13

ELECTRICAL MACHINERY, APPARATUS, AND APPLIANCES

THE UNITED STATES was the leading exporter of electrical machinery and apparatus, followed by Germany, the United Kingdom, and Japan (Table 13.1). The EEC countries accounted for two-thirds of the EEC market, while the United States dominated the Canadian, Japanese, and Latin American trade. The United Kingdom led all the other sellers by a wide margin in sales to other countries, and Japan was the major outside source for the U.S. market. All these statements are subject to an important reservation: More than $340 million in exports, mainly from the United States, were not identified by destination. These were over 20 per cent of U.S. exports and more than 5 per cent of OECD exports in this division.

The major shifts in export shares in this division took place between 1953 and 1961 (Table 13.2). The U.S. share was cut by fifteen percentage points (more than a third) and the smaller U.K. share by six percentage points (over a quarter). The main beneficiary was Japan, whose share was less than 1 per cent in 1953 and rose to more than 7 per cent in 1961. Germany's share gained by nine percentage points, an increase of 70 per cent over its initial share of exports. France and the other EEC countries also improved their position substantially.

After 1961 the U.S. share changed little but the U.K. position continued to deteriorate. Germany's share, which had risen so rapidly before 1961, declined in the next few years. The shares of Japan and of

Note: SITC 72. *Value of OECD exports in 1963:* $6,005 million; 13.5 per cent of study total. *Coverage:* Equipment for producing and transmitting electricity, telecommunications apparatus, domestic electrical equipment, and all other electrical machinery and appliances.

Table 13.1
OECD Exports of Electrical Machinery, Apparatus, and Appliances (SITC 72),
by Origin, Destination, and Commodity Group, 1963
(dollars in millions)

	Value of Exports	Per Cent of OECD Exports in 72	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
Total, all destinations and groups	$6,005	100.0	100.0	24.8	14.8	41.2	19.5	8.6
Destination								
U.S.	397	6.6	100.0		10.6	22.2	11.6	47.1
OECD Europe	2,660	44.3	100.0	13.8	10.2	61.8	30.5	2.1
U.K.	173	2.9	100.0	33.5		45.7	17.3	2.9
EEC total	1,535	25.6	100.0	13.9	8.9	65.2	27.8	1.6
Germany	344	5.7	100.0	15.1	9.6	53.8		3.5
Canada	338	5.6	100.0	78.1	13.0	4.4	2.4	3.0
Japan	67	1.1	100.0	70.1	7.5	16.4	9.0	
Latin America	490	8.2	100.0	40.8	7.8	30.2	12.2	10.6
Other	1,708	28.5	100.0	15.9	28.8	33.4	14.1	12.5
Unaccounted for by destination	344	5.7	100.0	100.0				

(continued)

Table 13.1 (concluded)

	Value of Exports	Per Cent of OECD Exports in 72	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
SITC commodity group								
Electric power machinery and switchgear (722)	$1,403	23.4	100.0	23.2	15.4	43.2	22.5	4.1
Electricity distribution equipment (723)	343	5.7	100.0	10.5	28.6	39.1	17.5	11.4
Telecommunications equipment (724)	1,715	28.6	100.0	22.8	12.8	37.9	16.3	16.5
Domestic electrical equipment (725)	554	9.2	100.0	17.7	18.0	49.4	24.0	3.5
Miscellaneous electrical machinery and apparatus (726, 729)	1,989	33.1	100.0	32.3	13.0	40.8	19.3	6.1

Source: Appendix A and sources cited there.

Table 13.2
OECD Exports of Electrical Machinery, Apparatus, and Appliances, 1953, 1957, 1961–64
(dollars in millions)

	Value of OECD Exports	Share in OECD Exports (per cent)					
		OECD	U.S.	U.K.	EEC Total	EEC Germany	Japan
		INCLUDING SWITZERLAND AND SPAIN					
1964	$6,836	100.0	24.4	12.9	42.6	19.2	9.3
1963	6,005	100.0	24.9	14.8	41.2	19.5	8.6
1962	5,312	100.0	25.6	15.1	40.7	20.4	8.1
1961	4,748	100.0	24.9	16.0	41.8	21.5	7.1
		EXCLUDING SWITZERLAND AND SPAIN					
1961	4,599	100.0	25.7	16.5	43.2	22.2	7.4
1957	3,063	100.0	32.8	20.8	37.5	21.0	2.5
1953	2,112	100.0	40.4	22.8	29.5	13.1	0.7

Source: Appendix B.

EEC countries outside of Germany and France also increased between 1961 and 1964.

The rapid growth in Japan's exports before 1961 was associated with a great increase in Japanese price competitiveness, at least during 1957–61, and the continued gains after that matched a favorable relative price movement until 1963 (Table 13.3). During 1953–57, export shares of the United States and the United Kingdom and their price competitiveness declined. After that, U.S. price performance improved steadily but its export share continued to fall until 1961.

Price increases in this division were smaller than in most others covered by the study. Japanese prices in 1964 were far lower than in the first year shown, and U.S. prices ended somewhat below the initial level. Only the United Kingdom had a price increase of over 5 per cent.

The U.S. price position in SITC 72 was relatively favorable at the end of the period, as compared with that in other products. Even the Japanese price level was only 10 per cent lower. German prices were slightly below those of the United States, and British prices were higher.

Table 13.3
International Prices, Price Competitiveness, and Price Levels, Electrical Machinery, Apparatus, and Appliances, 1953, 1957, 1961–64

	1953	1957	1961	1962	1963	1964
INTERNATIONAL PRICE INDEXES (1962 = 100)						
U.S.	102	108	104	100	97	97
U.K.	96	98	103	100	101	101
EEC	98	100	102	100	100	99
Germany	96	98	101	100	99	98
Japan	NA	124	106	100	97	99
INDEXES OF U.S. PRICE COMPETITIVENESS (1962 = 100)						
Relative to						
U.K.	94	91	99	100	105	103
EEC	96	92	97	100	103	101
Germany	94	91	97	100	102	101
Japan	NA	115	102	100	100	102
INTERNATIONAL PRICE LEVELS (U.S. FOR EACH YEAR = 100)						
U.S.	100	100	100	100	100	100
U.K.	97	94	102	103	108	106
EEC	90	86	91	94	97	95
Germany	90	87	93	96	98	97
Japan	NA	103	91	89	90	91

Source: International price indexes from Appendix C; price competitiveness indexes, Appendix D; price levels, Appendix E.

In the following sections four specific groups in the electrical machinery division—electric power machinery and switchgear, electricity distribution equipment, telecommunications equipment, and domestic electrical equipment—are discussed in detail. These groups account for over $4 billion in OECD exports, more than two-thirds of the total for the division. The most important group not covered is miscellaneous electrical machinery and apparatus (SITC 729), which is a collection of heterogeneous subgroups not appropriately treated as one group.

Electric Power Machinery and Switchgear [1]

Trade

In 1963, the United States was the leading exporter of electric power machinery and switchgear (SITC 722) by a narrow margin over Germany, and the United Kingdom ranked third, a considerable distance behind (Table 13.4). Germany was the dominant exporter to Europe, but the United States exported almost twice as much or more to the other areas shown in the table. Among the countries not listed separately, France was a major exporter, along with Sweden and Switzerland.

The two large subgroups which make up this group are electric power machinery (57 per cent), in which the United States was the largest exporter, and switchgear (43 per cent), in which Germany was more important. For the United States and the United Kingdom it is possible to break the electric power machinery down into its main components. Generators were the largest item, and the one in which the U.S. lead was greatest. Electric motors were the next most important in both the United States and the United Kingdom, followed by transformers, in which the United Kingdom had a slight lead as an exporter.

The U.S. share of OECD exports of electric power machinery and switchgear fell sharply between 1957 and 1961 but then remained stable and even increased slightly (Table 13.5). The share of the United Kingdom, on the other hand, fell steadily—from 30 per cent in 1953, which was close to the U.S. share, to less than 15 per cent at the end of the period. The EEC countries as a whole, and Germany in particular, made rapid gains between 1953 and 1961, but after that the German share fell back and France's remained approximately constant. Other large increases, amounting almost to a tripling of their share between 1953 and 1962, were made by other OECD countries, particularly Sweden.

Within the electric power machinery subgroup, the United States has been a leader in the movement toward larger units and has tended to be an exporter at the upper end of the size scale for generators and transformers. It has also led in the development of atomic power generating

[1] SITC 722. *Value of OECD exports in 1963:* $1.4 billion; 3.1 per cent of study total. *Coverage:* Generators, transformers, electric motors, circuit breakers and other apparatus for making, breaking, or protecting electrical circuits.

Table 13.4
OECD Exports of Electric Power Machinery and Switchgear (SITC 722), by Origin, Destination, and Commodity Subgroup, 1963
(dollars in millions)

	Value of Exports	Per Cent of OECD Exports in 722	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
Total, all destinations and subgroups	$1,403	100.0	100.0	23.2	15.4	43.2	22.5	4.1
Destination								
U.S.	31	2.2	100.0		19.4	19.4	12.9	22.6
OECD Europe	584	40.8	100.0	13.2	6.0	63.0	37.8	0.3
U.K.	28	2.0	100.0	25.0		50.0	25.0	[a]
EEC total	329	23.4	100.0	12.8	4.2	67.2	35.6	0.3
Germany	62	4.4	100.0	11.3	3.2	51.6		[a]
Canada	65	4.6	100.0	81.5	12.3	3.1	1.5	[a]
Japan	19	1.4	100.0	73.7	5.3	10.5	10.5	
Latin America	171	12.2	100.0	39.8	8.8	32.2	9.9	8.2
Other	531	38.7	100.0	21.5	28.2	32.2	13.6	6.3
Unaccounted for by destination	2	0.1	100.0					100.0
SITC commodity subgroup								
Electric power machinery (SITC 722.1)	803	57.2	100.0	24.9	16.1	40.2	20.7	4.7
Switchgear (SITC 722.2)	600	42.8	100.0	21.0	14.5	47.0	25.0	3.2

Source: Appendix A and sources cited there
[a]Less than 0.05 per cent.

Table 13.5
OECD Exports of Electric Power Machinery and Switchgear, 1953, 1957, 1961–64
(dollars in millions)

	Value of OECD Exports	Share in OECD Exports (per cent)					
					EEC		
		OECD	U.S.	U.K.	Total	Germany	Japan
ELECTRIC POWER MACHINERY AND SWITCHGEAR (SITC 722)							
Including Japan							
1964	$1,547	100.0	23.0	13.3	43.9	22.8	3.8
1963	1,403	100.0	23.2	15.4	43.2	22.5	4.0
1962	1,228	100.0	21.5	15.6	44.7	24.8	3.7
Excluding Japan							
1962	1,182	100.0	22.3	16.2	46.4	25.7	NA
1961	1,096	100.0	22.3	17.4	45.6	26.3	NA
Excluding Japan, Switzerland, and Spain							
1961	1,067	100.0	23.0	17.9	46.9	27.0	NA
1957	755	100.0	34.7	24.5	35.7	23.5	NA
1953	555	100.0	34.1	29.9	30.8	17.1	NA
ELECTRIC POWER MACHINERY (SITC 722.1)							
Including Japan							
1964	875	100.0	26.3	13.5	39.5	20.1	4.1
1963	803	100.0	24.9	16.1	40.3	20.6	4.7
1962	702	100.0	22.1	17.4	41.4	23.0	4.8
Excluding Japan							
1962	669	100.0	23.2	18.2	43.3	24.2	NA
1961	635	100.0	23.5	18.4	43.9	24.7	NA
SWITCHGEAR (SITC 722.2)							
Including Japan							
1964	672	100.0	18.8	13.1	49.7	26.3	3.3
1963	600	100.0	21.0	14.4	47.1	25.1	3.1
1962	526	100.0	20.7	13.2	49.2	27.2	2.5
Excluding Japan							
1962	513	100.0	21.2	13.5	50.5	27.9	NA
1961	461	100.0	20.8	16.1	48.1	28.4	NA

Source: Appendix B.

systems. Bids on these are not included in our indexes, however, partly because most of the development came after the period covered by the study. Although the United Kingdom was a leader in the earlier development of atomic power, it later fell behind, particularly when U.S. companies, anticipating the gains from the larger scale of production of components, cut prices in 1963 and after. In early 1967 it was reported that the United Kingdom had received no export orders for nuclear plants for several years; France received its first export order in 1966. The American companies had, in the meantime, won a substantial number of contracts for atomic power generating stations in several different foreign countries. The success of U.S. companies in bidding does not necessarily imply that the full amount of the bid was purchased in the United States, because some foreign purchasers insisted on producing as many of the components as they could, even at the expense of raising the cost considerably by foregoing the economies of scale available in U.S. component production.[2]

Sweden's technological leadership in high-voltage direct current transmission systems was responsible for some of its successes in the American and Canadian markets after 1964, and probably accounted for some of the increases in its share of exports in this group before that date.[3]

Nonprice Influences on Trade

Trade in heavy electrical equipment of the type bought mainly by utilities, such as large generators, transformers, and circuit breakers, is both restricted and promoted by governmental actions, and has been influenced also by various private arrangements among companies within

[2] "The Atomic Flood-Tide," *Economist*, September 24, 1966; "GE to Publish Prices of Atomic Power Plants up to Million Kilowatts," *Wall Street Journal*, February 28, 1964; "Atomic Power: Wide of Target," *Economist*, May 6, 1967; "Atomic Power: Bargain and Barter," *ibid.*, October 22, 1966; "GE Plant in Japan," *Wall Street Journal*, December 12, 1963; "Westinghouse to Build Swiss Atomic Plant," *ibid.*, July 19, 1965; "U.S. Firms Seek to Win Atomic Power Order," *Journal of Commerce*, April 11, 1966; "Spain Will Get Its Second Nuclear Power Plant; GE Shares in $61-million Contract," *Business Week*, May 14, 1966; "GE Wins Contract: Swiss Opt for Nuclear Power," *Journal of Commerce*, September 9, 1966; "Atomic Push Abroad: Growing World Market in Nuclear Power Field Attracts U.S. Firms," *Wall Street Journal*, September 13, 1966; "Atomic Energy: Bidding," *Economist*, September 10, 1966.

