore deposits, the USSR faces rising costs of producing iron and steel products, specifically because of the need to transport ores from distant deposits and to beneficiate an increasing percentage of ore whose iron content has declined from more than 50 percent to some 30 percent.31 Similarly, production of manganese and chromium has been stagnant since the 1970s, and the Soviet Union has been forced to exploit deeper deposits and to use lower-grade ores.32

Siberia’s contribution to iron ore production has been small—slightly more than 6 percent of 251 million tons of total usable ore in

29 See appendix for more detailed information on the USSR endowment of these resources and the importance of Siberia as a source of these raw materials.

30 Manganese is an important element in improving the quality of steel produced. Similarly, chromium is used in small amounts to strengthen and harden steel; in larger amounts, it is used with iron to produce stainless steel.

31 Beneficiation refers to dressing or processing of ores in order to regulate the product’s size, remove unwanted constituents, and improve the product’s quality, purity, or assay grade.

1987. Development of Siberian reserves has not been emphasized, although the construction of the BAM has raised interest in exploiting East Siberian and Far Eastern reserves and shipping these ores to export markets in East Asia, especially to Japan. Exploration has been undertaken in two areas: the Chara-Tokko district, with reserves of 4.3 billion tons; and the South Aidan district, with 12.2 billion tons of estimated reserves. Moreover, the current five-year plan includes a proposal to build a new integrated iron and steel plant in the Far East, based on Neryungri coking coal and Aidan iron ore. Siberia's very small deposits of manganese and chromium have not been fully exploited.\textsuperscript{33}

The USSR is an important world producer of nonferrous metals and nonmetallics. Nonferrous metals include platinum, nickel, copper, aluminum, gold, titanium, tin, lead, and zinc. Nonmetallics include apatite, asbestos, sulfur, and diamonds (see appendix). Although both groups have been major contributors to hard currency earnings, the Soviet Union has been depleting the reserves of many of these products; thus, the potential for raising exports of these goods is limited.

A subset of these resources has a relatively large market in Japan. This subset includes aluminum, copper, gold, nickel, platinum, precious and semiprecious stones, and asbestos, and falls into two major categories: resources whose reserves in easily accessible regions are being depleted and whose deposits are being sought in Siberia; and resources found mostly in East Siberia or in the Far East and that are estimated to be in relatively abundant supply.

In the first category are nickel, copper, and asbestos. Major deposits of these metals and nonmetallics exist in the European USSR, but reserves and average ore content have fallen. Efforts to increase high-grade ore output from these accessible deposits have been unsuccessful. New deposits of nickel and copper have been located in the Noril'sk mining and metallurgical district in northern East Siberia and are being developed. This region accounts for some 60 percent of Soviet nickel production. However, exploitation of substantial copper deposits located at Udokan in East Siberia—reportedly the world's largest copper province—has been delayed because of technological problems in mining and beneficiating the ore, and efforts to gain Japanese or U.S. financial and technical assistance have been unsuccessful. Major deposits of asbestos, found in the Urals, have reached peak production and now face declining grades of product and rising costs. Small deposits of asbestos in East

Siberia and the Far East are currently undergoing development, mostly for domestic use.\textsuperscript{34}

Although the Soviet Union publishes little data on the production of the second category of goods—platinum, gold, and diamonds—estimates of output and trade indicate that they are important earners of hard currency. Major deposits of platinum are located in the Noril'sk district of East Siberia—75 percent of total production—and some 50 to 60 percent of the gold and all of the natural diamond reserves are located in the Far East. In addition to these resources, East Siberia has a large supply of hydroelectric power, which is being used to produce aluminum. East Siberia now has approximately 60 percent of the country's smelting capacity for aluminum (which is becoming an important export item to Japan), although some 50 percent of the raw bauxite and alumina must be imported.\textsuperscript{35}

**USSR PLANS FOR RESOURCE DEVELOPMENT**

In the 12th five-year plan, the USSR turned away from the large development projects of past plans and the comprehensive development of Siberia. Instead, it turned toward the renewal and cost-effective use of facilities in the European USSR, emphasizing modernization and retooling of existing facilities, with special attention given to the machine-building sector. The energy sector was targeted for a high rate of investment growth (47 percent).\textsuperscript{36} West Siberia was viewed as the major source of fuel and energy resources, and East Siberia and the


Far East faced a deceleration in the growth of investment funds. Press reports suggested that the Far East region would, nonetheless, receive long-term investments of 232 billion rubles—or more than $300 billion at the official exchange rate—by the year 2000. This amount is small relative to past investments, and the Soviet Union would still need foreign capital and assistance to develop this region. In fact, Dienes speculated that this plan was publicized to test Japanese reaction and willingness to participate in the Far East development.

With the many political and economic changes taking place in the Soviet Union over the past year, five-year economic plans are becoming less important than efforts to introduce market-oriented reforms. How reform will affect investments in resource development remains unclear, but the levels of funding will likely fall. The USSR faces several problems and dilemmas, especially with regard to the pace of restructuring and the need to maintain oil and gas production in order to earn the hard-currency foreign exchange required to buy the consumer and capital goods necessary for economic restructuring. In addition, it needs to control the high and rising costs of producing its resources.

HIGH AND RISING COSTS

As the USSR depletes its available resources in the European USSR and southern and central West Siberia, it faces increasing difficulties and associated costs of exploring and developing resources located in less accessible regions of the country. The estimated costs of developing these regions are enormous; one study indicates that

- Construction costs are two to three times the country’s average around developed areas near the Trans-Siberian railway, and four to eight times greater than the average in remote areas;
- Infrastructure outlays—for housing, schools, and roads—are often ten times the costs in other regions of the country, comprising approximately one-third the total investment necessary to develop a resource;
- Equipment costs exceed the national average, annual repair costs are some 25 to 30 percent of the more expensive

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machinery developed to operate in the north, and for some machines, capital repairs may exceed the equipment’s value;

- Labor costs are 1.7 to 7 times the norm, depending on the level of skills required.\footnote{Victor Mote, “Environmental Constraints to the Economic Development of Siberia,” in Jensen et al. (eds.), Soviet Natural Resources, p. 17.}

These high costs are attributable to rising input requirements and their related expense, transportation problems, and the harsh environmental conditions in these regions of the country.

This section examines these costs and why they are high and rising. It considers the impact of climate, capital costs and investment requirements, labor shortages, and transportation problems.

Climate and Environment

Environment is the overriding determinant of Siberian development difficulties. Siberia suffers from a variety of environmental factors that make development problematic and add to costs. Cold temperature is but one of these problems. Cold has several undesirable effects on humans—from simple chafed skin and irritated tear ducts to gangrene, lethargy, and Arctic hysteria\footnote{A mental disorder resulting from reaction to long winter nights in the subarctic and Arctic.}—and on machinery and equipment, which breaks or fails under extreme climatic conditions. In other words, it reduces the productivity of both labor and capital, and the decline is directly related to the drop in temperature.\footnote{Major points of calibration are 0° C, at which the average proportion of workdays lost is 30 percent, and −20° C, with 73 percent losses. Similarly, machinery and equipment, even that incorporating new technologies for northern conditions, breaks down more frequently than in more temperate climates. See Mote, “Environmental Constraints,” pp. 21–22.}

The harshness of the cold temperatures is not uniform across Siberia. In terms of economic zones, West Siberia suffers less from harsh cold than East Siberia and the Far East, and the Far East has the most total area of “very high harshness.” This mapping of the cold in Siberia readily shows why the southern regions of West Siberia are much more developed than are East Siberia and the Far East, and why the Soviet Union faces increasing costs as it moves to exploit resources in the northern sections of West Siberia, East Siberia, and the Far East.

Other variables that accompany cold temperatures also lower the productivity of labor and equipment. They include wind and wind chill; cloud cover, rain, and snow; and temperature inversion, humidity,
and fog. Siberia also has numerous other natural hazards—earthquakes and volcanoes, debris flows, landslides, avalanches, snowstorms, dust storms, blizzards, and hurricanes—that magnify the harshness of the environment. These hazards, though limited in time and area, occur unpredictably. They occur most frequently in the Soviet Far East, in the BAM service area, and along the Arctic coast.

In addition to all these inhospitable factors and hazards, approximately half the Soviet Union and two-thirds of Siberia have a layer of permanently frozen ground—permafrost. Permafrost adds to the difficulty and expense of constructing buildings and infrastructure. The top layer of permafrost, the so-called active zone, freezes and thaws with the seasons, creating an unsuitable and unstable foundation for any construction: buildings, railroads, and roads crack and crumble in winter and collapse as soil, water, and mud shift and flow in the spring. The thickness of the permafrost layer varies by area, ranging from over 500 meters in the northern regions to 25–100 meters in the southern regions, and extends as far south as northern Mongolia. Permafrost is a major problem in most of the Far East, the northern quarter of East Siberia, and the northern tip of West Siberia.

Besides raising the costs of construction, permafrost creates problems in water supply. Although Siberia holds a relatively large volume of surface water, the base flow of water is frozen in the permafrost. Siberian rivers are the major source of reliable water supply, but the difficulty in using the rivers is that they flow north, away from the populated areas to the frozen seas. In West Siberia, the mouths of the slow-moving rivers remain frozen two months after the spring breakup of the tributaries and begin freezing again in October. Two flooding seasons, in the spring and fall, together with the help of permafrost, which prevents the natural flow and runoff of the water, make West Siberia boggy. The region has high water tables and is full of stagnant pools low in oxygen and high in methane. With settlement, the water has rapidly become further polluted with domestic and industrial wastes. In East Siberia and the Far East, surface water is less prevalent than in West Siberia and remains frozen for eight months of the year. Groundwater is limited, difficult to locate (found with the same seismic-prospecting methods used in oil and gas exploration), and costly to provide. Its supply is usually too small to support any extensive settlement. Water in East Siberia and the Far East is said to be more costly than the copper and asbestos located in these regions.\(^43\)


Capital Costs and Requirements

Capital costs represent an important percentage of resource development expense, and in the Soviet Union, these costs are rising at a rapid pace, requiring ever-increasing additions of investment funds, particularly for energy production. Two major changes underlie this phenomenon. First, rising prices of machinery and equipment raise the cost of replacement or new capacity per unit of output. Similarly, building costs for housing and other construction have grown rapidly, providing fewer square meters of building space for each increment in investment. For example, 1000 rubles put in place 1.1 fewer square meters of housing space—a 27 percent reduction—in 1981–1984 than in the period 1971–1975. Second, the inputs necessary to maintain a given level of production are rising as high-quality reserves are used up and older fields and mines produce a declining share of output. New reserves often provide lower-quality product than do old reserves; are located in distant, inaccessible regions; or are found in complex, difficult-to-develop geological formations. In other words, additional inputs of labor and capital, but especially more capital, are necessary just to sustain a constant production level, and even larger increments are necessary if production is to be increased. Estimates of investment costs per unit for the energy sector indicate how rapid this increase has been. One study shows a 42 percent increase for oil and 48 percent increase for coal in real costs of adding a unit of output between the 9th and 10th five-year plans, 1971–1980 (see Table 3.4). Other

Table 3.4

INVESTMENT COSTS PER UNIT OF OUTPUT
FOR OIL AND COAL, 1971–1980
(1969 Rubles)

<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Coal</th>
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<tr>
<td></td>
<td>1969 Rubles per</td>
<td>1969 Rubles per</td>
</tr>
<tr>
<td></td>
<td>Barrel per Day</td>
<td>Metric Ton</td>
</tr>
<tr>
<td>1971–1975</td>
<td>1963</td>
<td>73.03</td>
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</tbody>
</table>


studies indicate an acceleration in the investment requirements, at least for the oil and gas industries. The percentage of investment capital allocated to the energy sector has been steadily rising over the past two decades, increasing from 13 percent of total industry investment during the 9th five-year plan (1971–1975), to 22 percent in the 11th five-year plan (1981–1985) and to more than 28 percent in 1988.46 These percentages reflect not only the increase in the resources allocated to the energy sector, but also the growth in capital costs.

Transportation Problems

Transportation expenses are a significant cost not only of developing new resource deposits in Siberia (especially in East Siberia and the Far East), but also of shipping the resources to the industrial centers. Transportation costs of shipping resources become important as the location of deposits moves to less accessible regions of the country—the northern regions of West Siberia, East Siberia, and the Far East—far from the USSR’s industrial center. Resources must be shipped by rail, pipeline, or wire (electricity) from these regions. The Soviet Union has no highway network across the country. In fact, it lacks a good transportation infrastructure to ship both resources and other products to the country’s industrial centers.

The importance of transport costs, at least for the energy sector, has been shown by Hewett. He has estimated extraction costs and extraction plus transportation costs for incremental output of coal, oil, and gas. Over the period 1966–1980, the cost of extracting an additional million barrels per day of gas (oil equivalent) has been stagnant, but that of oil has tripled; investment per net increment of energy output for gas rose from 3812 rubles in the 1966–1970 period to 4279 rubles by 1976–1980, while that for oil rose from 5050 rubles to 11,653 rubles. When the costs of transportation are taken into account, the costs of gas and oil are similar—13,655 rubles and 13,431 rubles, respectively—by 1976–1980, but still well below the extraction costs alone for coal, which ran 122,000 rubles in the same period (see Table 3.5).47

The Soviet Union has devoted huge sums in its past five-year plans to the transportation system, mostly in pipelines and the railroads, as part of the major resource development projects in Siberia, and has made much progress. However, the system remains inadequate and is unlikely to improve soon, particularly in terms of shipping resources to

47Hewett, Energy, pp. 40–42.
<table>
<thead>
<tr>
<th>Period or Year</th>
<th>Total Extraction</th>
<th>Coal</th>
<th>Extraction Cost Only</th>
<th>Extraction Plus Transportation Costs&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Extraction Plus Transportation Costs&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Electric Power</th>
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</thead>
<tbody>
<tr>
<td>1966-1970</td>
<td>22.76</td>
<td>7.24</td>
<td>11.06</td>
<td>(d)</td>
<td>4.46</td>
<td>(d)</td>
</tr>
<tr>
<td>1971-1975</td>
<td>31.61</td>
<td>8.34</td>
<td>15.98</td>
<td>18.98</td>
<td>7.29</td>
<td>13.79</td>
</tr>
<tr>
<td>1980</td>
<td>10.89</td>
<td>2.09</td>
<td>6.63</td>
<td>(d)</td>
<td>2.17</td>
<td>(d)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount (billions of 1969 rubles)</th>
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<tbody>
<tr>
<td>1966-1970</td>
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<tr>
<td>1971-1975</td>
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<tr>
<td>1976-1980</td>
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<td>1980</td>
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<tr>
<th>Net Increment to Energy Output (mbdooe)&lt;sup&gt;b&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>1966-1970</td>
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<td>1971-1975</td>
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<td>1976-1980</td>
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<td>1980</td>
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<tr>
<th>Investment per Net Increment to Energy Output (1969 rubles per bdoe)&lt;sup&gt;c&lt;/sup&gt;</th>
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<td>1966-1970</td>
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<td>1976-1980</td>
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<td>1980</td>
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</table>

**SOURCE:** Hewett, *Energy, Economics, and Foreign Policy in the Soviet Union.*

<sup>a</sup>Pipeline-transportation only. Hewett estimated the split between oil and gas pipelines in 1976-1980 as 4 billion rubles (oil) and 18.30 billion rubles (gas), assuming a simple trend between 1971-1975 and plans for 1981-1985.

