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Soviet Copper: An Overview

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SOVIET COPPER: AN OVERVIEW

SUMMARY

1. The USSR has steadily expanded its copper production since 1960 and now ranks second only to the United States in world output. Becoming a net copper exporter in 1964, the USSR increased its net exports to 232,000 metric tons by 1973, of which about two-fifths went to non-Communist countries. The Soviets hope to develop Siberian copper deposits with foreign assistance, which—if forthcoming—would raise production and exports dramatically.

DISCUSSION

Resources

2. Soviet reserves of copper are among the largest in the world. According to the limited data available, measured reserves in the USSR at the end of 1965 amounted to more than 50 million tons of contained metal. Although proved reserves undoubtedly have increased since 1965, they probably fall short of the US level of about 80 million tons.

3. The principal deposits currently being exploited are in Kazakhstan, and other important deposits are in the Urals, Central Asia, the Kola Peninsula, and the region near Noril'sk (see Figure 1). The most notable deposit discovered in recent years is the giant Udokan ore body in the Transbaikalia region of east Siberia. The Udokan deposit, which the USSR claims to be the largest single copper deposit in the world, reportedly has the potential to yield 400,000 tons of refined copper per year for more than 50 years. The quality of the ore is said to be high, averaging 1½% to 2% copper content. Elsewhere in the USSR, as in the United States, commercially exploited ores usually average considerably less in terms of copper content.

Production

4. The USSR has increased production of refined copper steadily from about 0.5 million tons in 1960 to about 1.2 million tons in 1973 (see Table 1 and Figure 2). Soviet output in 1973 was the second largest in the world, although only about 60% of US production of 2.1 million tons. Soviet production is adequate to meet increasing domestic needs and leave a surplus for export. Production is scheduled to increase by 41% during the Ninth Five-Year Plan (1971-75) to about 1.4 million tons, mainly by increasing the scale of operations at existing mining and metallurgical centers.

Note: Comments and queries regarding this publication are welcomed. They may be directed to _____ of the Office of Economic Research,



Table 1
Soviet Copper Industry¹

	Thousand Metric Tons		
	Estimated Production (Refined)	Net Imports	Apparent Domestic Supply
1946	143	6	149
1947	156	-2	154
1948	187	-1	186
1949	224	-13	211
1950	247	-20	227
1951	281	-34	247
1952	323	-41	282
1953	321	-31	290
1954	337	-16	321
1955	377	7	384
1956	387	-8	379
1957	396	-1	395
1958	406	50	456
1959	440	57	497
1960	475	42	517
1961	510	22	532
1962	550	35	585
1963	600	16	616
1964	650	-80	570
1965	700	-92	608
1966	750	-113	637
1967	800	-93	707
1968	900	-100	800
1969	950	-107	843
1970	1,015	-122	883
1971	1,090	-166	924
1972	1,145	-193	952
1973	1,200	-232	968

¹ The derivation of production and trade statistics is explained in the Appendix.