[3] "Swedish Electrical Producer Spreads Its Production and World Facilities," *Journal of Commerce*, February 19, 1964; "Swedish Firm Has High Hopes for System of Long-Distance Transmission of Power," *Wall Street Journal*, June 11, 1964; "Swedish Producer Receives Electric Transmission Order," *New York Times*, January 31, 1965; "GE Wins Order in Power Project," *ibid.*, May 1, 1965; "GE, Swedish Firm Get $52 Million in Pacts for Two Terminals on Pacific Power Intertie," *Wall Street Journal*, May 3, 1965; "Swedish Electrical Firm Seeks U.S. Sales," *Journal of Commerce*, May 24, 1965; "Power Lines Get Higher Voltage," *New York Times*, July 4, 1965.

and among different countries. In many countries the production and distribution of electricity are governmental functions, and the electricity authorities consider themselves obliged to purchase their equipment from domestic producers without inviting offers from foreign firms.[4] The relation of government enterprises to foreign suppliers was the opposite in the United States. Privately owned utilities, far more important than government-owned ones, were reluctant to purchase abroad, and the ratio of imports to domestic output was very low.[5] However, government-owned authorities, both federal and local, took the lead in encouraging foreign producers to enter bids and at times purchased substantial fractions—as much as a quarter or a third—of some types of equipment from overseas despite "buy-American" differentials of 6 per cent or more (up to 50 per cent for the Defense Department).[6]

Governmental actions affecting trade in electric power and related machinery are not confined to imports but include also the encouragement of exports through tied loans. Some international aid is not tied, particularly loans by the IBRD and IDA, which lent almost $3 billion for electric power projects during 1953–64.[7] Total exports of electric power machinery and switchgear by OECD countries during these years came to over $10 billion.

Most U.S. government loans under the Agency for International Development (AID) have been tied in recent years and Export-Import Bank loans have always been tied to procurement in the United States.

[4] Imports of electric power and related equipment were about 2 per cent of home consumption in the United Kingdom in 1951 (*Report on the Supply and Exports of Electrical and Allied Machinery and Plant*, Monopolies and Restrictive Practices Commission, London, 1957, p. 337). The Central Electricity Authority considered any attempt ". . . to stimulate competition and obtain a check on price levels . . . by importing . . . impracticable for political reasons" (*ibid.*, pp. 222–223). In 1961, however, the Central Electricity Generating Board, which had previously purchased only those foreign products not available at home, did buy transformers from Canada ("Electricity: Buying Abroad," *Economist*, November 18, 1961).

[5] U.S. imports of motors, generators, and transformers in the early 1960s were about 1 per cent of the new supply, that is, output plus imports (*U.S. Commodity Exports and Imports as Related to Output, 1964 and 1963*, U.S. Bureau of the Census, Series ES 2, No. 7, 1966). After 1964 the attitudes of private utilities showed signs of change. The most notable of these was a purchase of turbine generators, in 1967, but that was only one of a number of recent private orders ("American Electric Buys 2 Turbines from Swiss Firm," *Wall Street Journal*, Dec. 12, 1967; "Switzerland's New Peak," *Economist*, Dec. 16, 1967; "Edison Buys Huge Turbine Generator," *Journal of Commerce*, Aug. 31, 1967; "AEI Awarded Contract for Generators," *ibid.*, Jan. 18, 1968; "Utilities Looking Abroad for Quality," *New York Times*, March 2, 1969).

[6] "Electrifying Surrender," *Economist*, December 10, 1960; "English Electric Pushes Export Drive," *Journal of Commerce*, August 4, 1965.

[7] *Annual Report*, International Bank for Reconstruction and Development and International Development Association, 1952–53 and 1964–65.

These two agencies lent over $1.25 billion on projects related to electric power during the decade of this study, of which only about $200 million was in AID loans before the period when they were tied to purchases in the United States.[8] Other countries have frequently insisted on tying their aid loans and grants, and these measures have influenced the direction of trade in this commodity group.

In addition to governmental restriction and encouragement of exporting there have been, at times at least, private agreements which allocated markets, often as part of licensing arrangements. The British report, cited earlier, mentions two agreements on generators, one ". . . a technical aid agreement with an associated foreign company. . . . Each party also agrees not to supply in the other's specified exclusive territory without the other's consent"; and the second ". . . an agreement between a United Kingdom manufacturer and a foreign manufacturer under which the British company receives the right to the use of certain designs, test and manufacturing data . . . and undertakes . . . not to export machinery of the types concerned without the foreign manufacturer's consent. . . ." [9]

The antitrust cases against the U.S. electrical equipment manufacturers did not involve prices charged to foreign buyers; and we do not know, therefore, whether the collusion among the U.S. companies extended to foreign sales (see the appendix to this chapter). The steep drop in export prices after 1957, parallel to that in domestic sales, suggests that similar agreements might have been keeping export prices artificially high. The high prices and the decline are particularly notable because our indexes exclude prices under tied aid, which we might have expected to be most strongly affected by collusion among domestic companies.

Price Competitiveness

The price competitiveness of the United States in electric power machinery and switchgear rose through most of the period from 1957

[8] Over $830 million in Eximbank credits were extended for electric power projects (not all for equipment in this group) during fiscal 1957–64 (*Report to the Congress*, Export-Import Bank of Washington, various years), and over $530 million in AID procurement expenditures for electrical apparatus in fiscal 1956–65, of which about $360 million were disbursed during fiscal 1962–65 (*Operations Report*, ICA and AID, various issues). The proportion procured in the United States doubled after 1962, from 36 per cent in fiscal 1956–61 to 76 per cent in 1962–65.

[9] *Report on the Supply and Exports of Electrical and Allied Machinery and Plant*, p. 104.

Table 13.6
U.S. Price Competitiveness, Electric Power Machinery and Switchgear, 1957, 1961–64
(1962 = 100)

	1957	1961	1962	1963	1964
ELECTRIC POWER MACHINERY AND SWITCHGEAR (SITC 722)					
Relative to					
U.K.	84	102	100	110	107
EEC	86	96	100	105	105
Germany	82	94	100	104	106
Japan	NA	97	100	102	113
ELECTRIC POWER MACHINERY (SITC 722.1)					
Relative to					
U.K.	75	91	100	109	101
EEC	81	92	100	108	109
Germany	76	90	100	105	111
Japan	NA	100	100	106	128
Sweden	NA	82	100	102	87
Switzerland	72	91	100	112	104
SWITCHGEAR (SITC 722.2)					
Relative to					
EEC	NA	101	100	101	100
Germany	NA	101	100	101	100

Source: Appendix D.

through 1964 (Table 13.6). Foreign prices, in other words, increased relative to U.S. prices, and the highest levels of U.S. price competitiveness were reached in 1963 or 1964.

The improvement in U.S. price competitiveness through 1963 is even stronger in the major subgroup, electric power machinery. The data here are more reliable, and some additional countries could be included in the comparison. The number of reversals in direction in 1964 is also greater, and the declines in U.S. price competitiveness were sharper than in the group as a whole. Sweden showed the outstanding gain that year, almost back to the 1961 level relative to the United States. With

this one exception, however, the peak in the U.S. position relative to each country was in 1963 or 1964, as it was for the whole group.

Only fragmentary data, insufficient for the calculation of indexes, are available before 1957. The best series, that for the U.K., shows a very large decline in U.S. price competitiveness between 1953 and 1957.

The indexes of price competitiveness for electric power machinery and switchgear, unlike most of the others in this study, have been calculated mainly from place-to-place price comparisons for contract bids on large installations. Price competitiveness measured from place-to-place data tends to be more volatile than that from the time series data used in most other commodity groups; consequently, the year-to-year fluctuations may not be very significant. The trends, however, seem unmistakable despite the wide fluctuations.

The gains in U.S. price competitiveness after 1957 are partly due to the high U.S. price level in that year, as we point out below, in the discussion of international price indexes. The sharp declines in U.S. domestic prices are frequently attributed to governmental attacks on collusive bidding practices within the United States, culminating in the Philadelphia indictments against twenty-nine electrical equipment manufacturers in July 1960 and their pleas of guilty or no contest in December of that year.[10] Reductions in prices offered to foreign countries apparently reflect the collapse of those domestic price arrangements. The large gains in U.S. price competitiveness after 1957 were exceptional among the commodity groups covered in the study.

It is difficult to compare movements in price competitiveness with changes in export shares for this group because the lag between order and delivery is so long for at least the major equipment. The U.S. export share did not decline between 1953 and 1957, when, we believe, U.S. price competitiveness greatly deteriorated. However, the U.S. share fell sharply from 1957 to 1961, perhaps in consequence of the earlier high prices exemplified by those of 1957, the effects of which may well have been felt in most of the 1961 deliveries. After 1962 U.S. and Swedish shares rose a little and U.K. and EEC shares declined, movements which appear consistent with changes in prices.

The price movements, as we have mentioned, were both sharper and more reliably measured for electric power machinery alone, but the export data are unfortunately available only back to 1961. In this period, how-

[10] See discussion in chapter appendix, below.

ever, the gains in U.S. and Swedish exports were much more marked than for the group as a whole, and U.K. and German shares clearly declined, as one would expect from the changes in price competitiveness. EEC countries other than Germany, with a more favorable price record, also increased their export shares, and the Japanese decline in price competitiveness was matched by a decline in exports relative to other countries. Thus, in the electric power machinery subgroup at least, the degree of consistency between price movements and export shares was substantial.

Since changes in international price competitiveness are often inferred from comparisons of wholesale price series, in the absence of international price data, we compared the indexes so derived, as given in Appendix F, with our indexes. Some of the differences between the two measures are quite large, particularly in electric power machinery (SITC 722.1). Both indexes for Germany in that subgroup show an improvement in U.S. price competitiveness from 1961 to 1962, but the index from wholesale prices shows little gain after that, while the NBER indexes show an improvement of more than 10 per cent. [1]Relative to Japan, the wholesale price data suggest only a small gain in U.S. price competitiveness in 1964; the NBER indexes, a very large one. On the whole, if the NBER data are correct, the wholesale price series seriously understate the gains in U.S. price competitiveness in this group in the later years.

Price Levels

Most countries' prices of electric power machinery and switchgear were close to the U.S. price level in 1964, after a long period of improvement in U.S. price competitiveness (Table 13.7). The U.S. price level was lowest in switchgear, but in the more important electric power machinery subgroup, its level was higher than that of all but the United Kingdom.

From the point of view of U.S. competitiveness, the earliest price relationships, for 1957, were the most unfavorable. For the total group, European prices were more than 20 per cent lower than U.S. prices, and for electric power machinery the foreign price levels ranged between 25 and 40 per cent lower.