<sup>b</sup>Data on increments to primary fuels output are from Hewett, Table 2.1. Increments to total electric power production, converted to average heat rate in the end year of the the quinquennium, are also from Hewett.

<sup>c</sup>Obtained by dividing the investment data by the data on net increments to output.

<sup>d</sup>Not available.
Asian and Japanese markets. The large system of pipelines put in place during past five-year plans to carry oil and gas from Siberian fields to consuming areas are concentrated in West Siberia in order to ship these products to the European USSR and Europe. The large railroad projects in East Siberia and the Far East are not fully operational after more than 15 years of effort. The Soviet Union still has only one railroad connecting the east and west coasts and has not succeeded in establishing a complete network of highways across the country. It has relied most heavily on railroads, then on pipelines. The relative use of sea transport has changed little over the past 40 years, and river transport, though less important for the country as a whole, has become increasingly important in Siberia. Motor transport has risen, while air transport use remains negligible, except possibly for high-valued products such as diamonds and gold.48

Most of the investment in the extensive pipeline system of 200,000 kilometers has been made in West Siberia, for the purpose of carrying oil and gas westward. Six pipelines currently carry crude petroleum and petroleum products from West Siberia to the European USSR, Eastern Europe, central Asia, and the Ukraine; many of the additional pipelines under construction are for petroleum products rather than crude oil. In the Far East, two pipelines carry oil from Sakhalin to the mainland. The gas pipeline system is also extensive, including four pipelines from West Siberia to Moscow, the Ukraine, and Western Europe. A set of six pipelines is currently under construction to ship gas out of Yamburg (West Siberia) to the Urals and other parts of the European USSR.49 In East Siberia, a pipeline from the Vilyui basin gas fields supplies gas to Yakutsk. In the Far East, a 600-kilometer natural gas pipeline has been operating since late 1986, paralleling the two oil lines from Sakhalin to the mainland.50

Although the Soviet Union has built its transportation network to serve oil and gas markets west of Siberia, it did consider shipping West Siberian oil eastward to the Pacific after the first Arab oil embargo. Indeed, shipping West Siberian oil to the Pacific was a major reason for beginning the construction of the BAM railway in 1974. In the same year, the USSR negotiated with a consortium of Japanese firms

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to cooperate in building an 8000-kilometer pipeline from the Tyumen fields in West Siberia to the port of Nakhodka. Japan was seeking an alternative and assured supply of crude in exchange for machinery, equipment, and pipes. However, several developments changed these original plans. First, the USSR began having difficulties in meeting oil and other fuel production goals in the late 1970s. Second, the projected cost of $2.4 billion (with an additional $800 million if terminal facilities were built at Nakhodka) was considered too expensive to go it alone, and the Japanese consortium sought U.S. participation. But, the passage of the Jackson-Vanik and Stevenson amendments sharply limited U.S. Export-Import Bank financing, an important source of funds for U.S. firms. Finally, China began to offer more favorable terms, agreeing to take Japanese consumer goods in exchange for its oil and coal—a more attractive option than the large, long-term, and risky capital investments required by the USSR.

The Soviet Union has relied most heavily on the railroad system in East Siberia and the Far East; it sought to expand this system in the 1970s, when prospects for increased trade with Japan looked promising. Until the 1970s, three major east-west lines to transport commodities across the country existed:

- The Trans-Siberian Railroad, the only line connecting the east and west coasts. Completed in 1918, it is the most important and most heavily traveled railway in the country, with twice the freight per unit of track than the national average. It has been key to the development of Siberia, carrying coal, grain, oil products, ores, fertilizers, timber, and necessary food and equipment both eastward and westward.
- The South Siberian Railroad, the second major east-west line between the European USSR and East Siberia.
- The Central Siberian Railroad, between the cities of Talmenka and Chelyabinsk, which is on the Trans-Siberian line.

In addition, a set of three north-south routes feeds into the east-west links: the Turkisib Railroad, connecting the Central Siberian and South Siberian lines; the Kurzbas Railroad, between the towns of Yurga and Tashtogol; and the Tyumen-Surgut-Urengoy Railroad, which is currently being extended to the Yamburg gas deposits in northern West Siberia.

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52Mathieson, Japan’s Role, pp. 87–92.
Expansion of the rail system, as part of the plan to develop East Siberia and the Far East, has not been as successful as the pipeline projects. Two railroad projects began in the 1970s: the BAM and the Amur-Yakutsk Mainline (AYaM). Construction of the BAM began in 1974 to connect the Pacific coast to central Siberia and to relieve the overburdened Trans-Siberian Railroad, which had been operating at an estimated 95 percent of theoretical capacity (well above normal). Despite an expected completion date of 1983 at a cost of 6 billion rubles, by September 1984 the BAM had a complete set of tracks but only one operational tunnel of the eight planned and could not carry a normal load of freight and people. The current five-year plan calls for full operation by 1990. Estimates of the BAM's cost have been revised upward to 10–11 billion rubles.\(^{54}\) Recently, the railroad has come under attack because the resource development projects in the BAM economic zone are unlikely to become operational until after 2000. Hence, the railroad is unlikely to begin providing any economic returns until 2017 (the best case), or possibly even 2050 (the worst case). Some opponents have suggested that the mainline be divided into three sections and transferred to operating railroads that would yield a profit.\(^{55}\)

The AYaM is expected to provide the necessary transportation link between the Yakut SSR and the Okhotsk seaboard. One segment of some 400 kilometers, the so-called little BAM, has been operational since 1980, connecting the South Yakutian complex in East Siberia (coal and apatite) to the BAM service area and the East Asian and Japanese markets. The remainder of the line will be completed in two parts: The segment between Berkakit to Tommot on the Aldan River is projected to be completed by 1990; and a section from Tommot to Yakutsk is slated for a 1993 operation date. However, these target dates may be optimistic, since budget allocations cut the AYaM funds by 85 percent (to 150 million rubles) for the 1986–1990 period.\(^{56}\)

The lack of good transportation infrastructure and the enormous cost of putting a man-made system in place have made river transport in Siberia an increasingly important means of shipping, especially for heavy and bulk commodities. Rivers are used during the summer and


serve as ice roads in winter. This alternative is relatively cheap, requiring little or no initial capital investment and costing seven to ten times less than truck transportation. River transport, however, is not without problems: First, the rivers flow from south to north, opposite the desired direction; second, they are subject to irregular seasonal flows and flooding (resulting from monsoons and spring meltwater) and are filled with sandbars and shoals. The major waterways in use are the Ob-Irtysh River basin, the Yenisey River, the Lena River and BAM waterways, and the Amur basin, the fourth largest river in Siberia and the Far East.57

Labor Problems

Adding to the cost of developing resources in Siberia and the Far East are major labor shortages and the high turnover of workers. The labor shortages are related to disparities in skill requirements and availabilities. Although projections of population growth and distribution, based on demographic and population data, suggest that deficits in labor supply could limit Siberian development,58 migration patterns in recent years have not completely borne out these projections. Since the early 1980s, a large number of invited and uninvited workers have moved to Siberia, particularly to the West Siberian north, as wages have risen. These workers, however, do not necessarily have the skills in demand. Siberia and the Far East face rising shortages of skilled manpower, especially as aging capital stock requires more repairs and as increasingly sophisticated equipment becomes available. The Soviet system cannot properly match available skills of these workers to required tasks, or efficiently use the large number of young, unskilled laborers attracted to the large Siberian oil, gas, mining, and port projects.59 One solution, which is used in the energy sector and which greatly increases costs, has been to fly skilled crews in from the European USSR to work in northern oil fields for several weeks at a time, then send them home.60

The second problem facing Siberia and the Far East is the high turnover of workers. The severe climate makes Siberia an uninviting

59Work by Steven Popper at The RAND Corporation on the economic cost of Soviet military manpower requirements provides an excellent analysis of the labor problems.
60See Hewett, Energy, pp. 60–75, for a discussion of labor problems in the energy sector.
area to live; consequently, Siberia—especially East Siberia and the Far East—is thinly populated, with a low birthrate and a slow rate of natural increase. The Soviet Union has sought to maintain a labor supply in these areas by offering several incentives, including higher wages, extra leave, and paid holidays. These inducements have succeeded in bringing in new laborers but not necessarily in keeping them.61 According to one estimate, the turnover is 80 percent per year in the Khabarovsk region and 70 percent on farms in the Amur oblast in the Far East. Labor shortages are most acute in the construction complex and the farming sector.62 Not only is the environment inhospitable, the cost of living is also considerably higher than in the rest of the country. Despite wage reform, wages are an estimated 30 to 40 percent lower in West and East Siberia and 50 to 60 percent lower in the Far East than is necessary to compensate for the great disparity in living costs and living conditions. Moreover, Siberia and the Far East are long distances from other population centers and lack the adequate infrastructure (that is, housing with heating and plumbing, schools, medical and recreation facilities). Investments in infrastructure are almost always subordinated to investments in producing or transporting output.63

The inefficiency of the labor force exacerbates these labor problems. One study estimates that a Siberian worker puts in only 70 percent of the time put in by an Alaskan counterpart. The result is that additional manpower is needed per unit of output.64 One solution has been to substitute capital for labor, but this alternative (as already discussed) has its own problems—not only the rising costs of equipment, but also equipment breakdown and failure in cold temperatures.

**Profitability of Resource Development**

The harsh climatic conditions in the northern regions of West Siberia and of East Siberia and the Far East, the growing capital requirements and labor shortages, and the lack of transportation infrastructure all point to high and rising costs of developing new reserves. Although data on the costs of developing individual resources are unavailable, several studies have estimated the average and

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marginal costs of producing oil and gas, at least for West Siberia. These estimates are based on official Soviet plans and information on operating costs and investments and do not reflect Western accounting principles or costs comparable to Western market values. They do, however, provide a baseline with which to gauge cost levels of projects the Soviets would consider worthwhile for investment; they also provide a basis for comparing production costs to world prices of oil and gas, and therefore, for assessing the profitability of exploiting these resources and potential Japanese interest.65

These studies show that the costs of exploiting new reserves—the average production cost of new capacity and the marginal cost of production—are rising quickly. The average cost of an additional barrel of new capacity of oil more than doubled between 1971 and 1985, and will likely grow more than 70 percent from the period 1981–1985 to 1986–1990. A breakdown of this cost in the oil industry indicates that extraction costs have risen more rapidly than transport costs (see Table 3.6). The average costs of new capacity gas have also grown over the same time period, but by less than half the increase in oil costs. Most of the rise is attributable to transport costs, which comprise some 50 percent of total gas production costs (see Table 3.7).66 The marginal and full costs (marginal cost plus depletion cost or the cost of extracting and consuming an exhaustible resource) of extracting oil and gas are rising more rapidly than the average cost of new capacity for both fuels, although the pace of increase is slower for gas (see Table 3.8).67

A comparison of these costs to world prices of the products shows that the production of these resources is currently profitable, but that oil production may not continue to be so. The average cost of new capacity and marginal cost of oil have been rising quickly, although both are still below the world market price. The marginal cost of oil in 1985 ($14.97 per barrel) is well below the 1985 average market price ($27.16 per barrel). If, however, the rising trend in average and marginal costs continues at the same pace, both costs could exceed the future market price, which was


Table 3.6

ESTIMATED AND PROJECTED COST PER UNIT OF NEW CAPACITY
IN USSR OIL INDUSTRY, 1971–1990
(U.S. dollars per barrel)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>2.55</td>
<td>2.70</td>
<td>5.36</td>
<td>9.19</td>
</tr>
<tr>
<td><strong>Total operating cost</strong></td>
<td>1.31</td>
<td>1.44</td>
<td>2.72</td>
<td>5.61</td>
</tr>
<tr>
<td><strong>Total investment</strong></td>
<td>10.12</td>
<td>10.48</td>
<td>22.03</td>
<td>29.80</td>
</tr>
<tr>
<td><strong>Extraction, total</strong></td>
<td>1.70</td>
<td>1.88</td>
<td>4.32</td>
<td>7.80</td>
</tr>
<tr>
<td><strong>Operation cost</strong></td>
<td>0.81</td>
<td>0.88</td>
<td>1.97</td>
<td>4.60</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>7.43</td>
<td>8.31</td>
<td>19.55</td>
<td>26.64</td>
</tr>
<tr>
<td><strong>Transportation, total</strong></td>
<td>0.42</td>
<td>0.45</td>
<td>0.63</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Operating cost</strong></td>
<td>0.25</td>
<td>0.34</td>
<td>0.50</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>1.39</td>
<td>0.98</td>
<td>1.15</td>
<td>1.61</td>
</tr>
<tr>
<td><strong>Usage cost, total</strong></td>
<td>0.40</td>
<td>0.37</td>
<td>0.41</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Operating cost</strong></td>
<td>0.24</td>
<td>0.22</td>
<td>0.25</td>
<td>0.29</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>1.30</td>
<td>1.19</td>
<td>1.33</td>
<td>1.55</td>
</tr>
</tbody>
</table>


NOTE: Ruble values converted to U.S. dollars using average official exchange over each five-year period and assuming an external to internal fuel price conversion coefficient of 1.0. This coefficient is based on discussions with Soviet national income accounting and trade experts in the U.S. government and academia.

$14.52 per barrel in 1988 and $17.48 in June 1989 (see Fig. 3.2). For natural gas, both average and marginal costs—including depletion and transport costs—are well below market prices and will likely remain so given the large Soviet reserves.

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68According to the Washington, D.C.–based consulting firm PlanEcon, in 1986 the Soviet Union sold oil to Eastern Europe at a loss. The estimated marginal costs of production were between 27 to 34 rubles per barrel; the selling price, 24 rubles per barrel. The price received in 1987 was lower. See PlanEcon Report, Vol. 3, No. 5, January 21, 1987, p. 2.

