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METHODS OF THE STUDY

IN THIS CHAPTER we describe the nature and sources of the data used in our study. We seek to show also how we met the conceptual problems that arose in trying to translate the principles described in Chapter 1 into operating procedures for putting data together into index numbers. More detailed information about the application of these procedures to particular commodity groups will be found in the chapters in Part Four.

Data Collection

Method of Collection

An important technical feature of the study was the decision to abandon the usual practice of organizing the price collection effort around a set of product specifications selected in advance. In the area of machinery, which was the most important in our study, it would have been impossible in most commodity groups to select any specifications applicable to all or even to most sellers. Each firm buys or sells products with slightly different specifications, and it would not have been sensible, even if much greater price collection resources had been available, to discard relevant information because it did not refer to a particular set of predetermined specifications.

Our solution to this problem was to place the burden of determining comparability on the respondent, asking him to select the most important items in each group about which he had knowledge and to provide comparable quotations either over time or between exporting countries. With rare exceptions, we did not ourselves undertake to match two prices in order to compute a time-to-time or place-to-place price relative. In a sense it was the price relative itself that we were collecting in our

field work, although we did obtain the actual prices as well. (In a few cases in which firms did not wish to divulge actual prices, we accepted price relatives without actual prices.)

Ideally, we would have wished to have both place-to-place and time-to-time comparisons for each individual commodity for all countries and all years. In practice, however, such complete comparisons were rarely possible. Even with a relatively simple commodity such as nails, we might find that a company bought one type of nail in 1953 and could compare U.S. and German prices for it, but bought a different type in 1957 and could compare the U.S. and German prices only for that type. A comparison of the United States and Japan might be possible only for a third type, and time-to-time price changes might be available only for a fourth. As was mentioned earlier, any unit of information was useful to us provided that it compared, for a precisely defined commodity, at least two countries' prices at one date or one country's prices for at least two dates. As a minimum, we required sufficient specification to assign each price relative to an appropriate five-digit SITC category. The price collection forms left with or sent to companies are reproduced in the appendix to this chapter.

Sources of Price Data

The comparative prices used in this study were gathered from a variety of sources. A major portion of the data came from more than 200 American firms, mainly large industrial companies, which in their aggregate account for a substantial fraction of American exports. About 375 firms of this type were approached for assistance in the study, and over 55 per cent provided some type of comparative price data. Most of the companies were among the 500 largest industrial corporations tabulated in the *Fortune* survey for 1963.[1] Almost half of the firms listed there were requested to assist in the study, and close to two-thirds of these cooperated. A high proportion of the largest companies on the list were approached (more than three-quarters of the 100 largest firms, of which 56 participated), and the proportion declined to less than one-quarter of the fifth hundred. In every group except the last hundred more than half of the firms from whom data were requested agreed to assist the study.

1 "The *Fortune* Directory: The 500 Largest U.S. Industrial Corporations," *Fortune*, July 1963, pp. 177–196.

Aside from these large industrial firms about 150 other companies were asked to participate. These included a few foreign firms, a few large companies in such fields as transportation and merchandising, and a large number of smaller firms selected because the nature of their business suggested that they would be good sources of international price data, particularly for categories not covered by the large industrial firms in our sample. Most of these were machinery manufacturers and metals dealers; some were firms that we thought were likely to have bought in international markets. This second group of companies differed in a number of ways from those picked from the largest 500. The proportion cooperating was slightly under half, and most of them provided selling rather than buying prices.

Among the whole group of firms responding, the proportion reporting only selling prices was slightly greater than the proportion reporting only buying prices. Only 7½ per cent of the firms reported both buying and selling prices. Among the firms picked from the 200 largest on the *Fortune* list, almost twice as many reported buying prices as selling prices. These proportions were almost reversed among those industrial firms drawn from the following 300, particularly among the smallest firms, of which about three-quarters reported only selling prices.

The characteristics of firms described here are not, of course, those of a random sample of U.S. corporations, but only of the particular sample used. Some of the characteristics stem from the way in which the sample was picked—particularly the fact that large firms were requested to help even when they were not engaged in machinery or metals products businesses. The assumption underlying this selection was that almost any large firm would have had some experience in purchasing metals and machinery even if it did not sell them. The smaller firms were selected mainly because of the nature of the products they sold and for that reason supplied mainly selling price data.

U.S. sellers of machinery and metal products were asked to provide their own export prices for our references dates and to compare these prices with those charged by foreign competitors or by their own foreign subsidiaries or licensees for identical or equivalent products. Companies involved in international markets through their purchasing activity were asked to compare offers from the United States and from foreign countries for specific items of equipment or metals, and also to trace the changes in the prices of such items over a period of years.

The extent of price data obtained from individual firms varied very widely. In one case a member of our staff spent many months digging out place-to-place and time-to-time price comparisons from the purchase records of a large international firm. A number of firms made extensive efforts to summarize their selling and/or purchasing experience for our benefit, giving us complete summaries of large numbers of export or purchasing transactions which, in a few cases, accounted for a significant fraction of world trade in the products covered.