We have not shown separate price level indexes by type of machinery within electric power machinery, but the data indicate that for the United

Table 13.7
Price Levels, Electric Power Machinery and Switchgear, 1957, 1961–64
(U.S. for each year = 100)

	1957	1961	1962	1963	1964
ELECTRIC POWER MACHINERY AND SWITCHGEAR (SITC 722)					
U.S.	100	100	100	100	100
U.K.	79	96	94	103	101
EEC	77	86	90	94	94
Germany	79	90	95	99	101
Japan	NA	85	88	90	99
ELECTRIC POWER MACHINERY (SITC 722.1)					
U.S.	100	100	100	100	100
U.K.	74	90	99	108	100
EEC	64	73	79	85	86
Germany	60	71	79	83	87
Japan	NA	73	73	77	93
Sweden	NA	67	82	83	71
Switzerland	59	76	83	93	87
SWITCHGEAR (SITC 722.2)					
U.S.	NA	100	100	100	100
U.K.	NA	NA	NA	NA	102
EEC	NA	106	105	106	105
Germany	NA	118	117	119	117
Japan	NA	NA	NA	NA	101

Source: Appendix E and the appendix to this chapter.

Kingdom, prices of electric motors were lower relative to the U.S. level than prices of generators and transformers. Among the latter two groups U.K. offers were quite commonly above those from U.S. companies in 1962 and 1963, on jobs both inside and outside the United States.

The German relationship was in the opposite direction. Generators and transformers were priced considerably lower, relative to the United States, than electric motors. For other EEC countries, and for Sweden and Switzerland, the data are insufficient to permit this comparison.

Among the transformers and generators the U.S. price level was par-

ticularly high relative to Germany, Sweden, and Switzerland on instrument transformers. Foreign offers that were a third below or even half of U.S. bids were not uncommon. Between generators and power transformers the relationship was not so regular, but the U.S. position in the last year was at least slightly more favorable for generators. Most of the foreign countries were offering bids on generators in 1964 that were above the corresponding U.S. bids.

These price level indexes are based mainly on comparisons of bids. For some of the bids, data were available on quality differences among the individual offers, usually in the form of adjustments, calculated by the purchaser, to take account of differences in efficiency. The basis for the purchase decision was the offer price adjusted for quality differences. In cases where the number of adjusted bid prices was adequate, only these were used to calculate the price level indexes. The quality-adjusted data were used for most generator and transformer price level indexes other than those for the United Kingdom.

It has been said that U.S. electrical equipment is superior to foreign makes and that published comparisons for equipment of specific sizes or capacity are often biased against the United States on this account. To test whether such biases might have affected place-to-place comparisons from non-quality-adjusted bids we compared place-to-place indexes from adjusted and unadjusted data. The results did not suggest very large or consistent relationships between the two sets of indexes, but on the whole the adjusted indexes were more favorable to the United States than the unadjusted ones through 1962 and less favorable after that. A defect of these comparisons is that the unadjusted data included many bids not covered by the adjusted data and the price relationships may thus have been affected by the characteristics of the items not in both samples. For part of the collection comparisons were made between adjusted and unadjusted prices on identical bids from 1961 through 1964. The price level indexes for adjusted data in 11 of 12 cases fell within 10 per cent of those from unadjusted data, the one exception being a price level estimate for Japan which was more than 20 per cent higher relative to the United States in the adjusted data. However, eight of the twelve adjusted indexes were less favorable to the United States than the corresponding unadjusted ones. From these tests we infer that quality differences are not uniformly

in favor of the United States. This inference is supported by some recent discussions provoked by American utilities' purchases of foreign equipment.[11]

A somewhat surprising result of the regression analysis in the appendix to this chapter, on which our price level estimates are based, is the significant positive coefficient for foreign projects. It might have been expected, since foreign power transformer prices were lower than U.S. prices, that U.S. companies would tend to offer lower prices to purchasers abroad than to U.S. purchasers. The data appear to show the opposite. U.S. companies' offers to foreign purchasers, most of whom were in less developed countries, were higher than their bids on the domestic projects in our sample; the differences were large (about 50 per cent) and were statistically significant, whether or not large transformers were included in the comparison. The finding is particularly unexpected because U.S. firms have the benefit of the buy-American differential on domestic projects and were competing on equal terms with others for the foreign projects.

One possible explanation for this difference in price levels is that our sample of domestic offers is biased because it is confined to that small proportion of domestic bids on which there is foreign competition. These are all bids to government agencies, since privately owned U.S. utilities had not, during the period covered by our data, sought foreign equipment bids. The American suppliers may have felt that foreign bidders would be offering particularly low prices to the U.S. government or particularly low prices on these projects in order to break into the U.S. market or to gain the prestige involved in beating the U.S. companies in their own market.

Another possibility is that foreign firms did not offer particularly low bids on U.S. government projects but American firms did, either because costs of supplying machinery to this country were lower than for supplying it to other countries or because American firms felt that it was a blow to their prestige when foreign companies won U.S. government contracts.

One way of investigating this question is to examine the average foreign-U.S. price ratios for particular suppliers and years on projects in the United States and abroad. If foreign companies charged the same prices in both markets, while U.S. companies charged 50 per

[11] "Utilities Looking Abroad for Quality," *New York Times*, March 2, 1969.

cent more abroad, the foreign-U.S. price ratios on U.S. government projects would be 50 per cent higher than on foreign contracts. If foreign companies maintained the same price differentials as U.S. companies, foreign and U.S. projects would show the same ratios.

Our data are too thin to give an authoritative answer to this question. What evidence there is suggests it is unusual for foreign-U.S. price ratios to be as much as 50 per cent higher on foreign than on U.S. projects and, therefore, that both foreign and U.S. companies charged more outside the United States. U.K. companies seemed to be selling abroad at levels more than 50 per cent higher than those charged to the United States, while suppliers in other countries offered prices abroad that were higher than their prices to the United States but not by the 50 per cent margin.

Price Trends

In most of the other commodity groups included in this study, international price indexes from time-to-time price comparisons are the most reliable source of information on relative price changes. In this group, because most of the products, with electric motors the chief exception, are made to order for specific contracts, it is almost impossible to collect transactions prices for an identical product at two different times.

The international price indexes shown in Table 13.8 are, for this reason, less reliable relative to the other types of indexes than those for most other commodity groups in the study. The U.S. indexes are based on the regression analysis described in the appendix to this chapter for electric power machinery other than motors, and on the usual type of time-to-time price data for electric motors and switchgear. The German indexes for switchgear are calculated from price competitiveness indexes based on time series data, but the German indexes for electric power machinery and all those for the other countries listed are estimated from indexes of price competitiveness based on place-to-place data. This procedure entails the drawback of multiplying the errors of the two types of indexes, a drawback that is the more serious because both are derived from the rather volatile prices offered in bidding on large projects.

For electric power machinery other than motors our U.S. index is based on a regression, for power transformers, of price on capacity

Table 13.8
International Prices, Electric Power Machinery and Switchgear, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
ELECTRIC POWER MACHINERY AND SWITCHGEAR (SITC 722)						
U.S.	NA	124	110	100	94	94
EEC	NA	107	105	100	99	99
Germany	NA	102	104	100	97	100
Japan	NA	NA	106	100	96	106
ELECTRIC POWER MACHINERY (SITC 722.1)						
U.S.	132	154	120	100	91	91
U.K.	NA	116	110	100	100	92
EEC	NA	125	111	100	98	99
Germany	NA	117	108	100	96	100
SWITCHGEAR (SITC 722.2)						
U.S.	NA	NA	99	100	98	99
Germany	88	90	100	100	99	99

Source: Appendix C.

(kilovolt-amperes, KVA, or millivolt-amperes, MVA), year, and market to which sold (United States vs. rest of the world). As is explained in the appendix to this chapter, it would have been desirable to include several more specifications, but the data did not contain enough information. This international price index was compared with domestic price indexes which, also, were constructed so as to take account of the widespread discounts from list price that prevailed in some years; and the results confirmed the correctness of at least the major price trends revealed by the regression analysis.

The U.S. international price index for the group as a whole shows a steep decline from 1957 through 1963, clearly accounted for by the electric power machinery subgroup, in which the fall was approximately 40 per cent, one of the largest declines among machinery items. Only for the United States do we have an estimate of the price change before 1957, and that suggests a substantial rise during that period but not an unusually large one for machinery.

As we pointed out earlier, the fall in U.S. prices after 1957 was from a high level relative to other countries. The decline was precipitated by a number of events, including outbreaks of competition on some products, the indictments of the electrical equipment manufacturers in 1960, and technological developments in the production of electric power equipment, and was influenced also by the increase in the size of individual units of equipment.

Prices of electric power machinery in other countries also declined between 1957 and 1963, although none as far as in the United States. But in these countries, as in the United States, the fall in price was particularly rapid between 1961 and 1962, which was not, in general, a period of declining price levels.

In 1964 U.S. prices remained unchanged and prices in several other countries increased for the first time since 1957. In the United Kingdom, however, and particularly in Sweden, the price decline continued; the indicated fall in Swedish prices for 1961 through 1964, not shown in the table, was at least as large as that in any other country. These international price indexes differ widely from other price measures. An index taken from official Japanese export price data, for example, shows almost no change in electric power machinery prices from 1961 through 1964, while our indexes for Japan and for all other countries showed substantial declines.

Two comparisons with U.S. wholesale price indexes gave contrasting results. For switchgear, both the international and the wholesale price index were quite stable from 1961 through 1964, but in electric power machinery the wholesale index, although it declined from 1957 through 1964, as few machinery prices did, fell much less than our international index. The difference in movement was apparently due to the failure of the wholesale price index to take account of extensive discounting from list prices in both domestic and foreign markets rather than from any major differences between domestic and export price movements (see the appendix to this chapter).

Electric power equipment is represented in the official export unit value index of the U.S. Department of Commerce by only three series on electric motors and generating sets. The export price movement implied by these series is in direct contradiction to that shown by the NBER index. The unit value series show price increases in every period except for 1964, cumulating to a total increase of about 40 per cent. The NBER index, on the other hand, shows a 30 per cent fall in U.S.

international prices over the same period. Given our knowledge about even list prices in the United States and the extent of discounting from list prices in the 1960s it seems fair to say that the unit value data in this subgroup seriously misrepresent the price trends.

Electricity Distribution Equipment [12]

Trade

In 1963, the United Kingdom was by far the leading exporter in the group as a whole and in the major subgroup (Table 13.9). Germany followed, and then Japan and the United States. More than two-thirds of the exports went to countries outside the OECD; and the proportion shipped to these, mainly less developed, countries by the United Kingdom and Japan was particularly high. Only Germany exported mainly to other developed countries. Japan was the leading exporter of insulating equipment (SITC 723.2), with a wide lead over the United States, the United Kingdom, and Germany, which were all at about the same export level.

The products involved in this group are very different from most of those in the electric power machinery group (SITC 722). Both cable and insulators are relatively standardized items made to a single specification in large quantities, while much of the power equipment is produced to order, with each piece of equipment somewhat different from the previous order. Also, a greater degree of technological change took place in power equipment than in cable and insulators. The lower rate of technological change may partly explain the unusually small importance of the United States as an exporter.

The shares of the United States and the United Kingdom in OECD exports did not change very greatly in the four years for which we have data (Table 13.10). The major shifts were the growth in Japanese exports, almost doubling between 1962 and 1964, and declines in the EEC share, applying to both Germany and other EEC countries, particularly the latter. The shift in export shares from the EEC countries to Japan was even stronger in the main subgroup, insulated wire and cable, than in the group as a whole.

[12] SITC 723. *Value of OECD exports in 1963:* $343 million; three-fourths of 1 per cent of study total. *Coverage:* Insulated wire and cable (80 per cent); electrical insulating equipment.

Table 13.9
OECD Exports of Electricity Distribution Equipment (SITC 723),
by Origin, Destination, and Commodity Subgroup, 1963
(dollars in millions)

	Value of Exports	Per Cent of OECD Exports in 723	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
Total, all destinations and subgroups	$343	100.0	100.0	10.5	28.6	39.1	17.5	11.4
Destination								
U.S.	17	5.0	100.0		41.2	17.6	17.6	17.6
OECD Europe	97	28.3	100.0	9.3	11.3	64.9	37.1	2.1
U.K.	5	1.4	100.0	60.0		20.0	20.0	
EEC total	50	14.6	100.0	4.0	8.0	74.0	38.0	2.0
Germany	13	3.8	100.0	7.7	15.4	53.8		2.2
Canada	16	4.7	100.0	37.5	56.2	0.6	[a]	6.2
Japan	1	0.3	100.0	60.0	40.0	[a]	[a]	
Latin America	21	6.1	100.0	28.6	9.5	38.1	14.3	14.3
Other	185	53.9	100.0	7.6	36.7	31.4	9.2	16.2
Unaccounted for by destination	5	1.4	100.0	[a]	15.4	44.2	9.6	19.2
SITC commodity subgroup								
Insulated wire and cable (723.1)	282	82.2	100.0	9.2	31.6	40.1	18.1	8.5
Electrical insulating equipment (723.2)	61	17.8	100.0	14.8	16.4	32.8	14.8	24.6

Source: Appendix A and sources cited there.
[a]Less than 0.05 per cent.