69However, we must view these comparisons in light of the problems with the cost estimates. All costs are in current prices and hence, the increase in costs may not be as rapid as the data suggest. Depending on the rate of inflation one assumes, the rise in real costs may be double, or possibly negative. Adding to any distortions in the numbers caused by inflation and a lack of market-determined costs is the problem of conversion from domestic costs and prices in ruble terms to foreign currencies. Soviet experts do not agree on the appropriate coefficients to use to convert domestic costs/prices into gold rubles, and a different coefficient should be used for each internationally traded commodity or group of commodities. Moreover, use of the official ruble-dollar exchange rates does not represent the market values of currency exchange.
Table 3.7

ESTIMATED AND PROJECTED COSTS IN THE SOVIET NATURAL GAS INDUSTRY, PER UNIT OF NEW CAPACITY, 1971–1990
(U.S. dollars per million BtuS)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Min.)</td>
<td>(Max.)</td>
<td>(Min.)</td>
<td>(Max.)</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td>0.50</td>
<td>0.47</td>
<td>0.80</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(4.66)</td>
<td>(5.94)</td>
<td>(6.52)</td>
</tr>
<tr>
<td><strong>Total operating cost</strong></td>
<td>0.17</td>
<td>0.20</td>
<td>0.34</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>(1.16)</td>
<td>(2.00)</td>
<td>(2.67)</td>
<td>(3.03)</td>
</tr>
<tr>
<td><strong>Total investment</strong></td>
<td>2.78</td>
<td>2.28</td>
<td>3.83</td>
<td>4.70</td>
</tr>
<tr>
<td></td>
<td>(13.22)</td>
<td>(22.20)</td>
<td>(27.29)</td>
<td>(29.02)</td>
</tr>
<tr>
<td><strong>Extraction, total</strong></td>
<td>0.20</td>
<td>0.17</td>
<td>0.30</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(1.76)</td>
<td>(2.02)</td>
<td>(2.59)</td>
</tr>
<tr>
<td><strong>Operation cost</strong></td>
<td>0.04</td>
<td>0.05</td>
<td>0.13</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.77)</td>
<td>(0.89)</td>
<td>(1.26)</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>1.27</td>
<td>2.28</td>
<td>1.42</td>
<td>1.62</td>
</tr>
<tr>
<td></td>
<td>(13.22)</td>
<td>(22.20)</td>
<td>(27.29)</td>
<td>(29.02)</td>
</tr>
<tr>
<td><strong>Transportation, total</strong></td>
<td>0.25</td>
<td>0.26</td>
<td>0.45</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(1.76)</td>
<td>(2.02)</td>
<td>(2.59)</td>
</tr>
<tr>
<td><strong>Operation cost</strong></td>
<td>0.10</td>
<td>0.13</td>
<td>0.19</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.77)</td>
<td>(0.89)</td>
<td>(1.26)</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>1.26</td>
<td>1.05</td>
<td>2.16</td>
<td>2.80</td>
</tr>
<tr>
<td><strong>User cost, total</strong></td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.77)</td>
<td>(0.89)</td>
<td>(1.26)</td>
</tr>
<tr>
<td><strong>Operating cost</strong></td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.25)</td>
<td>(0.25)</td>
<td>(0.25)</td>
<td>(0.29)</td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>0.25</td>
<td>0.22</td>
<td>0.25</td>
<td>0.29</td>
</tr>
</tbody>
</table>

**SOURCE:** Tretyakova and Heinemeier, Cost Estimates for the Soviet Gas Industry.

**NOTES:** Ruble values converted to U.S. dollars, using average official exchange rates over each five-year period and assuming a conversion ratio for external to internal fuel prices of 1.0. A conversion coefficient of 1.0 was selected based on discussions with Soviet national accounting and trade experts in government and academia. Btu: British thermal unit.

*Totals equal operating costs plus 12 percent of investment.

The cost and price data point to limited Japanese interest in participating in ventures to exploit new deposits in the future. The declining profitability of developing any new oil reserves would indicate diminished Japanese interest. As for gas, the Soviet Union is currently a competitive world producer of natural gas, but Japan's demand for Soviet gas will likely remain low since its long-term contracts for natural gas deliveries do not expire until the end of the century and it is being pressured by its trading partners (several of which are large producers of natural gas) to reduce bilateral trade surpluses by raising imports from these countries. (The next section discusses this issue.) Moreover, even if problems in
Table 3.8
AVERAGE AND MARGINAL COSTS OF PRODUCING CRUDE OIL

<table>
<thead>
<tr>
<th></th>
<th>Crude Oil and Associated Gas (U.S. dollars per barrel)</th>
<th>Natural Gas (U.S. dollars per million Btus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost of extraction(^a)</td>
<td>0.66 1.02 1.79 1.73 2.62</td>
<td>0.05 0.08 0.11 0.10 0.10</td>
</tr>
<tr>
<td>Marginal cost of extraction</td>
<td>0.93 2.37 7.76 9.99 14.97</td>
<td>(0.31) (0.49) (0.65) (0.60) (0.60)</td>
</tr>
<tr>
<td>Full cost(^b)</td>
<td>5.48 12.26 26.21 29.98 37.21</td>
<td>(0.52) (0.72) (0.85) (0.77) (0.77)</td>
</tr>
<tr>
<td>Full cost plus transport and usage cost</td>
<td>6.09 13.11 27.22 30.94 37.82</td>
<td>(0.53) (0.73) (0.88) (0.80) (0.80)</td>
</tr>
</tbody>
</table>

SOURCE: Leifert, "The Full Cost."
NOTES: Rubles converted to dollars using official exchange rates and assuming a conversion coefficient of external to internal fuel prices/costs of 1.0. A coefficient of 1.0 is based on discussions with Soviet national income accounting and trade experts in the U.S. government and academia. Btu: British thermal unit.
\(^a\)Average cost includes labor, depreciation, intermediate inputs, and an interest charge on capital.
\(^b\)Full cost equals marginal cost of extraction plus depletion cost.

ruble convertibility are ignored, the profitability of a joint project is probably lower than the cost and price comparisons would suggest. The high and rising production costs these studies provide may be underestimated, at least in terms of the cost of capital investments. The nominal 12 percent return rate assumed in these studies (based on official Soviet prac-
Fig. 3.2—Average crude oil sales price
(U.S. dollars per barrel)

NOTE: The 1973 price is derived from posted prices; 1974–1984 prices are derived from
OPEC official sales prices; beginning in 1985, prices are a measure of average
world sales prices.
tice) has not varied over the past 15 to 20 years and is probably low by Western standards.70

Further reducing potential profitability are the large transport and exploration costs likely in developing any new reserves. The added costs of shipping output from West Siberia to Asian markets is difficult to determine with any degree of accuracy, but the 1974 estimate of $3 billion for the Tyumen pipeline provides one measure of relative magnitude. An alternative indicator of this cost’s size is the estimate by U.S. energy experts that shipping costs in Alaska, where climatic conditions are similar to those in northern West Siberia and East Siberia and the Far East, are at least double the costs of shipping in other regions of the United States. Moreover, because East Siberia and the Far East have not been fully explored, exploration expenses must be added to already high production and transport costs. Geological studies report that complex formations and inaccessible locations in East Siberia make exploitation both difficult and costly; the geology of potential reserves is likely to require more wells than in West Siberia to obtain similar production levels. In the Soviet Far East, costs of developing new deposits are difficult to estimate; transport costs would be lower than from East and West Siberia, but the region has not been completely explored. That the USSR continues exploration efforts without reporting major new deposits suggests that these costs could be quite high. The major source of oil in the Far East is Sakhalin, where only small additions to oil production are likely.

The conclusions about low expected profits and limited Japanese interest in exploiting Siberian resources are based on estimates of costs and prices of energy resources, but could reasonably be made about other raw materials and minerals. Evidence suggests that developing new reserves of other resources will also entail rapidly rising expenses—expenses that are approaching and will possibly exceed world market prices. The Soviet Union is experiencing similar difficulties of depleting nearby reserves; it is having to exploit distant, inaccessible deposits and faces the same transportation problems for shipping all resources. The difference between the production costs of energy and other resources lies in the capital intensity of the mining process. These costs are unlikely to fall unless the introduction of major technological innovations greatly

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70 In the United States, public utility commissions permit pipeline companies to receive rates of return on capital between 13 and 14 percent in nominal terms (or 9 to 10 percent in real terms at current inflation rates). For oil and gas exploration and development, the rule-of-thumb required rate of return on capital investments is some 15 percent in real terms (but this rate varies according to mineral rights and risks associated with exploration). Although U.S. rates of return are not necessarily applicable to the Soviet Union, they do provide a basis for evaluating the estimates of production costs.
improves production methods in cold, harsh climates, or unless new, cheaply exploitable reserves are discovered. Neither event appears to be on the horizon.\textsuperscript{71}

\textsuperscript{71}Hewett, \textit{Energy}, pp. 37–49.
IV. CAN JAPAN BE ENTICED TO INVEST IN THE USSR?

In light of the high and rising costs of exploiting resources located in all the economic regions of Siberia and the Far East and the deceleration in planned growth of Soviet investment in East Siberia and the Far East relative to the rest of the country, prospects for new and large Siberian joint development projects between Japan and the Soviet Union look dim. Nonetheless, the Soviet Union has continued to seek Japanese participation in Siberian projects and has changed its rules to attract foreign trade and investment. This section reviews these new Soviet laws and the extent to which Japanese firms have responded to date. It then examines Japan’s demand (and shifts in this demand) for Soviet goods—especially raw materials—given changes in the structure of Japan’s economy. Finally, it considers sectors in which both countries could mutually gain by trade and investment and discusses how the economic relationship might be expanded.

CHANGES IN SOVIET FOREIGN INVESTMENT RULES

As part of perestroika, the Soviet Union has introduced several foreign trade reforms in order to expand exports and reduce imports. These reforms include changes in regulations controlling foreign investment into the USSR. In January 1987, the Soviet Union issued new regulations to permit foreign investments into the country in the form of joint ventures. The objectives of the new law are to substitute domestic production for previously imported items, to improve the quality of domestic products, and to improve access to science and technology from abroad.

Joint Venture Rules

Because of both limited success in establishing these ventures over 1987 and complaints from existing and potential partners about operating conditions, at the end of 1988 the Soviets instituted several changes in regulations to begin in April 1989. Some special rules apply only to the Soviet Far East because of difficulties in attracting joint ventures to this economic region; contrary to expectations, more than 80 percent of the ventures established during 1988 will be located in the European USSR. The changes include the following:
• Equity shares of Soviet and foreign interests are negotiable and no longer require a minimum 51 percent Soviet ownership;
• The director of the joint venture does not have to be a Soviet citizen;
• All Soviet state enterprises and cooperatives are no longer required to operate through a centralized foreign trading organization and are allowed to trade directly with foreign companies;
• Joint ventures are allowed to hire and fire employees and to set wages without approval from the bureaucracy;
• In-country payments for housing and services by foreign workers can be made in rubles;
• Goods imported for use in production are subject to a low tax and may be exempted from taxes;
• New ventures are exempt from taxes on profits for two years from start-up date; new ventures established in the Far East economic region are exempt for three years from the time profits begin, and then may be subject to only a 10 percent tax on these profits.

In addition, profits from export sales can be granted a tax exemption by the Ministry of Finance, subject to terms stipulated in any tax treaties between the USSR and the corresponding foreign country. Hard currency earnings from these exports are used to pay for imports, and up to 10 percent of these earnings can be used to buy consumer goods, medicines, and medical equipment (Far Eastern enterprises are allowed up to 15 percent).¹

Continuing Foreign Concerns

Despite these changes, several concerns about participating in a Soviet joint venture remain. First, repatriated profits must be covered by hard currency earnings as opposed to domestic sales. How much in profits can be taken out of the country, however, is unclear. The decree provides rules for transferring foreign currency earnings into accounts for carrying out trade ("earnings in foreign currency, after deductions are sent to the state according to the established normatives, are transferred into the accounts of production cooperatives that carry out foreign trade

activity"\textsuperscript{2}), but it fails to provide clear-cut rules for the limits on repatriation of profits out of these hard currency earnings. Second, even though the foreign partner may have majority ownership, the joint venture still is subject to intervention in its decisionmaking by the Soviet bureaucracy. The new regulations require that "fundamental issues of the activity of the joint enterprise . . . be resolved at a meeting of the board on the basis of unanimity of all members of the board."\textsuperscript{3} What constitutes "fundamental issues" is not discussed. Third, the law does not specify the extent of liability of shareholders and owners; the Soviet system lacks legal definitions of liability limitations. Fourth, Soviet economists recognize that a convertible currency would help in bringing about the desired shifts in trade; a convertible ruble, accompanied by a properly functioning wholesale and retail price system in the country, will not likely be in place anytime soon.\textsuperscript{4} Fifth, given that the Soviet Union is still trying to determine what the laws should be, potential Western partners will likely be concerned about possible changes in the regulations, as well as about Soviet commitment to opening its markets to foreigners (as seen in China’s vacillation). This uncertainty reduces the attractiveness of any ventures into the USSR.\textsuperscript{5} Finally, no changes in the regulations are likely to overcome the problems underlying the Soviet system, which include unreliability, low-quality Soviet supplies, and lack of transportation and a communications infrastructure.\textsuperscript{6}

**Free Economic Zones**

As an additional incentive to establishing joint ventures and increasing foreign trade, the Soviet press has reported that, following the example of China, the government is considering proposals to create special economic zones around the country. These free economic zones would set aside locations that provide special privileges for joint venture activity, including easy access to capital, technology, skilled labor, and modern management techniques. Various cities and areas have been suggested, including Estonia, Leningrad, Odessa, Lithuania, and, in the Far East, Nakhodka, Hasang, and Glodykova. Nakhodka, which

\textsuperscript{2}Joint Enterprises," p. 84.

\textsuperscript{3}Joint Enterprises," p. 85.


\textsuperscript{5}This concern was raised by Steven Popper of The RAND Corporation.

\textsuperscript{6}For discussions of Western businessmen’s concerns about joint ventures with the USSR, see "Russia’s Hard Sell," Economist, December 24, 1988, pp. 77–78; Financial Times, October 20, 1988, p. 4; "The Deal of the Decade May Get Done in Moscow," Business Week, February 27, 1989, pp. 54–55; "Joint Ventures with Soviets Offer Profits, Pitfalls," Oil and Gas Journal, August 15, 1988, pp. 20–22.
has three ports, a railroad, construction capacities, and a developed infrastructure, is receiving special attention. The Soviet Union has sought cooperation from the Keidanren (Japanese Federation of Economic Organizations) in developing a plan for setting up a free economic zone in the Soviet Far East, and the Japanese government has begun drawing up guidelines for extending loans and establishing joint ventures. To make investment even more attractive to Japanese firms, in December 1988 the Soviet government also proposed a Japanese-Soviet investment safeguard agreement, similar to the one signed between Japan and China in September 1988, whereby Japanese investors are given most favored nation status, receive equal treatment with local producers in obtaining materials and labor, and are guaranteed remittance of foreign exchange. The signing of a trade agreement was scheduled for the summer of 1989.