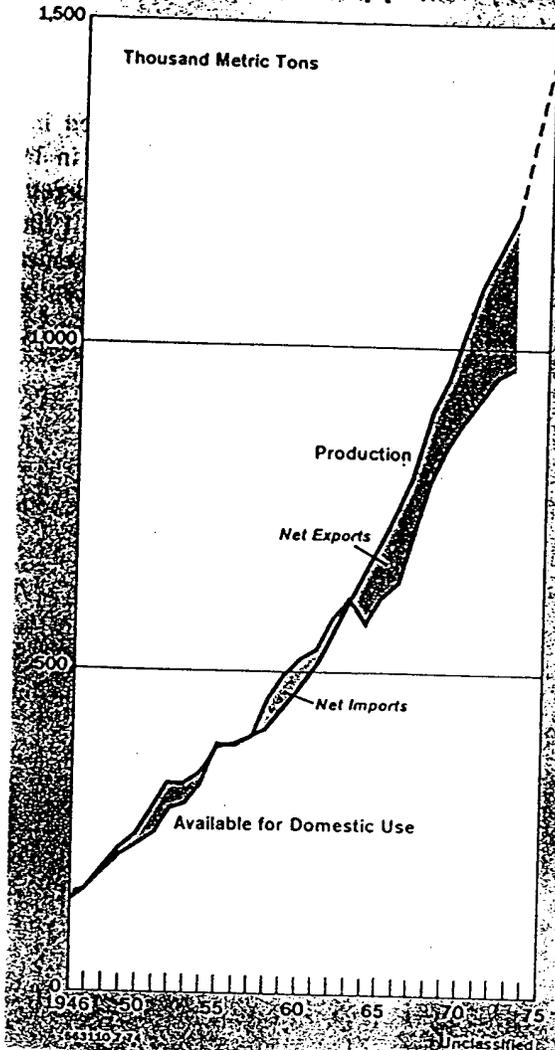
Table 2
Soviet Copper Trade¹

	Thousand Metric Tons		
	Exports	Imports	Net Exports
1946	2.3	8.3	-6.0
1947	3.7	1.8	1.9
1948	8.4	7.2	1.2
1949	16.9	4.1	12.8
1950	26.7	6.4	20.3
1951	36.0	1.5	34.5
1952	47.8	7.1	40.7
1953	44.5	13.2	31.3
1954	45.3	29.5	15.8
1955	36.7	43.8	-7.1
1956	52.4	44.7	7.7
1957	60.6	59.3	1.3
1958	43.8	93.8	-50.0
1959	58.8	115.9	-57.1
1960	64.4	106.0	-41.6
1961	60.4	82.2	-21.8
1962	71.3	106.4	-35.1
1963	72.0	88.0	-16.0
1964	89.5	9.5	80.0
1965	93.1	0.7	92.4
1966	120.0	7.4	112.7
1967	94.0	1.4	92.6
1968	109.3	9.4	99.9
1969	107.4	0.4	107.0
1970	123.1	1.0	122.1
1971	173.6	7.4	166.2
1972	202.1	8.8	193.3
1973	237.7	6.1	231.6

¹ The derivation of the trade statistics is explained in the Appendix.

Foreign Trade

Figure 2
Soviet Refined Copper Industry



5. From 1947 to 1957 (except for 1955) the USSR exported small to moderate quantities of refined copper, almost all to Eastern Europe (see Table 2). During 1958-63 the USSR was a net importer, obtaining virtually all of its foreign copper from non-Communist countries. Imports were reduced drastically after 1963, turning the USSR into a net exporter to both Communist and non-Communist areas. In 1973, net exports climbed to 232,000 tons, of which about two-fifths went to non-Communist countries.

6. Soviet exports to the non-Communist world increased sharply during 1970-73, from 19,000 tons to about 100,000 tons. During 1973, copper prices on the London Metal Exchange increased 100%, from 50 cents to approximately \$1.00 a pound. Prices continued to rise in 1974, reaching a peak of \$1.52 in March, although falling back to below \$1.00 by the end of June. The combination of increased shipments and rising prices has resulted in a substantial increase in hard currency earnings for the USSR; sales to hard currency countries in 1973 exceeded \$175 million, about twice the sales in the previous years.

Soviet Interest in Foreign Assistance

7. As far back as 1965, Soviet officials approached Western industrialists with proposals for developing the Udokan copper deposits. In 1971, Premier Kosygin invited American participation in the project. Estimates of the cost for development of mines and ore processing and production facilities, along with rail lines, housing, and other infrastructure, range up to \$2 billion. Completion of the project could take 10 years.

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8. The USSR is also negotiating with Finland for the purchase of equipment for a large copper and nickel smelting plant to be constructed at Noril'sk. Another indication of the USSR's interest in obtaining Western assistance has come from the International Investment Bank of the Council for Mutual Economic Assistance (CEMA). The CEMA bank reportedly wants to borrow large sums in Western money markets for major development projects, including construction of new copper mines in the USSR.

9. The expansion planned at Noril'sk would yield an estimated increase in production of about 150,000 tons per year, or 12% of total output in 1973. The project probably could be completed within several years. The larger Udokan project, however, would probably not be completed until the early 1980s at the earliest, assuming an initiation of work within the next year or two. Annual output at Udokan probably would amount to about 400,000 tons, or one-third of current output.