Table 13.10
OECD Exports of Electricity Distribution Equipment, 1961–64
(dollars in millions)

	Value of OECD Exports	Share in OECD Exports (per cent)					
					EEC		
		OECD	U.S.	U.K.	Total	Germany	Japan
				INCLUDING JAPAN			
1964	$377	100.0	9.0	26.2	39.5	17.5	14.1
1963	343	100.0	10.4	28.7	39.0	17.4	11.4
1962	320	100.0	9.4	25.0	45.3	19.4	7.8
				EXCLUDING JAPAN			
1962	295	100.0	10.2	27.1	49.2	21.0	
1961	268	100.0	10.8	28.3	48.1	20.5	

Source: Appendix B.

Price Trends

International prices for electricity distribution equipment rose throughout most of the period of the study in both the United Kingdom and Germany, while U.S. prices, after rising sharply between 1953 and 1957, declined until 1963 (Table 13.11). The fall in U.S. prices in 1962 is surprisingly large for a year in which other countries' prices were stable. One possible explanation is that the American data were much more heavily weighted with prices supplied by purchasers than at least the German information. However, the data for the United Kingdom from

Table 13.11
International Prices, Electricity Distribution Equipment, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
U.S.	100	114	111	100	97	99
U.K.	85	95	106	100	101	98
EEC	90	94	100	100	94	94
Germany	90	94	100	100	94	102

Source: Appendix C.

purchasers did not show any similar decline, and the U.S. prices from sellers, while they did not decline quite as fast as those reported by buyers, did show a fall in 1962. Thus, differences in type of respondent do not completely explain the differences in price behavior.

The decline in the U.S. international price index from 1961 to 1963 had a parallel in the even sharper decline in wholesale prices reported by Japan, followed, as in every country, by a rise in 1964. The U.S. domestic wholesale price index itself showed a strong downward trend, but it began earlier than that in the international index, and the wholesale price series did not rise from 1953 to 1957.

The evidence is fairly strong, therefore, that U.S. prices for electricity distribution equipment did decline, starting near the beginning of the period and ending in 1963, and then rose in 1964.

Price Levels

American price levels for electricity distribution equipment were higher than those of the other countries in our study in all the years for which we have data (Table 13.12). The margin by which U.K. prices

Table 13.12
Price Levels, Electricity Distribution Equipment, 1957, 1961–64
(U.S. for each year = 100)

	1957	1961	1962	1963	1964
ELECTRICITY DISTRIBUTION EQUIPMENT (SITC 723)					
U.S.	100	100	100	100	100
U.K.	73	83	87	90	86
EEC	62	68	76	73	72
Japan	NA	79	69	77	77
INSULATED WIRE AND CABLE (SITC 723.1)					
U.S.	100	100	100	100	100
U.K.	70	80	84	87	87
Japan	NA	79	69	78	78
ELECTRICAL INSULATING EQUIPMENT (SITC 723.2)					
U.S.	NA	100	100	100	100
Japan	NA	77	72	70	69

Source: Appendix E.

were lower ranged between 10 and almost 20 per cent, and the EEC countries and Japan undercut the United States by margins of 20 to 30 or even 40 per cent.

Few clear trends are evident in the levels in general. In insulated wire and cable, the subgroup for which we had somewhat better data, U.K. prices seemed to be closer to U.S. levels at the end of the period than initially. EEC prices appear to have been lower in 1964 than earlier. The Japanese relative price level, except for a dip in 1962, did not show any trend.

The price level data for Germany are too weak to be shown separately, but as far as they go, they suggest that German prices were higher than those of other EEC countries in the last two years after having been lower in the first two.

The poor export showing of the United States, described in Table 13.9, seems reasonable in the light of the price levels shown here, as do the unusually strong export positions of Japan and the EEC countries other than Germany. But the price data show the United Kingdom as being a higher-priced exporter than the EEC countries and Japan, a finding which seems anomalous in view of the United Kingdom's dominance of export trade in this group. However, the main strength of the United Kingdom is in insulated cable sold in Africa and the Far East, and it may be that, in the face of high prices, British sales were aided by the experience with British equipment and the adoption of British standards in Commonwealth countries.

The many place-to-place comparisons we have for this group are a potential source of information on differences in price levels by market of sale. Unfortunately, in only three years do we have samples of as many as five observations for a particular competitor in both U.S. and foreign markets. For electrical generating equipment (SITC 722.1) we found that the ratio of foreign to American prices was substantially lower on bids in the United States than abroad. In each case in electricity distribution equipment, the average ratio of foreign to U.S. prices was lower outside the United States than on U.S. projects, the opposite result to that in generating equipment.

This result may point to a possible bias in the comparison of price levels among foreign countries in this group. Only a small proportion of the EEC bids were on U.S. projects, for which we found that the ratios of foreign to U.S. prices were relatively high. However, a considerable

number of British bids and a majority of the Japanese bids used for our indexes were on U.S. contracts. If U.S. market price ratios were unfavorable to foreign firms, as the data suggest, we may have overestimated British and particularly Japanese price levels by overweighting that market, or underestimated EEC price levels by underweighting the U.S. market.

Price Competitiveness

The United States improved its price competitiveness relative to its European competitors, during 1953–64, particularly before 1962 (Table 13.13). Relative to Japan, the U.S. position declined greatly and then recovered almost to the 1961 level.

Data for insulated cable, the main subgroup, show a constant increase in American price competitiveness relative to the United Kingdom, but a sharp fall followed by a gain relative to Japan. In electrical insulating equipment, however, where only the Japanese data are adequate for

Table 13.13
U.S. Price Competitiveness, Electricity Distribution Equipment, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
ELECTRICITY DISTRIBUTION EQUIPMENT (SITC 723)						
Relative to						
U.K.	85	84	96	100	103	99
EEC	90	82	90	100	96	95
Germany	90	82	90	100	97	103
Japan	NA	NA	113	100	110	111
INSULATED WIRE AND CABLE (SITC 723.1)						
Relative to						
U.K.	NA	83	95	100	103	103
Japan	NA	NA	115	100	113	114
ELECTRICAL INSULATING EQUIPMENT (SITC 723.2)						
Relative to Japan	NA	NA	108	100	98	96

Source: Appendix D.

the publication of an index, the U.S. position declined throughout the four years for which we have data.

The export data of Table 13.10 show a substantial shift from the EEC countries to Japan during a four-year period, 1961–64, when EEC prices rose relative to Japanese prices. U.S. and U.K. price movements were between those of the other two countries, as were their export changes. However, the matching of price and export changes was poor for 1962–64, when price changes seemed to favor the EEC countries. That finding suggests that the sharp decline and rise in Japanese prices from 1961 to 1963 may reflect the erratic nature of the bidding data rather than actual price changes.

Telecommunications Equipment [13]

Trade

The United States was the leading exporter of telecommunications equipment in 1963. Japan, a comparatively minor factor in most machinery groups, was in second place, followed by Germany and the United Kingdom (Table 13.14). The ranking of the exporters varied greatly among the subgroups. In television receivers, Germany ranked first, followed closely by Japan. The United States and the United Kingdom were far behind. Japan completely dominated the trade in radio receivers, accounting for almost half the exports, largely with its portable transistor radios. U.S. and U.K. exports were negligible by comparison. In other telecommunications equipment the United States had a long lead over the United Kingdom, its nearest competitor, mainly in special-category exports classified under "electronic detection and navigational apparatus." These accounted for the great bulk of U.S. exports in the subgroup and even for three-quarters of U.S. exports of telecommunications equipment as a whole. We infer that exports by the Netherlands also were mainly of military products because no data on destination were reported in this category.

Exports of telecommunications equipment grew rapidly during the four years for which we have data. Exports by countries other than

[13] SITC 724. *Value of OECD exports in 1963:* $1.7 billion; 3.9 per cent of study total. *Coverage:* Television and radio receivers, telephone equipment, other telecommunications equipment, including telegraph equipment, microphones, loudspeakers, radar and other communications devices, and other components.

Table 13.14
OECD Exports of Telecommunications Equipment (SITC 724),
by Origin, Destination, and Commodity Subgroup, 1963
(dollars in millions)

	Value of Exports	Per Cent of OECD Exports in 724	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
Total, all destinations and subgroups	$1,715	100.0	100.0	22.7	12.8	37.9	16.3	16.5
Destination								
U.S.	210	12.3	100.0		4.3	12.4	9.3	63.8
OECD Europe	672	39.2	100.0	14.7	9.9	59.7	27.1	5.2
U.K.	44	2.6	100.0	50.0		34.1	15.9	6.8
EEC total	383	22.3	100.0	15.4	7.3	65.3	25.6	3.9
Germany	81	4.7	100.0	8.6	8.6	64.2		9.9
Canada	89	5.2	100.0	66.3	19.1	6.7	4.5	6.7
Japan	14	0.8	100.0	85.7	7.1	7.1	1.4	
Latin America	99	5.8	100.0	24.2	7.1	26.3	17.9	21.2
Other	392	22.9	100.0	8.2	30.1	29.8	14.7	21.7
Unaccounted for by destination	236	13.8	100.0	69.5	0.0	30.5		0.1

(continued)

Table 13.14 (concluded)

	Value of Exports	Per Cent of OECD Exports in 724	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
SITC commodity subgroup								
Television receivers (724.1)	$149	8.7	100.0	14.8	7.4	43.0	28.8	27.5
Radio receivers (724.2)	386	22.5	100.0	1.8	4.4	40.7	17.9	49.0
Telecommunications equipment, n.e.s. (724.9)	1,180	68.8	100.0	30.6	16.2	36.4	14.2	4.4
Electric line telephone and telegraph equipment (724.91)	358	20.9	100.0	9.4	22.4	38.9	22.6	2.6
Microphones, loudspeakers, amplifiers (724.92)	67	3.9	100.0	32.0	7.4	36.8	13.7	19.2
Other telecommunications equipment (724.99)	754	44.0	100.0	40.6	14.1	35.1	10.3	4.0

Source: Appendix A and sources cited there.

Japan increased by more than 40 per cent from 1961 to 1964, and Japanese exports grew by that amount between 1962 and 1964 (Appendix B). The U.S. share of OECD exports rose sharply in 1962, mainly at the expense of Germany. It then fell back to about the initial proportion of exports other than Japanese (Table 13.15). The U.K. share fell in every year, while the main gains were scored by Japan and Italy.

The shifts in export shares showed up more strongly in the subgroup data. In television receivers the United Kingdom made a large gain in 1962 at the expense mainly of Germany. After that all the main exporters except Japan lost heavily (in relative terms), as Japan doubled its share from 15 to 30 per cent in two years. The rise in the Japanese share was the result of the rapid growth in exports of small television sets, principally to the U.S. market, in which the Japanese succeeded in capturing something like 10 per cent of sales of black and white sets at the end of our period and probably a greater share later, mostly under the brand names of U.S. television set producers and retail chains. The U.S. producers specialized in larger sets, for which the market was greatest in the United States, while the Japanese were innovators and specialists in small-screen sets which accounted for the bulk of the Japanese home market. The same specialization seemed to be taking

Table 13.15
OECD Exports of Telecommunications Equipment, 1961–64
(dollars in millions)

	Value of OECD Exports	Share in OECD Exports (per cent)						
					EEC			
		OECD	U.S.	U.K.	Total	Germany	Netherlands	Japan
					INCLUDING JAPAN			
1964	$1,961	100.0	20.6	11.5	40.5	16.1	10.2	17.8
1963	1,715	100.0	22.7	12.8	37.9	16.3	7.9	16.5
1962	1,538	100.0	24.0	13.4	37.0	15.9	7.5	15.8
					EXCLUDING JAPAN			
1962	1,296	100.0	28.5	15.9	43.6	18.9	11.5	
1961	1,106	100.0	24.8	16.8	47.4	22.2	6.4	

Source: Appendix B.

place in color television after the end of the period covered by this study.[14]

Japan's dominance in radio receivers antedated the period covered in our table, and the Japanese share continued to increase while that of the EEC countries declined. By the end of the period, Japan was meeting increasing competition from producers in Hong Kong, Taiwan, and South Korea, none of which is included in the export data of Tables 13.14 and 13.15.[15]

In the largest subgroup, other telecommunications equipment (SITC 724.9), both the United States and the United Kingdom lost ground to the EEC countries as a group. The Netherlands and Italy made the largest gains, but the other EEC countries also improved their position.