**Japanese Response**

Japanese firms have not rushed to set up joint ventures in response to the reforms and changes in the Soviet system. In part, their reluctance reflects the Japanese government's discouragement of initiatives by firms that proceed without governmental supervision; the government does this to continue its policy of linking economic and political considerations in its negotiations with the USSR. (The next section discusses this issue more fully.) A relatively small number (compared to the number of collaborations with West European countries, which accounted for 75 out of 103 total joint ventures by September 1988) of joint Japanese-USSR ventures have been established; they are a variation of the types of ventures set up under the compensation agreements. That is, they are resource-

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oriented and low-technology ventures, although the Soviets have tried to
interest Japanese companies in the machinery and equipment industry
and in ventures providing more advanced technologies. The venture
agreements also require that the Japanese partner export a portion of
production in order to earn hard currency. The agreements include the
following:

- The first joint venture, Igirma-Tairiku, set up in Irkutsk in
  East Siberia in April 1988, is capitalized at Y460 million ($3.48
  million). The Soviet side has provided land, raw materials,
  energy resources, and transportation facilities; the Japanese
  side, building materials, equipment, technology, and spare parts
  for a lumber mill. The mill is designed to process coniferous
  timber into lumber and construction materials. Plans are to
  ship some three-fourths of the scheduled production of 90,000
  cubic meters of lumber to Japan, leaving the remainder for
domestic consumption. To date, the venture has suffered
  several setbacks, including delays in Japanese shipments of
  robotics because of COCOM regulations, inadequacies in local
  transportation and communications facilities, and problems
  relating to quality control of raw materials.10

- A second lumber mill will be constructed in Khabarovsk in a
  joint venture between C. Itoh and Company and the Soviet
  Ministry of the Timber, Pulp and Paper, and Wood Processing
  Industries. Total investment will be Y200 million ($1.52 mil-
  lion), with the Soviet ministry putting up 51 percent and
  C. Itoh and its affiliates, 49 percent. The venture is expected to
  produce 100,000 cubic meters of timber, valued at Y1 billion, for
  housing and furniture in the first year; all output will be
  exported to Japan.11

- The Soviet Foreign Trade Ministry has agreed to set up three
  fishery joint ventures in the Soviet Far East to catch and process
  fish. The first is with the Taiyo Fishery Company; the second,
  with Nippon Suisan Kaisha and Mitsui and Company; and the
  third, with Nichiro Gyogyo and C. Itoh. Each partner plans to
  share the investment of Y200–Y400 million ($1.52–$3.03 million)
  equally with the Soviet Union. Each joint venture will provide

10“Soviet-Japanese Enterprise Put into Operation,” Ecotase, April 18, 1988, pp. 9–10;
“Soviet Thaw Not Warm Enough to Lure Tie-ups,” Japan Economic Journal, January
16, 1988, p. 7; “Criticizes COCOM Controls,” Kyodo, January 27, 1988 (trans. in FBIS-
EAS-88-017, January 27, 1988, p. 5); “Timber Ministry Responds to Japanese Criticism,”
11“Joint Venture Formed with Soviet Ministry,” Nihon Keizai Shimbun, April 14,
half its production to the domestic market and export the remaining half to Japan and third markets.\textsuperscript{12} Two other joint ventures have been set up in Sakhalin: Pinlinga, to cultivate salmon, trout, and other marine products; and Ginaga, to process fish and other marine products.\textsuperscript{13}

- Several joint ventures in the services sector have been established. One is a ship-repairing enterprise in Nakhodka between the Soviet Maritime Fishing Vessels Repairing Association and Tokyo Maruichi Seiji, another is a sports-resort complex to be built in East Siberia near Lake Baykal, and a third is a luxury hotel in Moscow to be constructed by Mitsui Bussan and Shimizu Construction Company and operated and managed by the Seibu-Saison Group.\textsuperscript{14} The construction of a jointly owned restaurant is also planned for the USSR's Khabarovsk. The Japanese trading company Pioneer Trading will put up Y70–Y80 million ($530–$610 thousand); the Soviet side, Y100 million ($760 thousand).\textsuperscript{15}

More than 60 additional joint ventures are reportedly under discussion, including an assembly plant for radio-tape recorders (which initially would assemble Japanese parts and components, with the long-term goal of Soviet production under license), an aluminum-processing plant in the Far East, a fish hatchery, and a machine-tool and machinery-leasing company.\textsuperscript{16}


Restructuring the Japanese Economy

A major factor limiting Japan's interest in participating in future joint development projects in Siberia is the structural change that has been occurring in its economy and the resulting shifts in Japan's demand for raw materials and resources from the USSR. Two important aspects of the restructuring process affect demand for resources. The first stems from Japan's past strategy of moving from an economy based on energy- and resource-intensive industries to one that emphasizes knowledge-intensive industries—and, as it approaches the 21st century, to one based on "economies of scope," stressing flexibility in producing relatively small batches of a wide variety of products and hinging on the introduction of new and increasingly sophisticated technologies. The second is the shift from an economy heavily dependent on exports for growth to a more domestically oriented economy.

Declining Demand for Raw Materials and Resources

Movement toward knowledge-intensive, economies-of-scope industries has steadily reduced Japan's relative needs for raw materials and energy resources. This shift is evident in both the structure of domestic production in Japan and the composition of its imports. At the aggregate level, Japan has been steadily following the expected evolution of a mature industrial economy, with its agriculture, mining, and manufacturing sectors producing a smaller proportion of output and the services sector producing an increasing share (see Fig. 4.1). Within the manufacturing sector, it has been slowly moving out of resource-intensive industries into knowledge-intensive industries:

- Its reliance on the metals industries has been falling.
- The percentage contribution to total manufacturing output from consumer goods and other low-technology industries has also been declining.
- The share from the transport equipment sector has remained stable.
- The proportion of production from knowledge-intensive industries—the electrical machinery, the nonelectrical machinery, and the professional and scientific equipment—has been steadily rising.\(^{18}\)


\(^{18}\)These last three industry groups are usually considered high technology or knowledge-intensive, or at least comprise a high proportion of industry subgroups that
These changes in the structure of the Japanese economy are reflected in the composition of its global imports—specifically, imports of raw materials and fuels. The proportion of machinery and manufac-

produce advanced technology goods and in which high research and development (R&D) investments are made (as a percentage of value added or sales)—for example, robotics and machine tools, computers, microelectronics, and telecommunications equipment. Among researchers of high-technology industries, some debate exists about whether or not the transport equipment industry—specifically, the automobile industry—should be classified as high or medium/low technology. Its investments in R&D are not as high as in standardly defined high-technology industries, but it incorporates a large volume of high-technology goods, such as microelectronics, in its production. Some subgroups of the chemical industry—pharmaceuticals, plastics—are considered high technology. However, very detailed data must be provided to make these distinctions.
tured goods has been rising over the time period 1975–1987. Although the country's major imports remain raw materials and resources, the relative importance of these commodities in the country's imports has been falling.

**Fuels.** The decline in Japan's major import item, fuels, is especially dramatic, going from a high of 50 percent of total imports in 1980 to 27 percent in 1987 (see Fig. 4.2). This drop in the share of fuel imports is not just a result of the fall in petroleum prices. Japan has pursued a conservation policy to improve its energy efficiency and reduce its consumption of oil in its basic industries. An additional means of achieving its conservation goals has been accomplished by substituting imports of products that require heavy energy inputs for domestic production or by exporting industries that are energy intensive (establishing overseas facilities). In volume terms, Japan's consumption of oil has been falling since 1980; its consumption of primary energy (in oil equivalents), which peaked at 7695 thousand barrels per day, has been relatively stable since 1979 (see Fig. 4.3). This conservation in energy consumption—remarkable in light of its relatively high growth rate over this period—has changed the composition of Japan's imports of fuels.

The success of Japan's energy conservation program suggests little room for large increases in oil imports from or participation in oil projects in the USSR. For its part, the Soviet Union does not view Japan as a major market for its oil exports. Additional investments in and purchases of Siberian and Far Eastern coal are possible, however, if new technologies can be found to reduce the high costs of development and enhance the venture's profit potential. Japan has substituted imports of coal and liquefied gas to compensate partially for its steady reduction of imports of crude petroleum since the mid-1970s; it has also increased its domestic production of nuclear energy.

A further indicator of Japan's declining interest in investments in or purchases of Soviet oil and gas is its current interest in exploring and buying up petroleum sources around the world. It is taking steps to assure its supply of petroleum resources by increasing the number of fields leased or owned by Japanese companies. The strong yen, large cash reserves, and new incentives from the Japanese government have combined to quicken the pace of Japanese oil companies' aim to become major producers and retailers of oil. The Japanese government is encouraging exploration and

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19This indirect reduction is difficult to measure without a detailed input-output analysis identifying the flows of primary, intermediate, and final goods between Japan and specific trading partners.

20Includes coal, crude oil, natural gas liquids, natural gas, and hydroelectric and nuclear electricity.
Fig. 4.2—Japan's distribution of imports (1975, 1980, 1985, 1987)

production, and has created new tax incentives—an exemption of 3.5 percent of purchase price of a foreign field, or a 15 percent, first-year accelerated depreciation on the purchase price—for companies that buy existing fields. Also, companies are eligible for an 80 percent reimbursement for exploration costs and are guaranteed loans for development once oil is discovered. Extensive funding for these projects is coming from the Japan National Oil Corporation, a government body promoting oil exploration. At present Japanese oil companies, which are mainly refiners and marketers, are primarily looking for joint ventures or asset purchases and secondarily for purchases of companies. This strategy gives them a chance to learn the oil business, downstream and upstream, and prepare for the longer-term objective of becoming integrated, international oil companies. They are seeking to reduce dependence on Middle East oil and the whims of price, production, and export decisions.
made by OPEC, and are focusing activity in the United States, Canada, the North Sea, and Southeast Asia.  

**Other Resources.** Despite limited opportunities for expanded trade and investment in energy resources, two areas offer possibilities for growth in resource-related trade between Japan and the USSR. The first is trade in semimanufactures, which could increase over time. Even though the composition of Japan's imports from the Soviet Union has not changed radically over the past 20 years (as Sec. II discussed), the dominance of its major imports, wood and fuels, has been falling. On the other hand, imports of semimanufactures, such as unwrought metals, have been slowly rising over time (see Sec. II, Tables 2.1 and 2.2). As Japan reduces its domestic production of metal products and other resource-intensive goods, semimanufactures represent a sector in which the Soviet Union could seek to increase exports, with the long-term aim of selling more processed iron and steel and other metal products. Aluminum, a heavy energy user, is an example of this possibility. Soviet exports of unwrought aluminum to Japan are rising, and Japan's domestic production of primary aluminum has dropped precipitously—from a high of 1091 thousand metric tons in 1980 to 140 thousand metric tons in 1986. The two countries have recently been discussing establishing a joint venture to process aluminum. An initial agreement has recently been signed for Japan to supply the capital and equipment to set up a plant in the Far East that will produce aluminum alloys for export to Japan.  

The Soviet Union, of course, must make major improvements in its production efficiency and reduce its widely reported waste of materials and energy before it can become an important supplier to Japan (see the next section for a discussion of alternative suppliers). A recent study of the Soviet steel industry provides some indication of the magnitude of its wastefulness. The Soviet Union loses some 30 percent of its steel in the smelting process—a large percentage compared to other major producers such as the United States, with an 18.4 percent loss; West Germany, 9.4 percent; Japan, 5 percent; and South Korea, 1 percent. It also wastes an estimated 442 trillion kilocalories of energy, spending 62–87 percent more energy in steel production than does Japan.  

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In the second case, there is added potential for increased imports of wood and other raw materials from the USSR to the extent that Japan shifts domestic production toward goods that require Soviet resources—such as housing, roads, public buildings—in its move from export-based to domestic-oriented growth. This increase, however, will likely be transient and very much a function of the business cycle. Nonetheless, in both cases, opportunities for increased imports hinge on how well the Soviet Union can compete with Japan’s alternative suppliers of these raw materials and semimanufactured goods in price and quality.

Alternative Sources of Raw Materials and Resources

Japan has recourse to numerous alternative producers who have been providing the bulk of its fuel and raw material imports, and the USSR has remained a small supplier (see Table 4.1). Its major suppliers include the following:

- For wood, the top three sellers are the United States, Malaysia, and Canada; the USSR ranks fourth.
- For coal, Australia is by far the largest supplier, followed by Canada, the United States, and South Africa; together, these four countries provide more than 90 percent of Japan’s imports.
- For petroleum and petroleum products, the Middle Eastern countries, Saudi Arabia, United Arab Emirates, and Oman, along with Indonesia and China, are the major suppliers. The United States provides a fair proportion of petroleum products.
- For selected minerals and ores—iron ore, unwrought aluminum, copper, and pig iron—Japan has several suppliers with percentage sales well above that of the USSR.

These producers are eager to sell to Japan, and the United States and Canada are seeking to reduce large trade imbalances through sales of these goods. The Soviet Union, therefore, has several major competitors for the Japanese market.

JAPAN’S COMPARATIVE ADVANTAGE: “HIGH-TECH, MANUFACTURED GOODS”

Other areas aside from new and large Siberian resource development projects exist in which Japanese investments and sales could be mutually beneficial. These areas include sectors in which Japan has an increasing comparative advantage—high-technology goods and products, energy- and material-efficient plants and processes, and assembly
Table 4.1

MAJOR SUPPLIERS OF SELECTED RESOURCES IMPORTED BY JAPAN, 1987
(Percentage of imported items)

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>Malaysia</th>
<th>United States</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>6.5</td>
<td>33.5</td>
<td>31.4</td>
<td>15.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>Saudi Arabia</th>
<th>United Arab Emirates</th>
<th>Other Mideast Nations</th>
<th>Indonesia</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude petroleum</td>
<td>0.02</td>
<td>21.6</td>
<td>19.6</td>
<td>26.5</td>
<td>12.5</td>
<td>5.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>Saudi Arabia</th>
<th>Other Mideast Nations</th>
<th>Indonesia</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum products</td>
<td>1.8</td>
<td>22.2</td>
<td>14.2</td>
<td>12.5</td>
<td>8.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>Australia</th>
<th>Canada</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>6.4</td>
<td>46.4</td>
<td>22.9</td>
<td>12.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>China</th>
<th>Brazil</th>
<th>Norway</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig iron</td>
<td>8.3</td>
<td>16.8</td>
<td>11.9</td>
<td>6.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource</th>
<th>USSR</th>
<th>Australia</th>
<th>United States</th>
<th>Brazil</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unwrought aluminum</td>
<td>3.4</td>
<td>21.8</td>
<td>13.1</td>
<td>12.0</td>
<td>9.3</td>
</tr>
</tbody>
</table>


plants—and are not necessarily restricted to Siberia and the Far East (see Fig. 4.4).