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APPENDIX

METHODOLOGY

Production Estimates

The last year for which the Soviets released actual production data was 1938. Since then, percentage increases in production have been announced for plan periods and/or individual years, which can be related to the 1938 production level. In this manner a production estimate has been made for each year during 1937-75 (see Table 3).

Although the estimated year-to-year production increases exhibit a questionable regularity in certain periods, the overall growth pattern for the industry is consistent with the improvement in the Soviet copper supply position. For example,

since 1967 the Soviets have made a major effort to modernize and increase smelter and refinery capacities. Between 1968 and 1973, refinery capacity increased 30%, from 1.176 million to 1.530 million tons—levels roughly consistent with the estimates of production. (Copper refinery capacity has been estimated by using a correlation between the size of the electrolytic cell building and annual output. Generally stated, the area of the cell building divided by 1.29 yields the annual refined copper capacity in tons. The correlation factor was derived from a study of copper refineries in the United States.

Foreign Trade

Since 1946 the USSR has been the primary source of refined copper for Eastern Europe, which took most of the Soviet copper exports to Communist countries (see Table 4). These exports have been reported, by annual total and by country of destination, fairly consistently in Soviet foreign trade handbooks, and some gaps can be cleared up by inspecting trading partner statistics. Imports from Communist countries have not been identified except for very small amounts from North Korea in 1959-61. The USSR probably did not import any copper from Eastern Europe because these countries all imported copper and had only limited copper resources.¹

Imports from non-Communist countries have been reported annually since 1952, although large amounts were not identified, by country of origin, for 1958-62.² No exports to non-Communist countries were reported for the years before 1966; in

1. Poland has recently begun to develop sizable copper deposits and has begun to export to both Communist and non-Communist markets.

2. There is no clear explanation for the large discrepancies in this period. The Soviet copper industry fell short of planned production goals before and during the Seven-Year Plan, so the copper may have been purchased on international markets with the origin not specified.

Table 3

Methodology: Estimates of Soviet Refined Copper Production

	Thousand Metric Tons	Percentage Increase ¹
1937 ²	98	
1938 ²	103	
1939 ³	143	5.7
1940 ⁵	161	46 ⁴
1941 ⁶	187	65 ⁴
1942 ⁶	164	
1943 ⁶	141	
1944 ⁶	148	
1945 ⁷	135	
1946 ⁷	143	
1947 ⁷	156	6
1948 ⁷	187	9
1949 ⁷	224	20
1950 ⁷	247	20
1951 ⁸	281	10
1952 ⁹	323	14
1953 ¹⁰	321	15
1954 ¹¹	337	
1955 ¹²	377	
1956 ¹³	387	
1957 ¹³	396	
1958 ¹³	406	
1959 ¹⁴	440	
1960 ¹⁴	475	
1961 ¹⁴	510	
1962 ¹⁴	550	
1963 ¹⁴	600	
1964 ¹⁴	650	
1965 ¹⁴	700	
1966 ¹⁶	750	72.4 ¹⁵
1967 ¹⁶	800	
1968 ¹⁶	900	
1969 ¹⁸	950	28.5 ¹⁷
1970 ¹⁸	1,015	
1971 ¹⁹	1,090	45 ¹⁷
1972 ¹⁹	1,145	7.3
1973 ¹⁹	1,200	
1974 ¹⁹	1,300	
1975 ¹⁹	1,430	

Table 3

Methodology: Estimates of Soviet Refined Copper Production
(Continued)