Trade in telecommunications equipment, particularly in the 724.9 subgroup, is affected to an important degree by nonprice factors. Most telephone systems outside the United States are government owned, and favor domestic over foreign suppliers in their purchasing. The Australian government, for example, favors home producers of telephone equipment by imposing hypothetical tariffs on foreign products in comparing offers, and has thereby encouraged the replacement of imports through the establishment of foreign subsidiaries and joint ventures with local firms. The British and German telephone systems also apparently confine their purchases to domestic producers. Several countries aid exports by supplying or guaranteeing finance, and it was said to be a principal handicap to exports by Sweden, a major producer of telephone equipment, that little government financing was available.[16]

Another factor in the telephone equipment industry is that the telephone systems of different producers are incompatible. It is, therefore, the bidding on the first major installation that determines the course of trade for additional equipment in succeeding years, because the customer

[14] "TV Exports Counter Sluggish Home Market," *Journal of Commerce*, September 29, 1965; "TV Importers Seeks Sales Mark," *ibid.*, May 25, 1965; "GE Slates Output of Small TV Sets to Counter Imports," *New York Times*, September 3, 1965; "Japan to Sell Color TV's in the U.S.," *Journal of Commerce*, December 15, 1965; "Japanese Color TV Drive Set," *ibid.*, August 22, 1966; "Japan's Hold on Small Color-TV Set Sales in U.S. Grows, Hidden by American Labels," *Wall Street Journal*, August 25, 1967.

[15] "Standard Kollsman to Offer Low-Priced, Small TV Tuner," *Wall Street Journal*, August 31, 1965; "U.S. Boom: Japanese Export Boon," *Journal of Commerce*, June 15, 1966.

[16] *Market Information on Electronic Products in Australia*, U.S. Dept. of Commerce, August 1967; "Telecommunications: A Very Close Look," *Economist*, January 14, 1967; "Sweden's Ericsson Phone Firm Wins Big Slice of Growing World Market," *Wall Street Journal*, August 29, 1963; "The Secrets of the Ring," *Economist*, July 23, 1960; "L. M. Ericsson Pushes U.S. Sales," *Journal of Commerce*, June 7, 1965.

is fairly well committed to the firm performing the initial installation. This fact, of course, affects pricing policy and at the same time tends to weaken the relationship between the flow of trade and contemporaneous price relationships.

Price Trends

International price data for telecommunications equipment are sparse throughout the period, particularly in the early years, but the evidence for a decline in prices after 1961 seems fairly strong (Table 13.16). This decline is evident in some of the unpublished indexes, such as the separate series for television receivers and radio receivers, as well as in those shown in the table. The few observations for portable transistor radios show some of the sharpest price declines found in the study, including price cuts of two-thirds or more between 1957 and 1961, as well as substantial declines in other periods.

Table 13.16
International Prices, Telecommunications Equipment, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
TELECOMMUNICATIONS EQUIPMENT (SITC 724)						
U.S.	NA	NA	101	100	95	96
U.K.	NA	NA	101	100	101	99
EEC	NA	NA	101	100	100	97
Germany	NA	NA	101	100	100	96
Japan	NA	NA	107	100	100	98
TELEVISION AND RADIO RECEIVERS (SITC 724.1 and 724.2)						
U.S.	NA	NA	102	100	90	85
EEC	125	113	103	100	96	94
Germany	119	108	103	100	97	94
OTHER TELECOMMUNICATIONS EQUIPMENT (SITC 724.9)						
U.S.	NA	NA	101	100	98	102
U.K.	NA	90	100	100	106	107
EEC	88	88	100	100	102	98
Germany	86	86	100	100	101	95

Source: Appendix C.

There were no U.K. data for radios other than portable transistor sets, and no U.S. data before 1961. The data for television sets and portable transistor radios indicate clearly that prices on both of these items fell, and that if we had been able to calculate an index for the combination of television and radio receivers it would have shown falling prices, as the indexes for Germany and the EEC countries do.

The main component of telecommunications equipment is SITC 724.9, which is dominated by telephone equipment. Prices in this subgroup rose in the EEC countries until 1963 and in the United Kingdom throughout the period. American prices were comparatively stable after 1961, declining at first and then recovering, but had risen sharply before then, according to fragmentary data.

In general, the main directions of movements in international prices are reflected in wholesale prices, too, with declines in television and radio receivers and comparative stability in other telecommunications equipment. The differences appear to involve mainly a widespread tendency toward smaller price declines in domestic wholesale prices than in international prices. Coverage, however, is very inconsistent. The U.S. wholesale price index excludes portable transistor radios, since they are unimportant in U.S. production, although they make up a large part of international trade in radio receivers. The Japanese wholesale price index for radio receivers, on the other hand, contains only transistor radios.

The U.S. Department of Commerce export unit value series for television and radio receivers, which are components of the official export unit value indexes, do not resemble any of the other price data in their trends or fluctuations. The export unit value for television sets declined sharply from 1961 through 1963 and then greatly increased. Both international and wholesale price series showed gradual declines with no reversals during those years. The export unit value for radios increased substantially from 1957 to 1963 and then fell precipitously, to considerably below the initial level. Wholesale and international prices of radios were declining throughout this whole period. In view of the intense competition from Japanese transistor radios, it seems very unlikely that any appropriate measure of U.S. prices could have shown an increase such as that of the unit value series. In this group, it seems safe to say, the official export unit value data are useless as measures of the behavior of U.S. export prices.

Price Competitiveness

American price competitiveness in telecommunications equipment as a whole moved within a fairly narrow range between 1953 and 1964, except for Japan (Table 13.17). It ranged from 98 to 106 per cent of the 1962 level relative to each of the other major competitors. Concealed in this apparent stability, however, were contrasting movements in competitiveness in television and radio receivers on the one hand and in other telecommunications equipment on the other. In television and radio receivers U.S. price competitiveness declined relative to Japan between 1957 and 1962, and relative to the EEC countries especially from 1953 to 1962 (see note to Table 13.17). The recovery fell far short of regaining the early levels. In other telecommunications equipment the U.S. gained relative to the EEC countries until 1963 and then lost the gains in 1964.

The comparison with the United Kingdom showed some gains in U.S. price competitiveness, mainly in the later years and for other telecommunications equipment. The index remained comparatively stable for television and radio receivers.

The widest movements in U.S. price competitiveness were relative to Japan, a very large fall for both television and radio receivers and for other telecommunications equipment after 1957. The supplementary data on wholesale prices suggest that even the large movements shown are smaller than the earlier losses, from 1953 to 1957, and that the U.S. recovery after 1962 was minor in comparison to the original decline.

Some of the differences among price competitiveness indexes in Table 13.16 are due to differences in coverage rather than relative price movements for specific commodities. The main one involves radio receivers (SITC 724.2) for which some countries' data include only portable transistor radios. The indexes in the note to Table 13.17, less complete in coverage than those in the table but more comparable among countries because only portable transistor radios were used in the subgroup index for SITC 724.2, suggest that U.S. price competitiveness relative to the EEC countries did not improve much more than that relative to the United Kingdom after 1962. There was, however, a large decline in the former before 1962, comparable to the decline relative to Japan.

U.S. price competitiveness indexes relative to Japan for television and radio receivers computed from wholesale price data declined moder-

Table 13.17
U.S. Price Competitiveness, Telecommunications Equipment, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
TELECOMMUNICATIONS EQUIPMENT (SITC 724)						
Relative to						
U.K.	98	98	100	100	106	103
EEC	NA	NA	100	100	105	101
Germany	NA	NA	100	100	105	99
Japan	NA	121	106	100	105	102
TELEVISION AND RADIO RECEIVERS (SITC 724.1 AND 724.2)						
Relative to						
U.K.	100	94	102	100	99	98
EEC	NA	NA	101	100	107	111
Germany	NA	NA	101	100	108	111
Japan	NA	151	124	100	110	110
OTHER TELECOMMUNICATIONS EQUIPMENT (SITC 724.9)						
Relative to						
U.K.	97	100	99	100	109	105
EEC	96	97	99	100	104	96
Germany	94	95	99	100	104	94
Japan	NA	110	99	100	102	98

Note: *Alternative calculation:* The indexes for Germany and the EEC above are not strictly comparable to those for the United Kingdom and Japan because they include both portable transistor and other radios in SITC 724.2. A more comparable, but less complete, set of calculations using only transistor radios in SITC 724.2 and giving SITC 724.2 only the weight of the transistor ratio portion results in the following indexes of U.S. price competitiveness (1962 = 100):

	1953	1957	1961	1962	1963	1964
TELECOMMUNICATIONS EQUIPMENT (SITC 724)						
Relative to						
U.K.	98	99	100	100	107	104
EEC	97	102	100	100	102	98
Germany	96	100	100	100	102	97
Japan	NA	115	103	100	103	100

(continued)

Notes to Table 13.17 (concluded)

TELEVISION AND RADIO RECEIVERS (SITC 724.1 AND 724.2)

Relative to						
U.K.	98	96	101	100	100	100
EEC	119	110	102	100	96	102
Germany	122	122	102	100	96	102
Japan	NA	137	117	100	106	107

All these indexes are based on small numbers of observations, considerably smaller, in the case of the EEC countries, than those used in table 13.17. Some indexes for 1953 and 1957, omitted there, are shown here because, although the number of observations is smaller, we have more assurance of comparability between countries.

ately after 1961 instead of declining and recovering like the indexes from international price data. For the earliest period, on which no international price data are available, the wholesale price data indicate a considerable deterioration in the U.S. position.

Wherever possible, the price competitiveness indexes were computed separately for portable transistor radios and for all other radios. But it may very possibly be that the two items are such close substitutes that we should have derived the index by comparing Japanese prices for the transistor radios with other countries' prices for radios of other types. The result would have been an even larger estimate of the gain in price competitiveness of Japan in radio receivers, since prices of portable transistor radios fell relative to other radio prices. The wholesale price comparison is of this nature, and that fact accounts for the steady or declining trend after 1961 in this measure of U.S. price competitiveness during a time when the comparisons among like types of radios showed an improvement in the U.S. position. The great increase in Japanese exports (see Appendix B) was mainly a matter of increases in portable transistor exports and later in exports of small-screen television sets rather than of improvements in their share within each of these items. Our method of measuring price competitiveness, involving comparisons within homogeneous groups, tends to conceal the basis for rising export shares in a case like this (see discussion in Chapter 3).

Price Levels

British prices of telecommunications equipment were apparently above U.S. ones throughout the whole period of the study, while EEC prices were consistently lower. Japanese prices were at first above the U.S. level and then fell to the EEC levels or below (Table 13.18). At the

Table 13.18
Price Levels, Telecommunications Equipment, 1953, 1957, 1961–64
(U.S. for each year = 100)

	1953	1957	1961	1962	1963	1964
TELECOMMUNICATIONS EQUIPMENT (SITC 724)						
U.S.	100	100	100	100	100	100
U.K.	113	112	115	115	122	118
EEC	NA	NA	89	89	93	89
Germany	NA	NA	88	88	93	87
Japan	NA	104	91	86	90	88
TELEVISION AND RADIO RECEIVERS (SITC 724.1 and 724.2)						
U.S.	100	100	100	100	100	100
U.K.	111	104	113	111	109	108
EEC	NA	NA	83	82	88	91
Germany	NA	NA	85	84	90	92
Japan	NA	135	111	89	98	98
OTHER TELECOMMUNICATIONS EQUIPMENT (SITC 724.9)						
U.S.	100	100	100	100	100	100
U.K.	114	116	116	117	127	123
EEC	88	89	91	92	96	88
Germany	85	86	90	90	94	85
Japan	NA	93	84	84	87	83

Note: An alternative set of indexes for 724, 724.1 and 724.2, more comparable among countries but less complete in coverage, can be derived by using only data on transistor radios in the level for 724.2 and extrapolating by corresponding indexes of price competitiveness, as described in the notes to Table 13.16. These indexes are as follows (U.S. for each year = 100):

	1953	1957	1961	1962	1963	1964
TELECOMMUNICATIONS EQUIPMENT (SITC 724)						
U.S.	100	100	100	100	100	100
U.K.	119	121	121	122	130	127
EEC	86	90	88	88	90	87
Germany	85	89	88	88	90	85
Japan	NA	94	84	82	84	82
TELEVISION AND RADIO RECEIVERS (SITC 724.1 and 724.2)						
U.S.	100	100	100	100	100	100
U.K.	103	101	107	105	105	105
EEC	97	97	83	81	78	83
Germany	99	99	83	81	78	83
Japan	NA	98	84	72	76	76

(continued)

Notes to Table 13.18 (concluded)

The differences between the two sets of indexes are greater in the case of radio and television receivers alone. The Japanese are shown to have offered the lowest prices among the leading exporters since 1962 instead of being above the EEC price level, and are described as having a price level consistently below that of the United States instead of being at first far above American prices. In addition, a much larger gap is indicated between Japanese and American prices and between EEC and U.S. prices at the end of the period. British prices, on the other hand, appear in these calculations to have been closer to U.S. prices than is suggested by the estimates in the table.