Japan's restructuring of its economy is also reflected in its exports and trade specialization. A recent study of Japan's trade indicates that in the 1960s, its comparative advantage lay in unskilled, labor-intensive products (such as textiles, apparel, and leather products) and in some skill-intensive goods (such as nonelectrical and electrical machinery, transport equipment, and instruments and related products). An
<table>
<thead>
<tr>
<th>Industry</th>
<th>0</th>
<th>1</th>
<th>2.0</th>
<th>3.0</th>
<th>4.0</th>
<th>5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food, beverages, and tobacco</td>
<td></td>
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<tr>
<td>Agricultural raw materials</td>
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<tr>
<td>Nonoil mineral products</td>
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<tr>
<td>Textile mill products</td>
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<tr>
<td>Apparel and other finished textile products</td>
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<tr>
<td>Lumber and wood products</td>
<td></td>
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<tr>
<td>Furniture and fixtures</td>
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<tr>
<td>Paper and allied products</td>
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<tr>
<td>Printing and publishing</td>
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<tr>
<td>Chemical and allied products</td>
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<tr>
<td>Rubber and plastic products</td>
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<tr>
<td>Leather and leather products</td>
<td></td>
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<tr>
<td>Stone, clay, and glass products</td>
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<td></td>
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<tr>
<td>Primary metal and allied products</td>
<td></td>
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<tr>
<td>Fabricated metal products</td>
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<td></td>
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<tr>
<td>Nonelectrical machinery</td>
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<td></td>
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<tr>
<td>Electrical machinery</td>
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<td></td>
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<tr>
<td>Transportation equipment</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Instruments and related products</td>
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<td></td>
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<tr>
<td>Miscellaneous manufacturing products</td>
<td></td>
<td></td>
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</tbody>
</table>

**SOURCE:** Bela Balassa and Marcus Noland, *Japan in the World Economy.*

**NOTE:** Values greater than (less than) one reflect the comparative advantage (disadvantage) in a given industry. The direction and length of each arrow indicate the direction and size of the shift in comparative advantage during the 1967–1983 period.

**Fig. 4.4**—Japan’s revealed comparative advantages for exports, 1967–1983
econometric analysis of comparative advantage shows that by the early 1980s:

- Japan’s disadvantage in resource-intensive products, such as wood and food, had increased;
- Japan had moved to a position of comparative disadvantage in unskilled, labor-intensive goods such as textiles;
- Japan’s comparative advantage in physical capital-intensive products, such as chemicals and primary metals, had risen slightly;
- Japan had greatly strengthened its advantage in skill- and R&D-intensive goods such as nonelectrical machinery.

High-Technology Goods and Products

Japan’s excellence in producing high-technology goods and products requiring advanced manufacturing processes does not show up in its trade with the USSR. High-technology goods are a small percentage of total Soviet imports from Japan and are concentrated in chemicals, automatic data-processing equipment, machine tools, and scientific instruments (see Fig. 4.5). Together, microelectronics and telecommunications equipment and parts represent less than 1 percent of total exports to the USSR; there is no trade in aircraft and parts. Increased exports of high-technology products from Japan would depend on changes in COCOM restrictions on sales of these products to the USSR. Some changes were made in July 1984. Simple home computers are now freely exported, but super minicomputers, small industrial-purpose computers, and some computer software are now under stricter controls. Controls on advanced telecommunications systems have been relaxed as of 1988. Changes in restrictions on some products sold to the PRC signal the possibility of similar change for the Soviet Union and depend in large part on the political relationship between the United States and the USSR. (The next section discusses COCOM restrictions.) Japanese firms, however, have been extraordinarily cautious in selling this class of goods and will

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24 Estimates of comparative advantage are derived by regressing export indexes against unskilled labor, physical capital (flows and stocks), skilled labor (human capital), and research and development spending. Two indexes of trade specialization are used: the export index of revealed comparative advantage (the ratio of a country’s share in the exports of a particular commodity category to its share in total merchandise exports), and the net export index (measured by net exports divided by the sum of exports and imports of a country). See Bela Balassa and Marcus Noland, *Japan in the World Economy*, Institute for International Economics, Washington, D.C., 1988, pp. 23–34, 193–209.

SOURCE: United Nations Bilateral Commodity Trade Databank.

Fig. 4.5—Japanese high-technology exports (Percent)
likely continue to be so, at least in the immediate future, given the trouble over the Toshiba sale of advanced technology to the Soviets in 1986.

**Material- and Energy-Efficient Plants**

The second group of capital goods the Soviet Union could use comprises material- and energy-efficient plants and processes. Through manufacturing process innovation, Japan has succeeded in reducing the volume of energy used in its basic industries and limiting wastage of materials. For example, it has been able to reduce the percent wastage of crude steel from 17 percent in 1974 to 5–8 percent in 1988. The Soviet Union is quite wasteful of both energy and materials and has made little progress in conserving these resources. Japanese capability could help the Soviet Union improve its production efficiency and quality control and slow its depletion of resources (although some question exists about how quickly or well technology can solve Soviet waste problems). Sales of these kinds of plants and processes would also speed the USSR movement from producing semimanufactures to producing high-quality, basic-industry manufactures. In the past, Japanese companies have supplied metal manufacturing plants and steel products in exchange for iron ore. Ironically, Japanese companies have entered into technology-exchange agreements for iron and steel production with the Soviet patent agency, and both sides have bought and sold licenses for steel technologies, which apparently are in wide use in Japan but not in the USSR.

Japanese experience in selling turnkey plants—wherein the Japanese firm or group of firms construct, supply, and train Soviet personnel to operate the plants—has been reasonably good. Most recently, the Soviet Union has signed an agreement with Toyo Engineering and Mitsui to rebuild and modernize ammonia plants put in place by these companies in 1969–1970 in the cities of Nevinomysk, Novgorod, Severodonetsk, and Novomoskovsk. Payment for the plants, valued at $100 million, is to be made with production, which Mitsui will market in third countries. The new plants will likely raise production by 25 percent and reduce energy consumption by 2 percent. According to

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26See work by Kent Osband at The RAND Corporation on Gorbachev's turn to economic reform as a means to Soviet modernization.


press reports. Agreements have also been signed for turnkey chemical plant sales, Nissho Iwai, Kobe Steel, Mitsui and Company, and Mitsui Engineering and Shipbuilding have signed an agreement to sell polyester fiber plants to be located at Blagovershchnensk and Budennovsk. These plants, valued at $1.2-4 billion, will be financed with credits from the Japanese Export-Import Bank. The bank has offered a rate of 7.3 percent, but the Japanese firms have offered the credits at 6.7–6.8 percent, bearing the cost of the differential. A second plant sale is for $86.9 million, with the Japanese participants supplying construction, equipment, and know-how. Other details of the agreement are unknown.28

Assembly Plants

The third class of capital goods would be a variation of the types of joint ventures recently established in the Far East. In the past, Japanese firms have supplied parts and consumer durables manufacturing plants—compressor plants, electrical motors manufacturing, household appliance manufacturing—and accepted products, such as raw cotton, aluminum ingots, and fertilizers, as payment.29 More and other types of facilities to produce or assemble lower technology products would help the USSR meet its consumer product needs. Although the Soviet Union has publicized its plans to manufacture its own consumer goods, it should take into account Japan’s high success in establishing these kinds of facilities in the Asian newly industrializing countries (NICs) and Association of Southeast Asian Nations (ASEAN) countries, specifically for automobiles, consumer electronics, and processed food. Its success is readily demonstrated by the inroads the NICs and ASEAN nations have made in the Japanese, U.S., and European markets for these goods, especially autos and consumer electronics. Japan, in fact, has been buying a rising proportion of its manufactured imports—as well as increasingly technologically sophisticated products—from these countries.30


29Mathieson, Japan’s Role, pp. 144–152, 204–212.

How Will the USSR Pay?

The USSR's major difficulty is still paying for Japanese goods and plants. Japanese investments in low-technology production facilities—consumer durables, metal manufacturing, and other types of assembly plants—and sales of related capital goods represent an answer to many of the Soviet Union's problems in meeting demands for consumer goods and for improving its manufacturing efficiency. Assuming political issues are resolvable, the Soviet Union could purchase Japanese capital goods in three main ways.

First, past compensation agreements offer a model for future transactions. The Soviet Union could pay for capital plants and equipment by bartering. Recently negotiated plant sales and joint ventures all have buyback or barter arrangements for exporting a percentage of output from these facilities, and earnings from these exports are used to pay for Soviet purchases. Even if Japan itself lacks a market for all these commodities, the Japanese trading companies are certainly expert in marketing them elsewhere.

Second, the Soviet Union could finance a bilateral deficit with Japan with its hard currency earnings from sales to other countries; for example, hard currency earnings from oil and gas sales to Western Europe. These earnings, however, have been difficult to maintain in recent years as the prices of oil and gas have fallen, and have been further reduced because much of its hard currency trade is conducted in U.S. dollars and the yen's value has strengthened. A convertible ruble, on the other hand, could diminish this hard currency earnings problem and greatly facilitate multilateral trade with all countries. It would ease purchases of desired Japanese capital goods and technology. Despite extensive discussions about and arguments for adopting a completely convertible ruble, and despite the introduction of a transferable ruble for settling accounts among Socialist economies, most experts recognize the need to reform domestic prices, both retail and wholesale, before international convertibility can be considered realistically. Some analysts have projected convertibility by the end of the century, but how long the process of price reform and complete ruble convertibility would take is unclear. At the moment, the Soviet Union appears to be proceeding slowly, trying to balance inflation pressures, price reform, and major shortages of goods before trying to introduce convertibility.32

Third, the Soviet Union could go into debt to Japan, although Japan appears to be a less willing partner than the Soviet Union. According to press reports, the USSR appears willing to become indebted to West European countries. Amid much publicity, Great Britain, West Germany, and Italy have agreed to extend large lines of credit to support Gorbachev’s modernization and restructuring goals (see Sec. II for a discussion of the role of Japanese credit). The Italian prime minister has even suggested a modern “Marshall Plan” to aid the reconstruction of the Soviet and East European Socialist economies. Japan, as the world’s largest creditor, has the funds to underwrite many projects the Soviets would like to pursue. Tokyo and Japanese banks, however, are treading this area carefully in response to U.S. complaints about Western (especially Japanese) loans to the Soviets. These loans are viewed by both right-wing activists in Japan and some officials in Washington as harmful to U.S. and Western national security. (The following section discusses this political issue more fully.38) News reports indicate that Japanese officials are encouraging Japanese banks to reduce lending to the Soviet bloc in 1990. The Japanese position will likely depend on U.S. policy.

38For a discussion and assessment of the controversy about lending to the USSR, see C. R. Neu and John Lund, Toward a Profile of Soviet Behavior in International Financial Markets, The RAND Corporation, R-3524-USDP, August 1987.

The United States is considering liberalizing loans in its current (spring 1990) trade negotiations with the USSR.
V. POLITICAL FACTORS

Political factors have been important in determining the level and pace of change in the economic relationship between Japan and the Soviet Union. Japan's relationship with the Soviet Union has a history of contention, including the territorial dispute since the end of World War II over ownership of the southern Kuril islands (Iturup Island and Kunashir Island) and several small islands (Shikotan Island and the Habomai Archipelago) north of Hokkaido. Over the past two centuries, the two countries have clashed over control over Sakhalin, Korea, and Manchuria.\(^1\) Twice in this century Japan attacked Russia: first, in 1904-1905 in the Russo-Japanese War; again in 1918 during the Russian civil war. As a result of these conflicts, Japan took possession of the southern half of Sakhalin Island and received economic concessions in the northern half of the island. As agreed by the Allies at Yalta at the end of World War II, the Soviet Union seized the Kuril islands and Sakhalin. In addition, since the end of World War II Japan has been politically and economically aligned with the United States, and its foreign policy toward the USSR has largely followed that of the United States toward the Soviet Union. This section reviews the two major political factors affecting Japanese-Soviet economic relations: the territorial dispute and East-West relations, including the COCOM restrictions on trade and the use of economic sanctions by Western nations to influence the Soviet bloc.

THE TERRITORIAL ISSUE

Despite numerous and increasingly frequent Soviet overtures for expanded economic ties, Japan has refused to negotiate economic agreements, which it has linked to resolving the territorial issue and to a peace treaty. The Soviet Union, on the other hand, argues that economic relations should be separate from political issues; only under Gorbachev's leadership and a changed approach toward East Asia and the Pacific Rim has it agreed that the territorial dispute may be an issue to be discussed with Japan.

The dispute, however, has been complicated because the two countries do not agree on which islands comprise the Kuril islands chain. The Soviets call the Habomais and Shikotan the "little Kurils," tacitly acknowledging these islands' geological and zoological similarity to Hokkaido and dissimilarity from the main Kuril islands chain. The Japanese government, on the other hand, has argued that Iturup and Kunashir form a separate chain from the Kurils and has officially claimed that the Habomais, Shikotan, Kunashir, and Iturup are "inalienable Japanese territory" that should be returned to Japan. Some Japanese, including members of the Japanese Communist party, believe that all the Kuril islands should be returned to Japan, while others call for the return of only the Habomais and Shikotan. Consequently, much of the discussion about the territorial dispute in Japan sidesteps the specifics and refers to Japan's claims as the "northern territories."²

History of Claims of Ownership

In the 19th century, Japan and Russia signed two treaties delineating the ownership of the Kurils. The first, the Treaty of Shimada, was signed in 1855 and reaffirmed the status quo in the Kurils by drawing the boundary between the two countries as one whereby Japan held the island of Iturup and all territory south, and the Soviet Union held the island of Urup and all islands north of Urup. The second treaty, the Treaty of St. Petersburg, transferred in 1875 Urup plus the rest of the Kurils to Japan; in exchange, Russia retained all of Sakhalin Island. The Treaty of St. Petersburg left a bitter legacy and enduring Japanese fear of Russian expansion, for the threat of Russian military action forced the Japanese to abandon claims to a large island, abundant in natural resources, for a string of volcanic rocks. Japan retook possession of the southern half of Sakhalin in 1905.³

At the end of World War II, the Yalta and the Potsdam Agreements of 1945 left Japanese territory confined to the four homeland islands of Honshu, Hokkaido, Kyushu, Shikoku, and a few minor islands. In the 1951 San Francisco Peace Treaty, Japan renounced claims to the Kuril islands and southern Sakhalin (see Fig. 5.1). At the time, Japanese delegates expressed reservations about the treaty provisions, but did not push for clarification of whether or not the Kuril islands included

²See work by Thomas Szayna at The RAND Corporation on the Kuril islands dispute for a good discussion of misconceptions of the issue.
Fig. 5.1—Japan-USSR: Northern territories
the Habomais, Shikotan, Iturup, and Kunashir.\textsuperscript{4} The United States and other allied countries did not give full attention to Japanese reservations about treaty provisions. Soviet leader Joseph Stalin had pushed for Soviet claims to these territories as the price for joining the Allies in the Pacific War, to which the Allies had agreed. His stated objective was to secure access to the Pacific Ocean and defend against Japanese aggression.\textsuperscript{5}

In 1955, the Soviet Union initiated negotiations to restore diplomatic relations and settle territorial claims with Japan, but disagreements among the Japanese leadership about how to proceed and on what terms prevented the signing of a peace treaty. Japan maintained its claims to the Habomais, Shikotan, Iturup, and Kunashir islands, plus southern Sakhalin, and the Soviet Union insisted that it held sovereignty over all these territories. In August 1955, the Soviet Union offered the territories closest to Japan, Habomais and Shikotan, and eliminated its demand that Japan dissolve its military alliance with the United States. Japan was unprepared to negotiate these new terms and restated its position that the Habomais and Shikotan were part of Hokkaido, that Kunashir and Iturup remained inalienable Japanese land, and that the remaining Kuril islands and Sakhalin should be items for international disposition. In October, only a joint declaration for diplomatic relations, not a formal peace treaty, was signed. In an implicit recognition of the illegality of occupying the Habomais and Shikotan, in Article 9 of the declaration the Soviet Union had agreed to transfer the Habomais and Shikotan to Japan upon the signing of a peace treaty. The Soviet Union invalidated this declaration in 1962 because, it claimed, Japan had nullified the agreement by renewing its security pact with the United States.\textsuperscript{6} Thus, in the 1960s, despite the signing of the first set of compensation agreements to develop the Far East, no progress was made in resolving the territorial dispute.