A number of firms that operate on a worldwide basis provided extensive comparative price data originally gathered for their own internal use. In some instances the data were from market surveys in which export prices of competitors from different countries were gleaned from a variety of sources. More often they were gathered from suppliers in a systematic way in order to guide purchasing decisions or to provide the basis for the estimation of the costs of installing new plants in various parts of the world; in some instances the firm maintained records of the prices of fifty to one hundred items in the main producing countries. Other firms collected price comparisons in the course of more sporadic buying activity, like that involved in the building of a factory abroad for the firm's own use or in its role as consultant or adviser to a foreign or domestic firm building a factory abroad. In a large number of cases, of course, firms provided only a few sets of comparative prices relating to different points in time for a given country or to different national sources of supply.

Almost all the companies were visited at least once by a member of the staff and many two or more times. Follow-up inquiries were often necessary to clarify the nature of the price data, to gather additional information necessary to assign an item to its proper four- or five-digit SITC category, or to obtain information beyond that available in the trade statistics on the nature of international specialization in a particular SITC category. Respondents were assured that the information they provided would be kept confidential. Written instructions for price collection and a standard form for entry of the data, both reproduced in the appendix to this chapter, were often left with the firms at the initial interview.

In addition to information supplied by business firms, price data were obtained from a number of U.S. government agencies. Most of these data consisted of formal bids by U.S. and foreign firms to supply the

government's needs for metals such as steel, aluminum, and copper, and for electrical equipment, scientific equipment, and so on. They were collected, with a great deal of help by the Bureau of Labor Statistics, from government-owned utilities, the military services, and other federal agencies. A small amount of data was obtained from local governments in the United States. All government data, which included bids probably numbering more than one thousand, represented purchase or offer prices.

The third major body of data was from foreign sources. Arrangements were made with several foreign research organizations for the collection of data in their own countries on U.S. and foreign prices. The most comprehensive time-to-time data were obtained from Germany through the aid of the IFO–Institut für Wirtschaftsforschung. These consisted of the official export price series broken down in considerable detail so as to provide, where available, information at the five-digit level, sometimes by destination. A considerable amount of data was also obtained on the movement of import prices, sometimes with breakdowns by country of origin. In addition to the time-to-time data taken from official sources, the German data included a limited number of direct place-to-place price comparisons gathered by the IFO–Institut. With the exception of the United Kingdom, where a private research organization supplied us with some comparisions based on selling prices, most other foreign data were based upon the purchasing experience of individual firms and public agencies. Some of this information came from agencies of the British and Canadian governments, but much more came from nonindustrialized countries. An extensive collection of comparative price information, involving both place-to-place comparisons and time-to-time data reflecting the development of prices from individual industrial countries, was obtained from Israel through arrangements made with members of the Department of Economics at the Hebrew University. The Israeli data provided both types of information for at least one product in virtually every one of the three-digit SITC categories included in our study. A more limited but significant body of data was obtained from Thailand; like the Israeli data, these reflected the purchasing experience of both private firms and public agencies.

In addition to the price data collected for the study by foreign research groups we were able to obtain additional information on bidding for contracts to supply foreign agencies, mostly governmental, with a wide

variety of machinery and equipment, particularly the type required for development projects. More than thirteen hundred such bids, some of which ran into millions of dollars and provided international price comparisons for many items, were analyzed. Some of them, as in the case of railroad locomotives and construction equipment, were also used in comparisons over time where sufficiently detailed specifications were available.

We believe that those varied sources of price data provided good samples of the basic metals, metal products, and machinery included in our study. For some important commodity segments, particularly those usually purchased by the public authorities of developing countries, such as machinery for irrigation and electrical projects, the sample covers a substantial fraction of international trade. All in all at least some data are included for purchases of firms or public agencies in each of about fifty countries.

Much of our confidence in the results of the study rests not only on the large number of observations but also on the variety of sources. Data from each individual type of source may be subject to biases of unknown importance, but there was a good chance of overcoming most of these by including a large number of almost every type of transaction that involves world trade.

A number of biases affect particularly the place-to-place comparisons. It seems likely, for example, that data from U.S. purchasers show low prices for foreign products because the prospective buyers obtain quotations from abroad only when they think the offerings are likely to be at significantly lower prices compared to the domestically produced goods. Many items are purchased routinely in the United States without comparison with foreign prices because the foreign price is known to be higher than the U.S. price, and the purchaser will not have in his files the kind of precise comparison for these products that he has for those in which foreign suppliers are known to be competitive. A similar situation probably exists with respect to formal bidding data such as for U.S. government agencies. Foreign producers will simply not bid on many products for which they have little hope of winning orders. We would really like a foreign price for every bidding, but we tend to find them much more frequently on products often sold by foreign companies. This bias is exacerbated by any provisions, such as buy-American differentials,

which favor U.S. companies. Their effect is presumably that foreign companies will limit their bidding to those products on which their advantage is great.