Source: Appendix E.

end, the price level differences were wider for other telecommunications equipment than for television and radio receivers, in which the range was surprisingly narrow. The range of price levels within that subgroup was much larger than for the aggregate, however, with EEC and Japanese prices for portable transistor radios far lower than American prices. Fragmentary data suggest that the United States, in turn, was in a superior position in the more important group of other radio receivers.

The data on radios other than portable transistor radios are particularly weak and do not cover the same items or all the years in each country. There may be some advantage, therefore, in comparing price levels estimated by using only the portable transistor portion of SITC 724.2 in combination with the other subgroups. The results, given in the note to Table 13.18 show EEC, particularly German, prices to have been the lowest of all in 1957, and to have been below U.S. and U.K. prices since 1953. The Japanese price level reached its position as the lowest among all the countries at an earlier date in these calculations than in our main indexes, and the margin relative to the United Kingdom and the United States was consistently greater.

It is difficult to choose between the indexes in the table, which are the more comprehensive in coverage, and those in the notes, which are the more reliable for the items covered. Those in the table represent our best estimates for the relationship of each country to the United States, but those in the notes are probably superior for comparisons among the foreign countries.

A juxtaposition of the price level estimates with the 1963 trade pattern, as given in Table 13.14, supports the indexes in the notes, at least as regards the radio receivers subgroup itself. The position of the Japanese as exporters of radio receivers fits in far better with the price level indexes for portable transistor radios alone than with that for all

radios. The levels for portable transistor radios show Japan far below Germany and the EEC as a whole, and those, in turn, far below the United Kingdom and the United States. The only anomaly is the relation between the United Kingdom and the United States, with the former exporting substantially more despite an apparently higher price level.

The export pattern for other telecommunications equipment did not confirm the reported price levels at all, possibly because military exports, which did not enter the price estimates, were important in trade. The United States, by far the major exporter, showed prices substantially higher than the EEC countries and Japan, while the United Kingdom was a major exporter despite prices considerably higher than even those of the United States. Japan, on the other hand, reported to be the lowest-priced equipment source, was a minor factor.

Household Electrical Equipment [17]

Trade

Germany was the leading exporter of household electrical equipment, followed by the United Kingdom, the United States, and Italy, here making a rare appearance as a major machinery exporter (Table 13.19). Italy's importance was concentrated in refrigerators, in which it was a close second to the United States as an exporter and was also a major producer. It was surpassed only by the United States and Germany in 1963 and only by the United States in 1964. The Italian industry was heavily dependent on exports, sending a third or more of its production abroad, mainly to other Common Market countries and Great Britain.[18] By comparison with Great Britain, at least, Italy specialized in large refrigerators, although it was also a major producer at the small end of the line.[19]

The major successes in recent trade in household electrical equipment were the expansions in exports by Italy and Japan, the former more than doubling its exports in three years and the latter almost doubling in

[17] SITC 725. *Value of OECD exports in 1963:* $554 million; 1.2 per cent of study total. *Coverage:* "Domestic" (i.e., household) refrigerators, domestic washing machines, other electromechanical domestic appliances, electric shavers and hair clippers, and other domestic electrical equipment.

[18] *Free World Production and Trade in Selected Household Appliances,* Overseas Business Reports, U.S. Dept. of Commerce, December 1966.

[19] "Italian Invasion," *Economist,* March 6, 1965.

Table 13.19
OECD Exports of Household Electrical Equipment (SITC 725), by Origin, Destination, and Commodity Subgroup, 1963
(dollars in millions)

	Value of Exports	Per Cent of OECD Exports in 725	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
Total, all destinations and subgroups	$554.4	100.0	100.0	17.7	18.0	49.4[a]	24.0	3.5
Destination								
U.S.	26.8	4.8	100.0		25.0	40.7	9.0	11.2
OECD Europe	336.8	60.8	100.0	4.9	16.0	64.8	34.6	0.5
U.K.	23.6	4.2	100.0	9.3		38.1	10.6	0.0
EEC total	186.2	33.6	100.0	5.0	17.1	69.6	33.1	0.7
Germany	30.9	5.6	100.0	6.5	29.4	43.4		1.0
Canada	35.2	6.3	100.0	89.5	5.7	3.7	0.8	0.3
Japan	2.1	0.4	100.0	33.3	9.5	42.8	23.8	
Latin America	37.9	6.8	100.0	68.1	6.6	12.9	6.1	3.4
Other	115.7	20.9	100.0	17.3	29.6	32.6	9.8	11.7

(continued)

Table 13.19 (concluded)

	Value of Exports	Per Cent of OECD Exports in 725	Share in OECD Exports (per cent)					
						EEC		
			OECD	U.S.	U.K.	Total	Germany	Japan
SITC commodity subgroup								
Domestic refrigerators (725.01)	$168.1	30.3	100.0	25.2	8.6	53.3[b]	20.3	2.3
Domestic washing machines (725.02)	128.6	23.2	100.0	14.2	30.6	50.1	32.7	1.1
Electromechanical domestic appliances, n.e.s. (725.03)	110.5	19.9	100.0	14.8	21.4	39.4	17.4	9.7
Electric shavers and hair clippers (725.04)	43.4	7.8	100.0	11.3	12.7	70.5	17.0	0.2
Electric spaceheating equipment (725.05)	102.6	18.5	100.0	15.8	16.2	44.8	29.5	3.4

Source: Appendix A and sources cited there.

[a]Of which Italy, 10.8 per cent.

[b]Of which Italy, 24.9 per cent.

Table 13.20
OECD Exports of Household Electrical Equipment, 1961–64
(dollars in millions)

	Value of OECD Exports	Share in OECD Exports (per cent)						
					EEC			
		OECD	U.S.	U.K.	Total	Germany	Italy	Japan
				INCLUDING JAPAN				
1964	$640	100.0	17.5	15.3	50.9	23.2	13.7	4.3
1963	554	100.0	17.7	18.0	49.4	24.0	10.8	3.5
1962	478	100.0	20.9	16.6	50.1	24.7	10.5	3.3
				EXCLUDING JAPAN				
1962	462	100.0	21.6	17.2	51.8	25.5	10.9	
1961	452	100.0	23.5	16.7	50.8	25.1	8.9	

Source: Appendix B.

two (Appendix B). Italy increased its share from 9 to 14 per cent while the other major exporters, the United States, the United Kingdom, and Germany, all lost ground (Table 13.20). The growth in Italian exports of refrigerators was so great that, in combination with an increasing degree of market saturation it led to declines in domestic production in the other Common Market countries; by the end of the period, Italian exports of washing machines were also gaining in importance.[20]

Price Trends

International prices of household electrical equipment changed relatively little over the period of the study (Table 13.21). The price stability for the group as a whole reflects a sharply declining trend in household refrigerators and mostly rising or stable prices for the other items in the group. The only other clear downward trend, not shown in the table because the number of observations was very small, was for prices of household washing machines in the EEC countries.

Refrigerator prices in the United States and the United Kingdom, based on too few reports for publication, showed major declines, al-

[20] From sources in footnotes 18 and 19. See also "Appliance Sales Abroad Building Up Momentum," *Journal of Commerce*, June 14, 1965; "Italy Appliance Makers Boost Exports to Britain," *ibid.*, April 8, 1965; "Washing Machines: A New Growth Point?" *Economist*, September 9, 1967.

Table 13.21
International Prices, Household Electrical Equipment, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
HOUSEHOLD ELECTRICAL EQUIPMENT (SITC 725)						
U.S.	NA	102	98	100	102	102
U.K.	NA	NA	NA	100	98	102
EEC	NA	102	100	100	99	100
Germany	NA	101	100	100	99	99
HOUSEHOLD REFRIGERATORS (SITC 725.01)						
EEC	140	118	101	100	97	96
Germany	132	114	100	100	96	96
ELECTROMECHANICAL HOUSEHOLD APPLIANCES, N.E.S. (SITC 725.03)						
EEC	94	94	100	100	101	104
Germany	92	93	100	100	101	104
ELECTRIC SPACE-HEATING AND OTHER ELECTRIC HEATING EQUIPMENT (SITC 725.05)						
EEC	NA	91	99	100	100	101
Germany	NA	91	99	100	101	101

Source: Appendix C.

though not as large as those for EEC countries. In the United Kingdom the price decline continued through 1964, probably in response to the pressure of imports from EEC countries, whose prices were also falling.

Wholesale prices in several cases moved quite differently from the international price indexes. They showed a strong downward trend in the United States, while the international prices were fairly stable; and a large price rise in the United Kingdom in 1962–64, when international price series showed little change (see Appendix F). In Japan, for which international price data were unavailable, wholesale price data indicated that the price level was falling between 1961 and 1964.

A downward price trend was pervasive in the U.S. wholesale price data, not only in refrigerators, where it was considerably stronger than the trend in international prices, but also in the other items, for which

international prices were rising or stable. The group is unusual in this respect; there are few groups in which most wholesale prices did not rise during this decade.

Both household refrigerators and washing machines were used in the construction of the official export unit value index. The decline in unit value for refrigerators was considerably smaller than the fall in international prices or in wholesale prices. In particular, the stability shown after 1962 seems doubtful in view of the declines in the other two series and in foreign prices. In the case of washing machines the large decline in the last year is not reflected in either of the other two sources and is also suspect on that account.

Price Competitiveness

Only very minor changes in price competitiveness between the major world exporters are seen in the indexes for household electrical equipment as a whole (Table 13.22). The U.S. position weakened somewhat relative to the EEC countries between 1961 and 1963, but that followed a slight rise in the previous period, and the net change over seven years was small.

Indexes for earlier years, not published because they cover too small a part of the total value of trade in the group, suggest a deterioration in the U.S. price position relative to the EEC countries at the beginning of the period, and a gain relative to the United Kingdom, followed by a rapid fall, all before 1962. These early indexes, however, mainly reflect the movement of refrigerator prices, in which first the EEC countries (particularly in 1953–57) and then the United Kingdom (in 1961–62 and 1962–63) improved their price competitiveness rela-

Table 13.22
U.S. Price Competitiveness, Household Electrical Equipment, 1957, 1961–64
(1962 = 100)

	1957	1961	1962	1963	1964
Relative to					
U.K.	NA	NA	100	97	100
EEC	100	102	100	98	98
Germany	99	102	100	97	97

Source: Appendix D.

tive to the United States by 15 per cent or more. In this item U.S. price competitiveness quite generally fell until 1963, but recovered sharply in 1964.

Indexes of price competitiveness from wholesale price data record a different story, mainly gains in U.S. price competitiveness throughout the period. The chief exceptions are several declines relative to Japan. The indexes from wholesale prices show a 9 per cent gain in U.S. price competitiveness relative to the United Kingdom between 1962 and 1964, while the indexes from international prices show no change. The indexes from wholesale prices show a gain relative to Germany of 5 per cent between 1961 and 1964; those from international prices, a 5 per cent decline.

Data on trade shares given in Table 13.20 fit better with the price competitiveness indexes from international price data than with those from wholesale price data. They show no gain in exports relative to the United Kingdom between 1962 and 1964, as might be expected from the wholesale price data. If anything they show some loss in the U.S. relative share. The U.S. export share also declined relative to Germany between 1961 and 1964, as might be expected from the international price data, instead of gaining, as one might expect from looking at the relative movements of wholesale prices.

Price Levels

Both U.K. and EEC household electrical equipment prices have been between 5 and 10 per cent below U.S. prices throughout the period of the study, with no strong trend visible in the data for the group as a whole (Table 13.23). The European level was lower for refrigerators

Table 13.23
Price Levels, Household Electrical Equipment, 1957, 1961–64
(U.S. for each year = 100)

	1957	1961	1962	1963	1964
U.S.	100	100	100	100	100
U.K.	NA	NA	92	90	93
EEC	93	95	93	90	90

Source: Appendix E.

than for the other items in 1964, particularly in the case of the EEC countries, and there is some evidence of a strong downward trend before that. There is a little evidence that EEC prices in the earlier years were substantially above U.S. ones.

A few scattered observations for Japan, not shown in the table, suggest that the Japanese price level was the lowest of all, but the data do not include any prices on the major household appliances; their inclusion might give a different impression.

In general, these place-to-place comparisons are considerably weaker than those in many other groups because of the large differences in the specifications of products produced and used in each country.