During the 1970s, neither side moved from its position on the islands. Several factors blocked mutual accommodation. First, East-West relations deteriorated in the second half of the 1970s, and Japan supported Western sanctions against the Soviet Union. Second, the Soviet Union refused to recognize that a territorial dispute existed and sought to negotiate other agreements that excluded this issue. Japan rejected these overtures and both sides continued to argue that each had historical claims to the territories. Third, relations cooled considerably when Japan signed the Treaty of Peace and Friendship with the PRC in 1978 despite strong Soviet objections to the treaty's

\textsuperscript{4}Szayna, work on the Kuril islands dispute.
\textsuperscript{5}Kamiya, "The Northern Territories," pp. 125-128.
antithegemony clause directed *de facto* against the Soviet Union. The Soviet Union followed with a buildup of military forces—108 SS-20s, 70 supersonic Backfire bombers, an aircraft carrier, the Minsk—in the Far East and redeployed a division-sized unit of ground troops on the disputed islands. Adding to these divisive factors were other incidents, such as Japan's refusal to return immediately the MIG-25 flown in by a pilot seeking asylum, and the USSR's establishment in 1977 of a 200-mile fishing limit, which created a continuing source of friction between the two countries.\(^7\)

In the 1980s, little movement toward normalization of relations occurred until very recently, despite Gorbachev's two appeals to Japan and its East Asian neighbors for better relations. In his 1986 speech at Vladivostok, Gorbachev made several proposals to improve the USSR's relations in the Asia-Pacific region, and, in May 1989, "normalized" relations with China. He also accorded importance to Japan's role in the world political and economic scene—a sore point for the Japanese—as well as a need to improve relations. In 1986, Soviet Foreign Minister Eduard Shevardnadze visited Japan, the first visit by a Soviet foreign minister in ten years. In September 1988 at Krasnoyarsk, Gorbachev reiterated his Vladivostok proposals to improve Soviet relations in the region, including limitations on nuclear and other military forces, control of environmental pollution, and special treatment for enterprises, domestic and foreign, in the Soviet Far East. He indicated the importance the Soviet Union placed on relations with Japan and a need to overcome problems limiting Japanese-Soviet ties.\(^8\)

Now that it has achieved rapprochement with China, the USSR appears to be turning its attention to improving relations with Japan. From the time Shevardnadze visited Japan in 1986, both sides have argued back and forth about ownership of the southern Kurils, the Habomais, and Shikotan. Japan has not changed its position. Until mid-1988, the Soviet Union vacillated back and forth, refusing to recognize the existence of a territorial dispute, and then implicitly (but not officially) agreed that Japan was making territorial claims on the USSR.


Importance of the Islands

For Japan, the islands north of Hokkaido have little economic value except for fishing rights. They have domestic political and strategic military importance. The issue is a popular one in Japan, and the current government would not give up claims to the islands without carefully weighing the political damage. Their strategic significance, from the Japanese perspective, lies in the Soviet military strength in the region in the post-Vietnam era. The Soviet Union increased its forces in the Pacific after the signing of the Sino-Japanese peace treaty in 1978 and again in the early 1980s in response to its perception of a U.S. challenge in the Pacific-Asia region and Japanese support of U.S. policies. The Soviet perception stems from a heavy-handed, military-oriented approach to international issues and is also probably influenced by the incremental buildup of Japanese defense capabilities since the 1970s (partly resulting from U.S. pressures to assume more security responsibilities in the region), by Japanese participation in joint U.S. military maneuvers, and by public discussion in Japan of previously taboo topics such as protecting sea lanes from Soviet submarines. Accompanying these changes is a decline in resistance in Japan to rearmament.

The Soviet Union has political and security reasons for wanting to hold onto the islands. It traces historical settlement of the territories, and has sought to block all demands for disputed lands in Asia and in Europe. Many Western analysts think the Soviets fear that agreeing to negotiate with Japan will establish a precedent for other countries’ claims in the future. The security importance of the disputed territories—specifically, Kunashir and Iturup islands—is that they provide a passage from the Soviet Maritime Province to the Pacific Ocean. The other passages are the southern route to the East China Sea through the Tsushima Strait between Korea and Japan, and the Taugaru Strait between the Japanese islands of Honshu and Hokkaido. The Kunashir-Hokkaido and Iturup-Kunashir channels are the quickest ways to the Pacific Ocean for Soviet ships using the Soya Strait (between Sakhalin and Hokkaido). The Soviets still have unhindered access from the Okhotsk Sea to the Pacific by using the straits between the mid- and northern Kurils, but such a voyage would be lengthier. The disputed islands therefore provide an important route for Soviet ships to leave and return to their major naval port at Vladivostok for repair, refueling, and resupply. More significantly, the Sea of Okhotsk has become an important bastion operating area for Soviet

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ballistic missile submarines.11 Returning the two islands, Kunashir and Iturup, reduces the Soviets' easy access to the Pacific Ocean and gives the Japanese (and the United States) greater access to the Sea of Okhotek. As long as the Soviet Union sees the risk of U.S. military power in the region, it is unlikely to give up these strategically placed islands.

Recent Events

Since mid-1988, news reports indicate a slow movement toward possible rapprochement between Japan and the USSR.

• In July 1988, the journal of the Soviet Institute of International Affairs, International Life, reported that top Soviet foreign policy planners—including Nikolai Rogachev, vice foreign minister in charge of Asian policy; Lyudvig A. Chizhov, head of the Foreign Ministry's Pacific and Southeast Asian Affairs; and senior members of the Academy of Sciences of the USSR—agreed that the Soviet Union could no longer ignore the territorial issue and had to reduce the perception of Soviet threat in the region.12 Up until this time, the Soviet Union had refused to acknowledge the existence of a territorial dispute between the two countries.

• The Soviet Union has unofficially sounded out possible compromises through scholars and others. One possibility put forth is that Japan lease the disputed islands and Sakhalin and help to establish a free economic zone in Vladivostok. Another is that the USSR return only the minor islands, Shikotan and the Habomais. A third proposal is that Japan retain residual sovereignty over the islands, in a way similar to the U.S. occupation of Okinawa, while the Soviet Union retains certain rights in the islands. Another possibility is that both countries jointly administer the islands for a given time period, with an agreement to demilitarize them. So far Japan has not responded positively, stating that consideration of any one of the proposals suggests an admission that the USSR has legal rights to the islands, and has demanded that all officially claimed islands be returned.13

11Whiting, Siberian Development, pp. 96–98, 124–126. The Pacific port of Petropavlovsk is also an important submarine base in the Pacific Ocean, but is covered with ice six months a year and lacks other transportation connections within the USSR.
• The territorial issue was on the agenda for the December 1988 talks between Japanese Foreign Minister Sosuke Uno and Soviet Foreign Minister Eduard Shevardnadze, along with security and armaments issues in the Pacific region, trade and economic issues, and international problems such as those related to the Korean peninsula and Indochina. No progress on resolving the territorial issue has been made, but there is movement toward dialogue. Both sides have agreed to continue talks toward concluding a peace treaty and have set up a standing working group for this purpose. A major question for Japan is whether or not the standing working group is a Soviet device to delay a peace treaty or to shelve the territorial dispute. Two other working groups have also been established to discuss regional problems and general bilateral relations.14

• The Soviets announced plans to cut their troops not only on the Mongolian border but also in the Far East, including the Pacific fleet. Of course, actions, rather than plans and intentions, are what Japan is seeking. Nonetheless, in published interviews two Soviet naval officers have claimed a reduction of 57 combat ships in the Soviet Pacific fleet since Gorbachev’s Vladivostok speech in July 1986. This reduction, however, does not include attack submarines, which the U.S. Department of Defense estimates to have risen by five in the past few years.15 In his speech in Beijing, Gorbachev announced that the Soviet Union would further reduce the Pacific fleet by 16 ships. Of course, the importance of these reductions depends on the age and types of ships being removed, and on the replacements.16

Although these events suggest progress toward a peace treaty and settlement of the territorial dispute, neither country has adhered to any one position rigidly over time. The Soviet Union continues to switch back and forth about whether or not the territories are an issue for negotiation. It has tried to get Japan to shelve the territorial issue,


using as a precedent Japan’s postponement of territorial disputes with China and South Korea in order to normalize relations with these two countries. At the same time, the USSR is cajoling Japan to separate political from economic issues and pushing for the signing of six reciprocal cooperation agreements proposed in December 1988; it keeps adding to its list of historical and legal arguments justifying its claims to the territories.\textsuperscript{17} Determining where the Soviet government really stands in its desires for a peace treaty is difficult. The strong policy statements have not been made by either Shevardnadze or Gorbachev, and this fact could be interpreted to be part of a campaign to set up big concessions by the senior leadership. On the other hand, statements by someone of Rogachev’s stature may indicate an opposite policy direction.\textsuperscript{18} Moreover, the Soviets are further reducing the credibility of their pursuit to improve relations by introducing discussions about imposing a corporation tax on Japanese firms and resident offices in the USSR equal to 6 percent of expenses—double the tax on enterprises from other foreign countries. The new tax is part of discussions to raise tax revenues for the Soviet government. These revenue-raising discussions are apparently not taking into account the foreign ministry efforts to enhance relations with Japan. Nonetheless, unilateral action by the Soviet Union would violate the January 1987 tax agreement signed by Japan and the USSR.\textsuperscript{19} Both Soviet actions have served to cool relations with Japan.

Despite its stated position, Japan has not completely tied the territorial issue and signing of a peace treaty to all agreements. It has proceeded to negotiate and sign several minor agreements on environmental protection; scientific-technical cooperation in agriculture, fishing, thermonuclear synthesis, radiation medicine, and artificial hearts; earthquake prediction; and cultural exchange. In addition, the Ministry of International Trade and Industry (MITI) has decided to set up a Japan External Trade Organization office in Moscow to work on international trade matters, and the Japan Association for Trade with the Soviet Union and the Socialist Countries of Europe is to assume initial


\textsuperscript{18}This point has been suggested by Steven Popper, The RAND Corporation.

work until the office is established in a few years.\textsuperscript{20} No date has been set for opening this office. The announcement may be part of a public relations effort, but does give the appearance that Japan is readying itself for expanded economic relations.

Japan has been unsuccessful in getting the Soviet Union to agree to include the territorial dispute issue in any official statements. In two joint communiqués issued after a series of meetings—one in December 1988 and the most recent in May 1989—both sides have agreed to carry on bilateral talks toward concluding a peace treaty and to resolve issues left over from World War II, but no specific mention of a territorial dispute has been made.\textsuperscript{21} The Soviet Union has, however, allowed public discussion of a territorial problem by Soviet and Japanese officials on Soviet television and in the open press. Kimura has hypothesized that the Soviet Union is slowly trying to get its own population to accept the notion that this dispute must be resolved in order to improve relations with Japan.\textsuperscript{22}

Which country retains control over the islands remains to be seen. For Japan, the islands represent political gains domestically and provide strategic and security benefits in the Pacific region. For the Soviet Union, the value of developing the Soviet Far East must be weighed against the military and security costs of losing control over the strategically important Kunashir and Iturup islands.

\textbf{EAST-WEST RELATIONS}

Japanese policies toward the Soviet Union and the Socialist countries are closely linked to U.S. national security strategies and foreign and economic policies toward the Soviet Union. This linkage results partly from the U.S. occupation of Japan and its aid to Japan after World War II, partly from the U.S. political and security umbrella in the region, and partly from the importance of Japan’s economic relations with the United States—the United States provides a huge market for Japanese goods and is a major source of crucial imports. Japan is a member of COCOM and includes under its export control regulations items embargoed for sale to the USSR and Socialist countries by COCOM. It has often followed the U.S. lead in using

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economic sanctions for political objectives—occasionally under U.S. pressure. Moreover, Japan may view any distancing from the Soviet Union as beneficial in its relations with the United States, especially in light of its current conflicts over its trade balance with the United States.

Control of Technology Transfer

The export of strategic Western goods to Communist countries is controlled by COCOM, which is the only organization that coordinates Western trade policies toward the Soviet bloc. Its members—all NATO countries (except Spain and Iceland), and Japan—send representatives to decide what items belong on its embargo lists, but members are not legally bound to participate in deliberations or to abide by the organization’s decisions. Not having direct enforcement powers, COCOM relies instead on individual member governments, customs authorities, and police.

Embargoed items are grouped into three lists: munitions, nuclear products, and dual-use goods that have both civil and probable military applications. Currently, 165 goods are on the lists—21 munitions goods, 23 nuclear products, and 121 industrial goods (mostly electronics and precision instruments). The lists are reviewed every three years and items may be added or subtracted. What is added or subtracted depends on how rapidly the technologies embodied in the embargoed goods are diffused to the Soviet bloc countries. Although members have generally agreed about what belongs on the lists of embargoed military or nuclear items, they have debated about dual-use items.

Member countries can apply for exceptions to the embargo, arguing, for example, that an item was mistakenly put on the list, that technological innovation has overridden the list, or that the product is clearly destined for civil use. Some differences in processing the request exist, depending on the technology’s sensitivity, but the key rule is that the decision must be unanimous or no sale is made. This exceptions rule has been used to extend COCOM regulations to foreign policy purposes. In particular, three guidelines have been developed to determine exceptional sales: very restrictive for the USSR and Poland (since the early 1980s); restrictive for Eastern Europe and pro-USSR nations in Asia; and liberal for China.