1. Over that for the previous year, unless otherwise indicated.
2. USSR, Gosplan. *Sotsialisticheskoye stroitel'stvo SSSR, 1933-38*, Moscow 1939.
3. *Industriya*, 23 May 1940.
4. Over that for 1937.
5. *Pravda*, 21 February 1941.
6. Production for the war years 1941-44 was derived from information about production in the Kazakh SSR and its relation to total production in the USSR. In 1941 the Kazakh SSR produced 22.3% of Soviet copper production, 31.6% in 1943, and 35.7% in 1944. Output in the Kazakh SSR in 1941, 1943, and 1944 was derived from percentage increases over output in 1940. Output in 1940 in the Kazakh SSR was derived from published reports relative to 1913 output, which was known. Output in the USSR was also calculated from German open sources which also estimated 1940 production at 160,000 tons. Primary sources for the above calculations were *Kazakhstanskaya pravda*, August 1944; *Planovoye khozyaystvo*, March 1952; and *Godovoy obzor mineral'nykh resursov*, Leningrad, 1926.
7. Production in 1945 was derived from reports linking it to output in 1955, for which an independent estimate has been made as explained in footnote 12. Production in 1950 was derived from 1955, which was reported as 53% greater than 1950. The derived figure for 1950 was linked to 1945 by reports giving annual percent increases during 1945-50. The sources for these estimates were *Pravda*, 21 January 1947, 18 January 1948, and 26 February 1956; *Current Digest of the Soviet Press*, February 1949, March 1950, and March 1951; and *Liteynoye proizvodstvo*, October 1957.
8. *Pravda*, 29 January 1952.
9. *Pravda*, 23 January 1953.
10. Derived from 1954 production, which was 5% greater than 1953. *Trud*, 21 January 1955.
11. Derived from 1955 production, which was 12% greater than 1954. *Current Digest of the Soviet Press*, 14 March 1956.
12. Output in 1955 was derived from the statement that the Kazakh SSR accounted for 44% of total output. Production for Kazakh SSR in 1955 was estimated at 166,000 tons by linking output in Kazakh SSR in 1940 to that in 1913, and output in 1950 to that in 1940, and output in 1955 to that in 1950. Production in 1940 was seven times that in 1913, or 35,490 tons. Planned output in 1950 was 260% of output in 1940, or 92,274 tons. The Fourth Five-Year Plan (1946-50) for production of copper in Kazakh SSR was fulfilled by 100.5%. Sources for these years were *Kazakhstanskaya pravda*, 28 January 1949, 16 December 1951, and 18 December 1955, and *Planovoye khozyaystvo*, March 1952.
13. Annual percentage increases of production were not published for 1956-58. If the USSR had increased production by as much as 5% in any one of these years an announcement would probably have been made. On the assumptions that some increase occurred and that it was less than 5%, a figure of 2.5% average increase per year was selected.
14. Output increased by 72.4% in 1965 over production in 1958. Production increases were allocated at an average annual rate of growth over the Seven-Year Plan (1958-65). (*The Soviet Journal of Nonferrous Metals*, April 1967)
15. Over that for 1958.
16. Production increased 28.5% in 1968 over 1965. (*Journal of Nonferrous Metals*, January 1969)
17. Over that for 1965.
18. Production during the Eighth Five-Year Plan (1966-70) increased by 45% over output in 1965. Output for 1969 was interpolated. The source of the plan fulfillment was *Journal of Nonferrous Metals*, May 1972.
19. Planned annual increases for the Ninth Five-Year Plan were announced in the *State Five-Year Plan for the Development of the USSR National Economy*. The plan called for the following percentage increases over 1970:

1971	1972	1973	1974	1975
7.0	12.8	18.0	28.1	41

Actual output for 1971 was announced as 7.3% over 1970, and the plans for 1972 and 1973 were reportedly achieved although no percentages were given. (*Journal of Nonferrous Metals*, May 1972, May 1973, and February 1974)