For example, as was mentioned earlier, the most popular household models of refrigerators in the United Kingdom were in the 3.5–4.5 cubic foot range even at the end of the period, and a British firm supplied the demand for larger models by importing those of about 4.5–8.5 cubic foot capacity from Italy, where the most popular range of sizes was 4.8–6.4 cubic feet.[21] In the United States, by way of contrast, the most popular size was 13.5–14.5 cubic feet, and only 45,000 units, about 1 per cent of the units produced, were under 8.5 cubic feet.[22] The value of comparing European and British refrigerator data with American data for the same products is questionable; it means comparing a small fringe of the U.S. industry with a high proportion of the Continental and British output, giving no weight to the bulk of U.S. output, which meets little or no competition. If we had received additional data we might have been able to apply regression analysis to the various countries' data to give a wider range of price comparisons. The small refrigerators are more important in world trade than the large ones, but U.S. exports were important, at about one-quarter of OECD exports, as can be seen in Table 13.19. The average U.S. export unit value of $166 in 1963 [23] suggests an average size of exported refrigerators in the 12.5–13.5 cubic foot range, which is not represented in our price comparisons. That size would, if included, almost certainly raise the ratio of foreign-U.S. prices in the refrigerator subgroup.

Other appliances also differ substantially from country to country, with foreign products being generally less automatic and of smaller

[21] "Italian Invasion," *Economist*, March 6, 1965; *Free World Production and Trade.*
[22] *Census of Manufactures: 1963, Industry Statistics: Household Appliances*, U.S. Bureau of the Census, 1966.
[23] *United States Exports of Domestic and Foreign Merchandise; Commodity by Country of Destination, 1963 Annual*, U.S. Bureau of the Census, Report FT 410, 1964.

capacity, although some contained features not wanted or not needed in the United States, such as water heaters in washing machines or water softeners in dishwashers. Where comparability was obtained in some price comparisons for freezers and dishwashers the European prices were far above the U.S. levels.

Appendix: Regression Analysis of Power Transformer Prices

Little direct information on price trends for power transformers was collected in the course of this study, mainly because the data for these products are almost entirely from purchasers and no purchaser is likely to buy identical items year after year. Even when we pooled the data from many purchasers it was difficult to find observations in successive years for products identical with respect to the short list of specifications available, and those that did have corresponding specifications probably differed in other characteristics for which we did not have information.

In such a product, for which each individual sale involves some degree of custom tailoring, prices supplied by sellers for an identical product over time are likely to be somewhat artificial. The agency requesting the price cannot even request actual prices because there will be few, if any, sales of the exact product specified by the collecting agency. The reported price is even more likely than usual to represent a list price, i.e., without adjustments to meet competition. Since we do not have time-to-time sellers' data on identical products, and each buyers' report is of an item somewhat different from the previous one, our choice of methods for making price comparisons is narrowed. Place-to-place comparisons for power transformers, and for most of the other items in this subgroup, were made from bidding data, as described in the text. For comparisons over time, however, the only possible technique was to fit regressions to each year's bid prices and to measure the price changes from these.[24] This procedure was applied only to U.S. prices, because observations for the other countries were too few. Indexes for the other countries were inferred from the U.S. ones by using the place-to-place relatives from bid data.

The basic data for the regression analysis were approximately 150 offers by U.S. companies in bidding on power transformers in the United

[24] For a discussion of the use of regression methods, see Chapter 5.

States and abroad in 1957 and 1961 through 1964. Only the lowest U.S. offer was taken for each bidding, on the ground that it was the only one relevant for the buyers. It undoubtedly would have been desirable to include several characteristics of the transformers in the equation.[25] However, we did not collect detailed specifications, although they were available in any degree of completeness desired, because the data were intended for use in place-to-place comparisons, in which the requirement that buyers' specifications be met and the evaluation of offers by purchasers insured comparability among suppliers. For that reason, the only characteristic of the equipment that could be included in our equations was transformer capacity, and we were obliged to assume that either the other characteristics were not correlated with capacity or the year of purchase or that they did not affect the price.

It would have been possible to calculate place-to-place indexes through regression analysis also, but this procedure would not have been efficient. Bidding produces the effect sought from the regression analysis; i.e., the comparison of prices of comparably specified items, or at least having comparable minimum specifications. The advantage is that the number of specifications matched or otherwise taken into account is much greater than could be included in any regression possible from the existing data.

Given the limitations on the number of characteristics to be used in the equations the main remaining decisions concerned the form of the equations. The variables included were the capacity of the transformer, measured in millivolt-amperes, the year in which the bidding took place, and a dummy variable to distinguish bids on projects in the United States from those on foreign projects. The equations with the greatest number of variables included those listed plus interaction terms to permit the coefficient for capacity to vary from year to year. Four equation forms were fitted for each set of variables, arithmetic in both dependent and independent variables, logarithmic in both, the dependent variable arithmetic and the independent variables logarithmic, and vice versa.

The mixed equation forms could be dismissed immediately. Many fitted the data poorly, and the best of them were inferior to the corre-

[25] Dean and De Podwin included not only capacity (kilovolt-amperes) but also dummy variables for phase and load tap changing, and calculated separate equations for self-cooled and forced oil auto and conventional transformers. See Charles R. Dean and Horace J. De Podwin, "Product Variation and Price Indexes: A Case Study of Electrical Apparatus," *Proceedings of the American Statistical Association,* December 29, 1961.

sponding arithmetic or logarithmic equations. The arithmetic equations produced some high levels of $\bar{R}^2$ but the residuals gave clear evidence of curvilinearity in the relationship of price to capacity.

The arithmetic equations show substantial differences in slope from year to year as well as differences in level. In equation 1 of Table 13.24, for example, the coefficient for MVA ranges from .82 in 1962 ($820 per MVA) to 2.33 in 1957, and the other equations show similarly wide ranges. However, the slope measures are sensitive to the presence or absence of large transformers in the sample. They sometimes increased sharply when the largest ones were dropped, as in 1962 and 1964, and sometimes declined, as in 1957 and 1963. This effect can be seen by a comparison of Table 13.24, which includes all transformers, with Table 13.25, which excludes nine transformers of 300 MVA or over. The elimination of the large transformers narrows the range of year-to-year variation in slope, although it remains large in Table 13.25. The most drastic change in coefficients is in 1963, the year in which most of the large transformer bids took place. The coefficient was cut from 1.18 to 0.69, the lowest of all the years shown.

The results from dropping the large transformers illustrate their role in the high levels of $\bar{R}^2$ reached in the arithmetic regressions. The equations of Table 13.25, without the few largest transformers, produce much lower levels of $\bar{R}^2$, ranging from .73 to .78 instead of .85 to .86, most of them about one-tenth below the corresponding ones in Table 13.24.

The logarithmic equations, which are superior to the arithmetic, are shown in Table 13.26. Differences in slopes, by year, were not statistically significant except for 1964. We therefore settled on equation 12, with only a single slope for the other years and with year-to-year price changes represented by the coefficients of the year dummy variables. For 1964, since the dummy variable for the slope was significant, the measured price change was different at each size of transformer. Price relatives were calculated for several different sizes, and these were weighted by our estimate, from bidding data, of the relative importance of each size in terms of the value of the trade involved. All of the year dummy coefficients were statistically significant, and the preferred equation, 12, shows a sharp fall in price from 1957 to 1961, smaller declines to 1963, and the smallest of all in 1964.

The logarithmic equations present a number of contrasts with the arithmetic ones. Not only are the $\bar{R}^2$ higher, all between .93 and .94,

Table 13.24
Arithmetic Regression Equations for Prices of Power Transformers, All Observations
(price in thousands of dollars; figures in parentheses are *t*-ratios)

	Equation Number				
	1	2	3	4	5
Constant term	36.272	40.359	23.545	23.594	17.144
	(3.6)	(4.3)	(3.6)	(4.7)	(2.2)
Dummy coefficient for					
1957	22.53	18.44			41.65
	(9.6)	(0.8)			(1.8)
1961	-10.90	-11.72			10.22
	(-0.8)	(-0.8)			(0.8)
1963	-34.47	-35.18			
	(-2.5)	(-2.6)			
1964	-38.71	-31.33			
	(-2.4)	(-2.2)			
Foreign project	12.10		0.12		4.75
	(1.1)		(0.01)		(0.5)
Slope (MVA)	0.8188	0.8066	0.8764	0.8762	0.9011
	(10.6)	(10.5)	(12.1)	(12.4)	(12.2)
Slope dummy coefficient					
1957	1.5094	1.5216	1.6189	1.6188	1.4271
	(8.1)	(8.2)	(10.4)	(10.5)	(7.6)
1961	0.6040	0.5965	0.5849	0.5846	0.5098
	(2.7)	(2.7)	(3.1)	(3.1)	(2.3)
1963	0.3662	0.3677	0.2293	0.2293	0.2278
	(3.7)	(3.7)	(2.6)	(2.7)	(2.6)
1964	0.7565	0.7353	0.6115	0.6116	0.6071
	(4.9)	(4.8)	(4.2)	(4.2)	(4.2)
Standard error	5.12	5.12	5.27	5.25	5.24
$\bar{R}^2$	.86	.86	.85	.85	.85

Table 13.25
Arithmetic Regression Equations for Prices of Power Transformers, Excluding Large Transformers
(price in thousands of dollars; figures in parentheses are *t*-ratios)

	Equation Number				
	1	2	3	4	5
Constant term	36.835	40.562	31.313	29.296	24.781
	(5.7)	(6.8)	(6.9)	(8.3)	(4.6)
Dummy coefficient for					
1957	47.16	43.34			66.18
	(2.7)	(2.5)			(3.9)
1961	-10.84	-11.92			3.73
	(-1.3)	(-1.4)			(0.5)
1963	-19.20	-19.62			
	(-2.5)	(-2.5)			
1964	-38.82	-32.04			
	(-3.7)	(-3.4)			
Foreign projects	9.82		-4.50		0.50
	(1.4)		(-0.7)		(0.1)
Slope (MVA)	0.8797	0.8576	0.8497	0.8621	0.9644
	(10.4)	(10.3)	(10.6)	(11.1)	(11.3)
Slope dummy coefficient					
1957	1.0750	1.0974	1.6369	1.6443	0.9573
	(4.5)	(4.5)	(8.7)	(8.7)	(3.8)
1961	0.5394	0.5456	0.5295	0.5335	0.4395
	(3.7)	(3.7)	(4.0)	(4.1)	(2.9)
1963	-0.1890	-0.1870	-0.1799	-0.1784	-0.2736
	(-2.6)	(-2.6)	(-2.7)	(-2.6)	(-4.0)
1964	1.0125	0.8688	0.2011	0.1752	0.2441
	(2.23)	(2.0)	(0.5)	(0.4)	(0.6)
Standard error	3.02	3.04	3.32	3.32	3.17
$\bar{R}^2$	.78	.77	.73	.73	.75

Table 13.26
Logarithmic Regression Equations for Prices of Power Transformers, All Observations
(natural logarithm of price in thousands of dollars; figures in parentheses are *t*-ratios)

	Equation Number					
	7	8	9	10	11	12
Constant term	1.4781	1.7510	1.4631	1.7139	1.7395	1.4886
	(15.8)	(19.1)	(17.7)	(22.0)	(21.9)	(18.1)
Dummy coefficient for						
1957	0.838	0.714	0.820	0.735	0.740	0.830
	(6.2)	(4.8)	(7.3)	(6.0)	(6.0)	(7.5)
1961	0.289	0.240	0.262	0.227	0.224	0.260
	(3.6)	(2.7)	(3.8)	(3.0)	(2.9)	(3.8)
1963	-0.165	-0.197	-0.164	-0.180	-0.178	-0.159
	(-2.2)	(-2.3)	(-2.4)	(-2.4)	(-2.4)	(-2.4)
1964	-0.253	-0.068	-0.187	-0.016	-0.061	-0.258
	(-2.7)	(-0.7)	(-2.2)	(-0.2)	(-0.6)	(-2.8)
Foreign project	0.419		0.399			0.417
	(6.0)		(5.8)			(6.1)
Slope (ln MVA)	0.7555	0.7047	0.7620	0.7166	0.7084	0.7523
	(32.6)	(29.2)	(41.4)	(38.9)	(36.8)	(40.4)

(continued)

Table 13.26 (concluded)

	Equation Number					
	7	8	9	10	11	12
Slope dummy coefficient						
1957	-0.0013	0.0036				
	(-0.1)	(0.3)				
1961	-0.0094	-0.0059				
	(-0.7)	(-0.4)				
1963	0.0006	0.0023				
	(0.1)	(0.5)				
1964	0.0179	0.0134			0.0128	0.0183
	(2.2)	(1.4)			(1.4)	(2.3)
Standard error	.30	.33	.30	.33	.33	.30
$\bar{R}^2$	.94	.93	.94	.93	.93	.94

and the slopes virtually constant from year to year, but the equations calculated from the sample excluding the largest transformers (Table 13.27) are almost identical to those from the complete sample. The $\bar{R}^2$ are hardly reduced by the reduction in the sample, ranging from .91 to .94, and the coefficients are mostly very close as well, except those for 1964 and the constant term for 1957, which is unstable because of the small number of observations for that year.