24 In September 1987, South Korea signed a memorandum agreeing to consult with the United States on technology and high-technology goods exports to Soviet bloc countries.
25 Buchan, “Western Security,” p. 26. Changes in COCOM are now being considered for Eastern Europe as this region has undergone major political and economic changes.
Although Japan has had a reputation of being a rather unenthusiastic member of COCOM, its exports of high-technology products are quite small relative to total trade with the USSR (see Sec. II). The Soviet Union has been seeking high-technology goods from Japan—including microprocessors, robots, and automatic design systems—but following the Toshiba affair, Japan has been especially careful and slow in responding to Soviet requests. In early 1987, Toshiba Machines was found guilty of violating COCOM restrictions by selling numerically controlled machine tools that enabled the USSR to produce quiet submarine propellers. The U.S. reaction was quite strong; the U.S. Congress threatened to pass legislation to ban Toshiba products from the United States, the company's largest export market. Since that time, Japanese firms have been reluctant to expand sales to the Soviet Union, and MITI has set up a new inspection system to control illegal exports. Matsushita Electric recently turned down the Soviet request for videotape recorder production technology, claiming a fear of creating problems with the United States.

Trade between Japan and the Soviet Union, however, could expand if East-West relations continue to improve. Current events indicate a trend toward rapprochement with the USSR as the United States and its NATO allies negotiate for weapons reduction in Europe. Although the situations are not completely analogous, the normalization of relations between China and the United States in 1978 has resulted in a relaxation of COCOM restrictions on high-technology sales to the PRC. In 1972, the guidelines for export controls were the same for both the USSR and the PRC. Following normalization and the 1980 visit to Beijing by the then secretary of defense Harold Brown, the United States raised the level of exceptional sales to China. According to press reports, West European allies are reducing the limitations on high-technology sales to the USSR as relations have improved, although the United States has not come around as yet. Its shift in policy toward the PRC certainly sets a precedent for a loosening of controls of commodities. If and when the United States decides to change restrictions on sales to the USSR, Japan will likely follow suit.

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Economic Sanctions and Foreign Policy

The United States has been the principal proponent for controlling the flow of technology useful for military purposes to the Soviet bloc, as well as for using economic sanctions to influence policies of the Soviet Union and other Socialist countries. It has used economic sanctions a number of times over the past 20 years. The most recent cases against the Soviet bloc include economic sanctions against the Soviet Union for invading Afghanistan in 1979, against Poland for imposing martial law in 1981, and against the USSR in 1981 for supporting Poland’s imposition of martial law.

Japan has usually followed the U.S. lead while trying to remain neutral, if possible. When the United States imposed sanctions against the Soviet Union for invading Afghanistan, many of its allies supported the grain embargo but proceeded to negotiate with the USSR on the gas pipeline project and manufacturing plants. Japan maintained its distance from the issue until the United States placed pressure on Japan for unity in foreign economic policy. Japan then suspended credits for ongoing Siberian projects and others under negotiation; it did not, however, cancel the credits. Official statements made clear that the suspension was temporary and that Japanese actions were tied to West European and U.S. initiatives. In spring 1980, Japan persuaded the United States to exempt the joint Sakhalin oil and gas project from sanctions.

Japan did support the U.S. and other Western countries’ sanctions against Poland, banning new government-sponsored credits, suspending negotiations on rescheduling debt, and imposing travel restrictions on Polish diplomats. When the United States initiated sanctions against the Soviet Union for its support of Poland’s policies, the United States and its West European allies could not agree on the extent of limits to export credits. In response, the United States extended its suspension of export licenses for high-technology items, including oil and gas equipment, to include U.S. foreign subsidiaries—a controversial action as far as European governments were concerned. Japan in this case, supported

33Hufbauer and Schott, Economic Sanctions Reconsidered, p. 661.
34Hufbauer and Schott, Economic Sanctions Reconsidered, p. 689.
the U.S. position, limiting loans from its Export-Import Bank and suspending export credits to the Soviet Union.

More recently, Japan has been unable to remain neutral with respect to loans and credits to the Soviet Union. During the Reagan administration, the United States tried to promote an explicit policy of limiting Western technology, credit, and trade to the USSR. The argument was that by helping the civil side, the West was actually helping the Soviet military effort because the USSR could then reallocate resources from the civil to the military side. Untied credit is considered especially damaging to Western interests. Although Western Europe and Japan have not entirely agreed with the U.S. position, U.S. pressures on Japan to limit its credits to the Soviet Union appear to have been successful. Reports from U.S. officials during the Reagan administration about the large percentage of Soviet hard currency loans held by Japanese banks have made Japanese bankers wary of expanding credits. According to press reports, Japanese bankers are awaiting the position from the Bush administration and are unlikely to risk their stakes in the United States for small returns on Soviet loans. In fact, Japan’s Bank of Tokyo has stated that Japanese banks are substantially reducing loans to the Soviet Union. The territorial issue is also cited as a problem in expanding loans.36

CONCLUSIONS

Among the political factors influencing the economic relations between the two countries, resolution of the territorial dispute has clearly received priority in Japan. Although other political issues, such as control of technology transfer, have affected the magnitude of trade and credit between the two countries, resolving the ownership of the southern Kurils, Shikotan, and the Habomais is necessary before Japan will consider signing any economic agreements. Nonetheless, before making any major changes in its policies toward and relations with the Soviet Union, Japan will likely give full consideration and weight to its close economic and political relations with the United States.

37See Neu and Lund, Toward a Profile, for a full discussion and assessment of this controversy.
38Section II discusses more fully the importance of Japanese lending to the Soviet Union.
VI. PROSPECTS

Resolving the territorial dispute will not produce large changes in the economic relations between Japan and the Soviet Union unless the Japanese government provides a major infusion of funds for the development of Siberia and the Far East. Without a resolution, the economic incentives for expanded trade and investment are small. At this point in time, neither side appears to want or need rapprochement badly enough to make the concessions necessary to achieve it.

ECONOMIC FACTORS

The complementarity between the two economies in terms of the supply and demand for the types of goods produced by each country has declined over the past two decades, especially from Japan's perspective. The restructuring occurring in Japan has reduced its demand for Soviet raw materials and resources, and Japan has responded slowly to Soviet overtures to sign an economic agreement and to provide Japanese capital and technology.

Raw Materials and Resources in Siberia

Siberia and the Soviet Far East, the regions closest to Japan geographically, hold a huge store of resources and are often viewed as the most promising areas for expanded trade and investment. However, this potential is limited, for several reasons. First, the resources dominating Japan's raw materials imports and Soviet production—oil and gas—are primarily located in West Siberia; the Soviet infrastructure has been set up to send these resources to the country's East and West European neighbors. Shipment to Asia would be expensive and place an additional burden on an already overtaxed transportation system. Second, the cost of exploring and developing new reserves of oil, gas, and other resources has been rising as the Soviet Union depletes its readily available, known reserves, and has had to move to more inaccessible, labor-scarce regions of the country that are geologically difficult to mine. Third, Japan is seeking to secure its own supply of resources, especially oil, by buying up petroleum sources and exploration rights around the world and has increased the pace of this activity over the past year. Finally, several other producers—the United States, Canada, Australia, and China—of raw materials and resources
(including oil, timber, and coal) are eager to sell to Japan, and would prove serious competitors to the Soviet Union.

**Decline in Japanese Demand for Raw Materials and Resources**

Japan has been restructuring its economy for the past two decades, moving from one based on energy- and resource-intensive industries to one that emphasizes knowledge-intensive industries. In the process, it has reduced its demand for raw materials and resources (especially fuels), and thus, many of its needs for Soviet products. Japan's decreased demand for Soviet raw materials and resources, however, can be moderated to the extent that Japan moves toward buying raw materials in semimanufactured form. This shift would be a long-term and slow-growing process. Japan has, for example, made some arrangements to buy aluminum products from the Soviet Union. In the near term, its demand could rise, at least cyclically, as it moves from a development strategy based on exports to one based on domestic growth.

**Perestroika and a Convertible Ruble**

If and when the Soviet Union succeeds in both changing its economic and political system and integrating itself into the world economy (with the result that foreign investors would be treated as they are in other countries), Japanese businessmen might be more willing to risk investments in the USSR. Right now, the Soviet Union lacks both the hard currency and products with which to pay for the Japanese capital goods and technology it wants and needs to improve productivity and quality. It is using countertrade and buyback agreements to make purchases from Japan and other Western countries. These types of arrangements, however, are cumbersome and inefficient, even though Japan's trading companies have become quite adept at carrying them out. More important, an inconvertible ruble reduces the attractiveness of any potential joint ventures because repatriating profits out of the country would be difficult.

**ROLE OF POLITICS**

Without a political settlement and peace treaty, Japanese funds are unlikely to be forthcoming in any significant volume. On their own, Japanese businessmen have been very cautious in their investments in
Siberia and the USSR as a whole, responding slowly to changes in Soviet regulations to encourage foreign investments and establishing only relatively small joint ventures. They would, of course, be willing to make major investments in Siberia and the Far East without government backing if technological innovation in exploring and mining minerals, metals, and petroleum greatly reduces the costs to a point where the expenses of developing these resources are competitive with other world producers, or if the prices of these resources rise on the world markets.

The first necessary step toward rapprochement and a peace treaty is resolving the territorial dispute. Japan has indicated a willingness not only to sign an economic agreement but also to provide financial resources for developing Siberia and the Far East if the dispute can be settled. For example, as Japanese Foreign Minister Sosuke Uno stated in an interview on his return from the most recent talks in Moscow, resolving the territories dispute and signing a peace treaty would open the way for Japanese investment and Japan would then be ready to help in developing Siberia. As the situation stands, the Soviet Union certainly needs Japanese, or at least Western, help to develop the resources in Siberia. As the world's largest creditor, Japan could certainly be an important player in developing Siberia and the Far East.

How and when a resolution to the dispute between the countries will occur is difficult to project. Japan is unlikely to move from its position about settlement of the territorial issue before proceeding in signing an economic agreement with the Soviet Union. Despite demands for the return of all territories, Japan might consider a compromise. Kimura has suggested two compromises Japan might find acceptable: the return of the territories on the condition that they be demilitarized, and the return of the Habomais and Shikotan with the signing of a peace treaty and the return of the remaining two islands at some definite date in the future. In any case, Japan has placed a great deal of domestic political capital into this issue and would have difficulty backing away from its position. The Soviet Union, for its part, has unofficially floated alternative proposals for compromise to test Japanese reactions. Although public statements suggest that the Soviet Union may be willing to return the Habomais and Shikotan, it will likely have difficulty returning the other two islands, Kunashir and Iturup, which have greater military and strategic importance. Their reversion back to Japan would depend not only on the promise of large

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financial support for developing Siberia and the Far East, but also, most probably, on some kind of agreement with the United States and Japan on reducing military forces in the Pacific. The USSR has requested a trilateral discussion of this issue with Japan, but so far Japan appears reluctant to consider it.

LIKELY SCENARIOS

If the relationship between Japan and the Soviet Union improves, the question is when. In the short term—that is, in the next 6 to 12 months—little progress is likely. The resignation of Prime Minister Noboru Takeshita threw the Japanese government into confusion. Toshiki Kaifu has been installed as a party figurehead to refurbish the Liberal Democratic Party (LDP) image. The LDP remains preoccupied with internal struggles and maneuvering over who will be the next leader. During this time, little attention will likely be paid to Japanese-Soviet relations. Moreover, Gorbachev put off a visit to Japan for another year and has announced a possible visit in 1991, signaling a delay in rapprochement between the two countries.

Although making predictions is always risky, several scenarios for the prospects for increased trade and investments are possible. The first and most likely scenario is that the territorial issue will not be settled anytime soon (that is, in the next 2 to 5 years) and that trade between the two countries will remain limited and the pace of establishing joint ventures slow. After 25 years, the Soviet Union has, under Gorbachev, agreed that the territories are an issue, and the net gains—development assistance versus military and strategic costs—of returning them to Japan anytime soon do not loom very large. Press reports have speculated that normalization between the Soviet Union and China reduces the Soviets' need to settle differences with Japan. Moreover, the USSR has been courting other Asian countries, especially South Korea, in an effort to get them to participate in joint ventures and the joint development of Siberia; it is doing so to acquire the products and technologies that Japan could have provided. Although neither China nor South Korea have the financial resources and technology of Japan, the Soviet Union will likely pursue this path to its end before it reevaluates the importance of Japanese participation. From the time Gorbachev made serious concessions to China's demands in his speech at Vladivostok, the Soviet Union and China took three years to reach rapprochement and a summit meeting. In the meantime, Japanese businesses are unlikely to change their assessment about the riskiness or attractiveness of investments in Siberia and the Far East.
The case with the least prospects for increased economic relations would be one in which negotiations over the territorial dispute break down for military or political reasons. Japan may then place some economic sanctions on trade and investment in the USSR, and the Soviet Union could limit its exports to Japan. For this case to occur, however, dramatic changes in current East-West or U.S.-Soviet relations would be necessary; thus, the likelihood of this scenario appears small.

The scenario offering the best prospects for greatly expanded trade and investment is one in which the two countries reach a compromise on the territorial issue, East-West relations are normalized, and Japan, the United States, and the Soviet Union can come to a settlement on the strategic forces in the Pacific. Japan would provide funds for developing Siberia and the Far East, and U.S. participation would reduce its financial and political risks. A mutual reduction of military forces in the region would increase Soviet willingness to settle the territorial issue with Japan as the USSR feels a reduced need for maintaining the current level of forces in the region and for retaining access to the Pacific Ocean. The probability of all three events taking place is very small. Nonetheless, even if just the territorial issue is resolved, a major commitment by the Japanese government—huge amounts of long-term credit at low interest rates, plus investment risk insurance—would be necessary before Japanese firms could be enticed to make major investments into exploiting resources in Siberia and the Far East. Japanese businesses would more likely become interested, with Japanese governmental support, in setting up plants to produce semi-manufactured raw materials and assembly plants in other regions of the USSR (and not just Siberia and the Far East) rather than resource development projects per se, given the latter’s high and rising marginal costs.

These scenarios, of course, exclude the possibility that Gorbachev might pull off a political surprise, as he did in initiating reductions in military forces in Europe, and might agree to return some or all of the disputed territory. However, he would not likely do so without some assurances from Japan that funds are forthcoming for developing the Soviet Far East or for facilities to produce consumer and other goods in the USSR, as well as without some agreement with the United States and Japan to limit military power in the Pacific region.

Despite the recent hardness of Soviet statements, there are several glimmers of hope that the two countries could come to an agreement on the territories and on economic cooperation, for several reasons. First, the Soviet Union has agreed to discuss the islands issue with Japan and has also shown some flexibility in settling territorial issues.
Although the situations and territories are not analogous, the Soviet Union has settled some questions about the Far Eastern border between the USSR and China, ceding several islands in the Amur River to China, in order to move toward "normalization" of relations. Second, Japan and the Soviet Union have set up a permanent working group to meet regularly to draw up terms for a peace treaty. This working group has met three times since its establishment in December 1988. Even though no concrete results have been obtained to date, the working group at least indicates a willingness to discuss problems. Third, the hard stance the Soviet Union has taken recently may be a prelude to earnest negotiations—that is, it has announced an extreme position before serious negotiations.3

Without a political settlement and heavy financial support by the Japanese government for Siberian development, the potential for a large expansion in economic relations between Japan and the Soviet Union looks very small, and therefore is unlikely to create political problems in the near future. Japanese businesses would want to invest in Siberia and the Far East if technological breakthroughs greatly reduced the cost of exploiting resources there; if new, cheap reserves were discovered; or if the prices of raw materials rose dramatically. Such changes, however, do not appear on the horizon.