Table 4
Methodology: Soviet Copper Trade¹

	Thousand Metric Tons							
	Trade			Exports		Imports ²	Residuals ³	
	Exports	Imports	Net Imports	To Communist Countries	To Non-Communist Countries ⁴	From Non-Communist Countries	Exports	Imports
1946	2.3	8.3	6.0	2.2				
1947	3.7	1.8	-1.9	2.7			0.1	8.3
1948	8.4	7.2	-1.2	8.1			1.0	1.8
1949	16.9	4.1	-12.8	16.0			0.3	7.2
1950	26.7	6.4	-20.3	25.1			0.9	4.1
1951	36.0	1.5	-34.5	30.7			1.6	6.4
1952	47.8	7.1	-40.7	41.5			5.3	1.5
1953	44.5	13.2	-31.3	40.7		0.3	6.3	6.8
1954	45.3	29.5	-15.8	34.9		5.8	3.8	7.4
1955	36.7	43.8	7.1	36.7		25.0	10.4	4.5
1956	52.4	44.7	-7.7	52.4		38.3	....	5.5
1957	60.6	59.3	-1.3	60.6		40.6	....	4.1
1958	43.8	93.8	50.0	43.8		53.9	....	5.4
1959	58.8	115.9	57.1	58.3		76.3	....	17.5
1960	64.4	106.0	41.6	64.2		50.2	0.5	65.7
1961	60.4	82.2	21.8	60.2		49.7	0.2	56.3
1962	71.3	106.4	35.1	70.2		52.1	0.2	30.1
1963	72.0	88.0	16.0	72.0		80.8	1.1	25.6
1964	89.5	9.5	-80.0	80.9		83.8	....	4.2
1965	93.1	0.7	-92.4	93.1		8.9	8.6	0.6
1966	120.1	7.4	-112.7	89.7		....	....	0.7
1967	94.0	1.4	-92.6	88.3	11.5	0.3 ⁵	18.9	7.1
1968	109.3	9.4	-99.9	98.6	5.6	1.4 ⁵	0.1	....
1969	107.4	0.4	-107.0	60.4 ⁶	10.7	9.2 ⁵	....	0.2
1970	123.1	1.0	-122.1	60.8 ⁶	4.3	0.1 ⁵	42.7 ⁶	0.3
1971	173.6	7.4	-166.2	63.8 ⁶	19.3	....⁵	43.0 ⁶	1.0
1972	202.1	8.8	-193.3	78.5 ⁶	63.2	6.4 ⁵	46.6 ⁶	1.0
1973	237.7	6.1	-231.6	91.0	72.0	0.8 ⁵	51.6 ⁶	8.0
					92.3	6.0 ⁵	54.4 ⁶	0.1

1. Reported in Soviet foreign trade handbooks.
2. Imports from non-Communist countries were not reported for 1946-51. There were no reported imports from Communist countries for any years except 1959, 1960, and 1961, when North Korea sent to the USSR 400, 100, and 30 tons.
3. Not reported by area. Export residuals are total exports minus exports to Communist countries minus exports to non-Communist countries (after 1951). Small residuals are probably caused by rounding. Most of the export residuals in 1969-73 probably are explained by unreported shipments to East Germany (footnote 6), but part of the residuals in 1972 and 1973 is explained by unreported shipments to France. France reported that it had imported 6,000 tons of copper from the USSR in 1972 and 14,000 tons in 1973.
4. Exports to non-Communist countries were not reported for 1946-65.
5. Net reported exports to non-Communist countries in 1966-73 were as follows (thousand tons):

1966	11.2
1967	4.2
1968	1.5
1969	4.2
1970	19.3
1971	56.8
1972	71.2
1973	86.3

6. No exports to East Germany were identified for these years. Shipments to East Germany in 1964-68 were as follows (thousand tons):

1964	40.3
1965	42.4
1966	42.9
1967	41.6
1968	43.8

If the average of 42,200 tons is added to known shipments to Communist countries for 1969-73, the annual totals are reasonably close to the reported total exports (thousand tons):

	Total Reported	Country Totals	Communist Countries	Non-Communist Countries
1969	107.4	106.9	=	102.6
1970	123.1	122.3	=	103.0
1971	173.6	169.2	=	106.0
1972	202.1	192.7	=	120.7
1973	237.7	225.5	=	133.2

most of these years the USSR bought sizable quantities of copper from these countries. Since 1966, imports have remained small while exports have increased.

Domestic Consumption

The USSR has not released data on domestic consumption of refined copper since the early 1930s and has never reported additions to or withdrawals from stockpiles. The supply, or apparent supply, as shown in Table 1, includes both consumption and net changes in stockpiled reserves.