Price indexes are derived below (Table 13.28) from equation 12 (previously mentioned as preferred), which includes a dummy variable for foreign projects and a slope dummy variable for 1964, and from two others. Of these, equation 11 is equation 12 minus the dummy variable for foreign projects, and equation 10 also excludes the 1964 slope dummy.

The movements of all three price indexes are fairly similar between 1961 and 1963 and those from equations 10 and 11 are similar throughout. However, the index from equation 12 declines in 1964 while the other two rise. It also declines more than the other two in 1957–61 and 1961–62, and rises more in 1962–63. The only really large difference is in the last year, when almost all the observations were from foreign projects; equation 12 implies that the apparent rise in U.S. prices between 1963 and 1964 is due entirely to this fact, and that the comparison with foreign projects alone shows a continuation of the price declines.

This international price index can be compared with a number of measures of domestic prices of power transformers and other electrical equipment, although the methods and time period covered differ from our own and the differences among the indexes cannot, therefore, be assumed to represent differences between domestic and international price behavior. These indexes and the international price index are shown on Chart 13.1 and Table 13.29.

The BLS series relies essentially on list or catalog prices and does not reflect what were apparently sharp short-term fluctuations in actual transaction prices. The indexes published by Dean and De Podwin and by Kuhlman [26] use transaction prices calculated by the electrical equipment manufacturers and fluctuate more sharply than the BLS series. The Dean and De Podwin index is, in addition, based on a regression

[26] Dean and De Podwin, *op. cit.;* John M. Kuhlman, "Theoretical Issues in the Estimation of Damages in a Private Antitrust Action," *Southern Economic Journal,* April 1967.

Table 13.27
Logarithmic Regression Equations for Prices of Power Transformers, Excluding Large Transformers
(natural logarithm of price in thousands of dollars; figures in parentheses are *t*-ratios)

	Equation Number					
	7	8	9	10	11	12
Constant term	1.4978	1.7557	1.5447	1.7992	1.8167	1.5680
	(17.0)	(19.5)	(18.8)	(22.5)	(21.9)	(19.0)
Dummy coefficient for						
1957	0.981	0.851	0.816	0.721	0.722	0.822
	(6.6)	(5.0)	(7.2)	(5.7)	(5.7)	(7.4)
1961	0.276	0.233	0.248	0.213	0.212	0.247
	(3.7)	(2.7)	(3.7)	(2.8)	(2.8)	(3.7)
1963	-0.153	-0.173	-0.215	-0.235	-0.237	-0.218
	(-2.2)	(-2.1)	(-3.2)	(-3.1)	(-3.1)	(-3.3)
1964	-0.302	-0.078	-0.264	-0.085	-0.132	-0.360
	(-3.0)	(-0.7)	(-3.1)	(-0.9)	(-1.2)	(-3.6)
Foreign project	0.422		0.403			0.419
	(6.5)		(6.1)			(6.3)
Slope (ln MVA)	0.7519	0.7058	0.7376	0.6908	0.6849	0.7281
	(32.7)	(28.2)	(37.2)	(33.5)	(31.4)	(35.8)

(continued)

Table 13.27 (concluded)

	Equation Number					
	7	8	9	10	11	12
Slope dummy coefficient						
1957	-0.0187	-0.0119				
	(-0.9)	(-0.5)				
1961	-0.0087	-0.0061				
	(-0.7)	(-0.4)				
1963	-0.0140	-0.0139				
	(-2.5)	(2.1)				
1964	0.0626	0.0270			0.0412	0.0784
	(1.4)	(0.5)			(0.8)	(1.8)
Standard error	.28	.32	.29	.32	.32	.28
$\bar{R}^2$	.94	.92	.93	.92	.91	.93

Table 13.28
Price Indexes for U.S. Power Transformers from Regression Equations, 1957, 1961–64
(1962 = 100)

Equation Number	1957	1961	1962	1963	1964
10	204.8	123.3	100.0	82.0	96.6
11	209.7	125.2	100.0	83.7	99.6
12	229.2	129.7	100.0	85.4	84.1

Source: Table 13.26.

Chart 13.1

Indexes of U.S. Power Transformer Prices, 1953–64

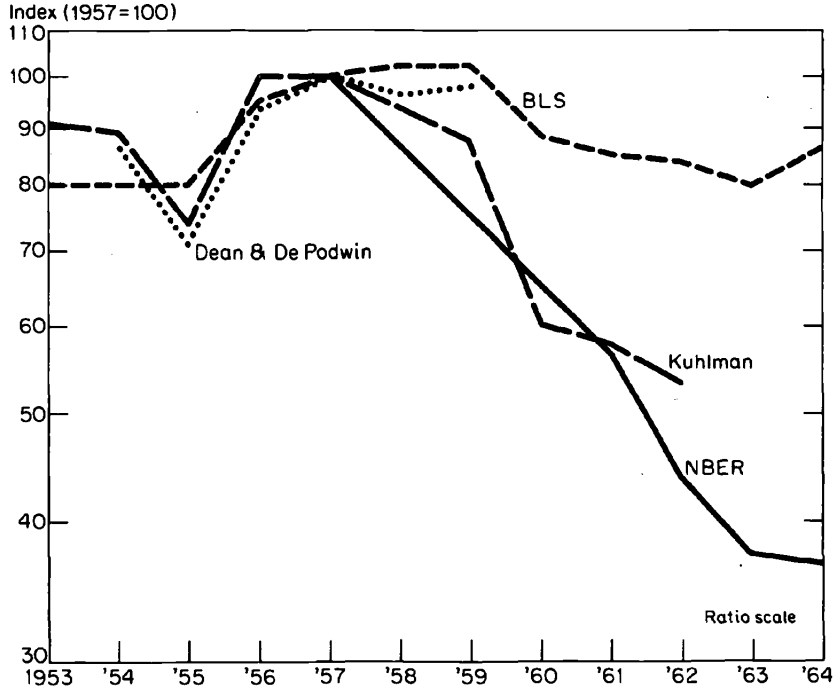

Table 13.29
Comparison of Several Indexes of U.S. Power Transformer Prices, 1953, 1957, 1961–64

	1953	1957	1961	1962	1963	1964
1962 = 100						
NBER	NA	229.2	129.7	100.0	85.4	84.1
Kuhlman	170.2	187.4	108.7	100.0		
BLS	95.1	118.8	101.4	100.0	95.1	102.6
		1957/1953	1961/1957	1962/1961	1963/1962	1964/1963
Each year on earlier year as 100						
NBER			56.1	77.1	85.4	98.5
Kuhlman		110.1	58.0	92.0		
Dean and De Podwin		115.8				
BLS		125.0	85.4	98.6	95.1	108.0

Note: NBER index: Table 13.28 index, from equation 12. Kuhlman index: John M. Kuhlman, "Theoretical Issues in the Estimation of Damages in a Private Antitrust Action," *Southern Economic Journal*, April 1967. Dean-De Podwin index: Charles R. Dean and Horace J. De Podwin, "Product Variation and Price Indexes: A Case Study of Electrical Apparatus," *Proceedings of the American Statistical Association*, December 1961; the first year is 1954 rather than 1953. BLS index: Price relative for 5,000 KVA power transformer (see notes to Appendix F).

analysis of prices similar to that used in calculating the NBER international price indexes, but it is more elaborate because their data permitted the use of additional variables. The Kuhlman index seems to have been based on a comparison of each transaction price with a 1954 book price—the price that would have been charged for that set of specifications if the 1954 price list had been used. The difference between that procedure and the regression method is that in the regression analysis the prices of particular characteristics, such as capacity, are inferred from market prices while in Kuhlman's index the characteristic prices are taken from the price list. If the difference between actual and book prices were greater for transformers of higher capacity and if this relationship had remained constant over time but there had been a shift toward larger transformers, Kuhlman's index would have declined relative to a regression-based index.

In fact, Kuhlman's index resembles Dean and De Podwin's closely except in 1959, when it declined sharply while the Dean-De Podwin index rose. Even this divergence may have been only in timing, since the Dean-De Podwin index turned sharply downward in the first quarter of 1960, the last period for which it is available. The NBER and Kuhlman indexes show similar large declines from 1957 to 1961, but we do not have data on intermediate years with which to compare year-to-year fluctuations. In 1962 the NBER index continued its rapid fall, while the Kuhlman series dropped by only 8 per cent.

The resemblances among the three series are particularly striking in view of the large differences in methods of construction, source of data, and even in the transactions covered, since the NBER data referred to foreign and U.S. government sales and the other two mainly or entirely to sales to private utility companies. The similarity among these indexes reinforces the impression that the BLS index greatly exaggerates the stability of power transformer prices and may well give an incorrect impression of the trend as well.

Some independent confirmation of the price changes shown by the indexes other than the BLS can be found in newspaper and magazine reports on the antitrust case against the electrical equipment manufacturers. For example, the "white sale" of 1954–55, which began at about the end of 1954, and the reported resumption of price-fixing arrangements in 1956 are clearly marked in both the Kuhlman and Dean-De Podwin indexes, particularly in the quarterly data, not reproduced here, but the BLS index shows no trace of them.[27] The defense in the trial was quoted as reporting that power transformer prices ". . . sagged badly in 1958, well before the end of the conspiracy." [28] The BLS series showed a rise in price in 1958 while both Kuhlman and Dean-De Podwin confirm the reported decline. The reported decline after the ending of the conspiracy—". . . 30 per cent or more below the price levels of a year ago" [29]—matches closely the Kuhlman figure of 29 per cent from the fourth quarter of 1959 to the fourth quarter of 1960. The BLS reported a fall of less than 15 per cent in the same period.

[27] Richard Austin Smith, "The Incredible Electrical Conspiracy, Part I," *Fortune*, April 1961.

[28] "Electrical-Gear Makers Go on Trial Today in First Civil Suit on Price-Fixing Charges," *Wall Street Journal*, March 16, 1964.

[29] "Electrifying Surrender," *Economist*, December 10, 1960.

On the other hand, the continuation of declining prices after 1962 or 1963 shown by the NBER indexes is contradicted by some newspaper reports in late 1963. These suggested that prices may have reached a low point in late 1963 and then rebounded, a pattern more like that of the BLS index or of indexes from the NBER equations that did not include a foreign project variable. The reports of price increases were frequent from September 1963 through the end of the year.[30] However, beginning in March 1964, reports of increases and decreases in transformer prices alternated frequently, suggesting that attempts to raise prices were being defeated by undercutting of the new levels,[31] and that the rise in prices shown by the BLS that year may have been very temporary or may have reflected only list prices, not transactions prices. It must also be remembered that the NBER data for 1964 relate almost entirely to foreign sales, for which the price movement could have been different from that in domestic sales.

In general, from the combination of evidence from several sources, we conclude that the large decline in transformer prices shown by the NBER international price index is probably a valid description of the course of prices in these years despite the divergence from price trends given by BLS data. In addition, since the Kuhlman index follows at least the major movement of the NBER series after 1961, we used it to extrapolate the international price index back to 1953.

[30] "Prices of Heavy Electrical Goods Are Seen Firming," *Wall Street Journal*, September 18, 1963; "GE Increases Network Transformer Prices," *ibid.*, September 30, 1963; "Westinghouse Raises Prices 5% on Network Transformers," *ibid.*, October 4, 1963; "GE Increases Price 6% on Power Transformers," *ibid.*, October 14, 1963; "Electrical Comeback: Power Equipment Field Lifts Prices, Indicating Long Slump Is Ending," *ibid.*, December 11, 1963.

[31] "Westinghouse Reduces Prices on Large-Rated Power Transformers," *Wall Street Journal*, March 19, 1964; "McGraw-Edison Unit Lifts Prices of Some Transformers by 6%," *ibid.*, April 1, 1964; "McGraw-Edison Unit Lifts Prices of Larger Power Transformers," *ibid.*, May 15, 1964; "Westinghouse Raises Prices for Large Transformers," *New York Times*, May 22, 1964; "G.E. Cuts Its Price for Transformers," *ibid.*, August 8, 1964; "Electrical Equipment Price Increased by Westinghouse," *ibid.*, October 15, 1964; "Westinghouse Raises Prices on Some Power, Network Transformers," *Wall Street Journal*, October 15, 1964; "Big-Transformer Prices Cut by Westinghouse," *ibid.*, November 4, 1964.