Appendix

METALS AND NONMETALLIC ORES

The Soviet Union produces a variety of ferrous metals, nonferrous metals, and nonmetallics (see Table A.1). This appendix reviews the extent of Soviet endowment in those resources for which it is a leading producer (among the world's top three) and the importance of Siberia as a source of these raw materials.

FERROUS METALS

Most of the reserves of ferrous ores and related metals are found in accessible regions of the country. These ferrous metals include iron ore and related iron and steel products, manganese, and chromium.¹

Iron Ore

The USSR has the world's largest proven and potential iron ore reserves. More than 75 percent of explored iron ore reserves, producing 83 percent of marketable ore, is in the European USSR—mostly in the Ukraine and the central region known as the Kursk Magnetic Anomaly. Given the huge supply in the European USSR, the flow of resources has been from West to East to meet the needs of the iron and steel industry in the Urals and in Siberia. However, production has been relatively stagnant over the past decade, with the largest reserve area in the Ukraine producing a declining share. Moreover, the iron content of the ores has been falling. The Asian regions (Kazakhstan and Siberia) have not been fully explored; their proven reserves are some 25 percent of the total, providing 17 percent of marketable ore. Siberia's contribution has been small—slightly more than 6 percent of total usable ore of 251 million tons in 1987. Development of Siberian reserves has not been emphasized, although the construction of the BAM has raised interest in exploiting East Siberian and Far Eastern reserves and shipping these ores to export markets in East Asia, especially Japan. Exploration has been undertaken in two areas:

¹Manganese is an important element in improving the quality of steel produced. Similarly, chromium is used in small amounts to strengthen and harden steel; in larger amounts, it is used with iron to produce stainless steel.
<table>
<thead>
<tr>
<th></th>
<th>USSR Rank</th>
<th>Major Producing Areas</th>
<th>Percent Export</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ferrous metals:</strong></td>
<td></td>
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</tr>
<tr>
<td>Iron Ore</td>
<td>1st</td>
<td>Ukraine, Kazakhstan</td>
<td>18</td>
<td>Depleting deposits in Ukraine. East Siberia and Far East: 6 percent of total output; two reserves being explored.</td>
</tr>
<tr>
<td>Iron and steel products</td>
<td></td>
<td></td>
<td></td>
<td>Focus on renovation, but integrated plant to be built in Far East near coal and iron deposits.</td>
</tr>
<tr>
<td>Manganese</td>
<td>1st</td>
<td>Ukraine, Georgia (95 percent of total)</td>
<td></td>
<td>Demand outpaced supply; supply stagnant and quality declining.</td>
</tr>
<tr>
<td>Chromium</td>
<td>Leader with So. Africa</td>
<td>Kazakhstan (95 percent of total)</td>
<td></td>
<td>Depleting accessible deposits; exploiting deeper deposits, and using lower grades</td>
</tr>
<tr>
<td><strong>Nonferrous metals:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>Leader with Canada and New Caledonia</td>
<td>Kola Peninsula, East Siberia</td>
<td>30</td>
<td>USSR helping Cuban industry development in exchange for nickel.</td>
</tr>
<tr>
<td>Platinum</td>
<td>2nd after So. Africa</td>
<td>East Siberia, Far East</td>
<td>40-60</td>
<td>USSR imports 50 percent bauxites; East Siberia with hydroelectric power, likely to increase share of production.</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2nd after United States</td>
<td>European USSR, East Siberia</td>
<td></td>
<td>Imports 50 percent of needs.</td>
</tr>
<tr>
<td>Tin</td>
<td>2nd after Malaysia</td>
<td>Far East</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonferrous metals:</td>
<td>USSR Rank</td>
<td>Major Producing Areas</td>
<td>Percent Export</td>
<td>Comments</td>
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</tr>
<tr>
<td>Copper</td>
<td>Leader with United States</td>
<td>Kazakhstan, East Siberia</td>
<td>15</td>
<td>Reserves and ore grade declining; largest province, Udokan, East Siberia, has technology problems in mining and beneficiating ore.</td>
</tr>
<tr>
<td>Gold</td>
<td>2nd after So. Africa</td>
<td>Far East</td>
<td></td>
<td>Used mostly to settle balance of payments deficits.</td>
</tr>
<tr>
<td>Titanium</td>
<td>1st</td>
<td>Ukraine</td>
<td></td>
<td>Large deposits in East Siberia undeveloped; USSR self-sufficient with surplus for export.</td>
</tr>
<tr>
<td>Lead, zinc</td>
<td>1st</td>
<td>Kazakhstan</td>
<td>Lead: 70 percent Zinc: 50 percent</td>
<td>Rising shortages, depleting reserves, declining ore grades; efforts to expand capacity unsuccessful. East Siberian deposits to be developed.</td>
</tr>
</tbody>
</table>

| Nonmetallics: | | | | |
| Asbestos        | 1st | Urals, East Siberia | 20 | Asbestos, Urals: declining output; East Siberian deposit under development. |
| Sulfur          | Major | Ukraine, Turkmen, Urals, Far East | | European USSR deposits depleting; Far East deposits remain undeveloped. New source (begun 1970s) is sulfur-bearing gas in West Siberia and central Asia. |
the Chara-Tokko district, with reserves of 4.3 billion tons; and the South Aldan district, with 12.2 billion tons of estimated reserves.²

Iron and Steel Products

The Soviet Union is the world’s largest producer of steel. Much of its productive capacity is based on older, less efficient technology than that used in Western countries and Japan. It faces rising production costs as it depletes its richest and most accessible iron ore deposits—expenses are rising because of the need to transport ore from distant reserves and to beneficiate an increasing percentage of ore whose iron content has declined from more than 50 percent to some 30 percent.³ Moreover, the USSR imports much of its requirements for high-quality steel sheet and tube products. In the 12th five-year plan, the country was focusing on modernization projects and more effective use of steel in a wider variety of products and in products of higher quality. The plan reflects a movement away from building new, large, and integrated metallurgical plants and from producing increased volumes of crude ingot steel. This trend necessitated a change in the manufacturing process used, away from open-hearth furnaces to basic oxygen converters in large, generally integrated plants and to electric furnaces in small mills. A major exception is in the Far East: A new integrated plant, based on Neryungri coking coal and Aldan iron ore, was proposed for the current plan. In addition, a new minimill was opened in December 1985. These mills reduce the need for long hauls of steel products across the country.⁴

Manganese

Although the USSR is the world’s largest producer of manganese, with three times the output of South Africa, Soviet demand has outpaced supply, in part because production has been stagnant for the past decade. Recent increases in output have come from mines with

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lower-grade ore. Almost all the country’s manganese comes from Nikopol Basin in the Ukraine (70 percent) and Chiatura Basin in the Georgian Republic (25 percent). Siberia has four deposits, contributing some 4 percent of the total output: The largest is at Usa in West Siberia, two are in East Siberia, and in the Far East, the Khingan deposit is modest—some 10 million metric tons.5

Chromium

The Soviet Union and South Africa are the world’s largest producers of chromium. Approximately 95 percent of the chromium mined in the USSR comes from the Donskoye complex in Kazakhstan, although deposits have been found in the Caucasus, East Siberia, and the Soviet Far East. In the 1970s, the Soviet Union faced depletion of easily accessible ores; it has been forced to exploit deeper deposits and to use lower-grade ores. Production has been stagnant since 1975, despite the addition of 800,000 tons of new capacity in 1987. Exports have been declining, in part because of the diffusion of a technological development in the 1960s that lowers the required grade of metallurgical ore used in the production process.6

NONFERROUS METALS

Nonferrous metals are a major contributor to hard currency earnings and include platinum, nickel, copper, aluminum, gold, titanium, tin, and lead and zinc. This group of products is difficult to analyze, however, because the USSR has restricted statistical reporting on these products since the mid-1970s.

Nickel

The USSR is reportedly one of the world’s largest producers of nickel, behind New Caledonia and Canada. The major deposits are found on the Kola Peninsula in the European USSR and in the Noril’sk district in northern East Siberia, where production began in the 1960s. Efforts to increase high-grade ore output on the Kola Peninsula have been unsuccessful. The Noril’sk development has become


the major center for nickel production and will likely continue to expand in the future. The Soviet Union has been able to meet its domestic and foreign sales needs by assisting in the development of the Cuban nickel industry in exchange for nickel ore. It exports an estimated 30 percent of its nickel—half to Eastern Europe and the remainder to West Germany, Great Britain, France, and Japan.\(^7\)

**Platinum**

A major producer and exporter of platinum-group metals, the Soviet Union ranks second to South Africa. Because of its importance as a hard currency earner and its military applications, the USSR has published little—at irregular intervals—about its production. Its major deposits are found in the Noril’sk district of northern East Siberia, although lower-grade deposits have been found in the Urals and the Kola Peninsula. Potential deposits, also lower grade, have been located in Yakutia in the Far East and have not been developed. An estimated 40 to 60 percent is exported, with the bulk going to the United States, Great Britain, and Eastern Europe.\(^8\)

**Aluminum**

Although the Soviet Union imports almost 50 percent of the raw material bauxite for its aluminum production, it is the world’s second largest producer (after the United States) and an important exporter of aluminum products. It has barter agreements with Guinea and Greece to exchange bauxite and alumina for machinery and equipment, and is assisting Ghana in exploiting its bauxite deposits. The current five-year plan calls for the development of two plants in East Siberia, as well as for the exploration of Katugino River cryolite deposits. East Siberia, which has a large volume of hydroelectric power along the Angora and Yenisey rivers, will likely produce an increasing proportion of the country’s aluminum and has the potential to expand exports to Western markets—especially Japan, which is currently an important buyer.\(^9\)

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Tin

The Soviet Union is the second largest producer of tin (after Malaysia), although it imports approximately a third of its needs. Most tin deposits are in the Far East; the largest is at Solnechny. A substantial proportion of the deposits is now within reach of the transportation system (that is, the BAM service area). Mining capacity is being expanded around this area, and improved processing technology is being sought to reduce the loss of tin content through beneficiation (an estimated one-third is lost through this process). 10

Copper

The Soviet Union is one of the largest producers of copper, sharing the lead with the United States. It has been attempting to increase its copper production as domestic consumption has grown, and its reserves and average ore content of copper mined have fallen. (Copper content in ore has declined some 50 percent in the past 30 years.) Kazakhstan, the country's major producing region, has approximately 50 percent of total reserves and produces some 30 percent of total output. Attempts to locate new deposits in the European USSR have not been successful. In East Siberia, the Noril'sk mining and metallurgical complex has increased output by 45 percent over the past ten years, but capacity must be added to maintain production. In addition, in East Siberia exploitation of the substantial deposits at Udokan—reportedly the world's largest copper province—has been delayed because of technological problems in mining and beneficiating the ore. The Soviets are trying to resolve these problems and have been seeking Japanese or U.S. assistance in developing these deposits. Despite the Soviet Union's production problems, analysts expect the USSR to continue to export some 15 percent of its output, mainly to Soviet bloc countries. 11

Gold

The Soviet Union is believed to be the world's second largest producer of gold, after South Africa; it uses gold mostly for settling

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balance-of-payment deficits. Reports suggest that gold sales have risen in the past several years to compensate for the loss of hard currency earnings caused by the fall in the price of oil. Most of the gold reserves are in the Soviet Far East.\textsuperscript{12} The 12th five-year plan calls for developing two new mines in central Asia and for a doubling of investment over the previous plan in the Magadan oblast in the Far East.\textsuperscript{13}

Titanium

The Soviet Union is one of the world's major producers of titanium, a material with important aerospace applications. Its major mineral deposits are in the Ukraine, the Urals, and Kazakhstan. Titanium has been found as a by-product in copper, cobalt, and iron ore production in mining complexes in the Far East. Large deposits, reportedly discovered in East Siberia, have not been developed because the Soviet Union is self-sufficient in titanium without East Siberian production and has a surplus for export, a major buyer being the United States.\textsuperscript{14}

Lead and Zinc

The USSR is encountering rising shortages of lead and zinc as reserves are being depleted and ore grade is declining. Efforts to expand capacity have been unsuccessful. The major producing region, Kazakhstan, provides 70 percent of the country's lead and 50 percent of its zinc. Other deposits are in the Urals, Georgia, and Siberia. In East Siberia, lead is being produced as a by-product of tin and zinc mining. Of three new sources in East Siberia, only one has been slated for development in the current five-year plan. The country has switched from being a net exporter to being a small importer of lead and zinc and has signed an agreement with the Congo to develop zinc deposits.\textsuperscript{15}

\textsuperscript{12}Deposits were also found in central Asia, the Urals, Armenia, and Mongolia in the 1970s.


NONMETALLICS

Nonmetals have been large earners of hard currency foreign exchange. They include apatite, asbestos, sulfur, and diamonds.

Apatite

Apatite provides raw material for approximately 75 percent of the domestic production of phosphatic fertilizer. The richest source, found in the Kola Peninsula, has reached peak production and is now facing declining ore grade, difficult mining conditions, and rapidly rising production costs. The Soviet Union is developing smaller and lower-grade ore deposits in Kazakhstan, the Urals, East Siberia, and the Far East. The Siberian sources will likely reduce the local deficiency of phosphate fertilizers, although only one site in the Far East is being developed under the current five-year plan.16

Asbestos

The USSR is the world’s largest producer of asbestos, producing some half of the world output and accounting for approximately a quarter of the total world trade in asbestos. Data show exports of 30 percent in 1975 and 21 percent in 1986. The largest and oldest deposit at Asbest in the Urals provides more than 50 percent of the country’s output of commercial asbestos but has been facing falling production. The USSR has sought to compensate for this decline by opening, in the mid-1960s, three mines in the European USSR and, in 1981, beginning development of a large deposit in East Siberia. The new mines have not made up for the fall in Asbest production, and the East Siberian mine has not been completed. Total production has remained 2–2.5 million tons since 1975.17

Diamonds

The Soviet Union is one of the world’s major producers of diamonds, both gem quality and industrial. Almost all diamonds are found in the Far East. Although no published data are available, estimates of production and trade indicate that diamonds are an important source of hard currency earnings, with exports of gem-quality diamonds ranging

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between 55 and 75 percent of output; of industrial diamonds, some 10 percent of production.\(^{18}\)

**Sulfur**

Although the Soviet Union is a major producer of sulfur, its consumption far exceeds production. Output of native sulfur, found in the European USSR, is declining as reserves are being depleted. Vast deposits have been located in the Far East, but are unlikely to be developed. The country has begun recovering sulfur from sulfur-bearing gas and expects to reduce its reliance on imports by expanding the processing of hydrogen-sulfide-saturated gas deposits, especially those found near the Caspian Sea.\(^{19}\)

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