In bidding outside the United States the bias is not necessarily against the United States. The tendency is for the least competitive companies and countries to decline to bid, with the result that a number of the most unfavorable comparisons are omitted from every country's data. This bias is probably particularly strong for Japan and for the Common Market countries other than Germany, which tend to bid much less frequently than the United States, the United Kingdom, and Germany and, therefore, appear in an unduly favorable light. On the other hand, there are products on which U.S. companies do not try to win orders abroad, and in these cases the data are biased in favor of the United States.

This bias applies not only to particular commodities or to bidding against the buying country's own suppliers. The conditions of bidding in any particular country frequently tend to favor one supplier over another. Sometimes, for example, the specifications tend to resemble those of a traditional supplier, either deliberately or simply through the habits of the purchasers. A supplier in a neighboring country will be more likely to bid for a project than a supplier in a distant country, because the distant supplier knows that differences in transport cost may eliminate him. On the other hand, if a distant supplier does decide to bid on a project he is likely to offer lower f.a.s. prices (see footnote 4, below) than on a project closer to home, because he knows that he must overcome the difference in transport cost.

Another source of place-to-place data was information from U.S. firms whose foreign subsidiaries produced models identical to those manufactured in the United States by the parent companies. These data too seem likely to be biased against the United States because it is rare for a foreign subsidiary to produce the parent company's whole range of products, and the products selected for production abroad are presumably those in which foreign production has the greatest advantage. For the products produced more advantageously by the parent company there are no place-to-place comparisons. A possible example of this type of bias was found in the data on construction machinery. The intracompany comparisons on identical models were distinctly less favorable to the United States than the other intercountry comparisons for what the buyer

considered equivalent products. A similar relationship was observed in railroad locomotives.

One type of differential pricing has a special interest. Companies are said to demand higher prices for goods sold under tied loans and grants than for those supplied under free international competition. In some commodity groups, in fact, U.S. companies say that they are able to sell abroad only to buyers using tied funds, because U.S. prices are higher than those of competitors. In practice, price offers under tied financing probably do not appear in our place-to-place comparisons since in such circumstances the buyer does not need to make international price comparisons. Sales under tied financing do, however, appear in our time-to-time data, but could not in most cases be distinguished from other sales.

The ideal solution, if the international market were completely separated from the tied fund market, would be to analyze the two markets separately, as if they involved different countries or different commodities. It is likely, however, that the two markets are not completely separated. Even under tied financing a buyer can exercise a choice among sources if several countries offer tied loans. In such cases the price of the product is one factor in a package that includes financing terms as well. It is not uncommon for countries operating under tied loans to switch purchases to other funds when the price differential between the offering under the tied financing and what is available elsewhere becomes too large. Countries that have tied loans or grants from more than one developed country naturally have wider opportunities to make given purchases from alternative sources.[2]

Because of these possibilities for bias, and others not mentioned, we considered it important to collect data from many different sources even if there was considerable duplication in commodity coverage and even when the cost per observation was much greater for some sources than for others. In this way we hoped to secure a representative sample of the world's purchases of internationally traded goods and to notice any serious biases in our data.

Selection of Items for the Sample

In some instances, respondents had to choose which price comparisons they would make for us from a great wealth of data on machinery and

[2] Cf. references on aid-tying cited in Chapter 3.

metal products. We suggested the following criteria of selection: (1) The items priced should be important in world trade (or else, as a second choice, in the exports or imports of the particular firm[3]); (2) the group of items selected taken together should be as representative as possible of world trade in the product category; and (3) preference should be given, as long as the first two criteria were met, to products which were produced in identical or comparable forms in different countries.

Since the selection of specific items was left to the respondents, additional firms were asked for information from time to time when it became apparent that those chosen earlier would not provide adequate data in certain product classifications. Instructions to the groups cooperating with us abroad were also adjusted to meet potential data deficencies.

Place of Reference of Prices

In order to focus on competitiveness as a feature of a country's own economy and to abstract from shifts in markets and differences in transport costs, we collected prices f.a.s. port of export wherever possible. Some data could only be secured on an f.o.b. factory basis, which we considered acceptable, and other information was available only c.i.f. destination. We accepted c.i.f. data but adjusted them to an f.a.s. or f.o.b. country-of-export basis before including them in the indexes.[4]

The alternative to this procedure would have been to measure price competitiveness in each different market of the world. The overall price competitiveness of each industrial country would then be determined by an averaging process in which each market would have a weight proportionate to its share in world consumption or imports. A more modest

[3] Where price data were available for a variety of sizes, quantity lots, and packagings (e.g., packaged versus bulk), the respondent was asked to supply data for his volume sales or purchases. In some product areas, quantity discounts or extras are quite significant and price relatives could have been distorted had not care been taken to ensure the comparability in this respect of the constituent prices of each relative.

[4] In order to make these adjustments for freight costs we collected information on freight rates, freight factors (ratios of freight to unit value), and f.o.b.-c.i.f. differentials from public bidding data and from the experience of some of the firms which supplied price data. Where these direct sources of information were not available we made use of some of the rates reported in congressional hearings on freight rates and from other governmental sources. See *Discriminatory Ocean Freight Rates and the Balance of Payments,* Hearings before the Joint Economic Committee, 88th Cong., 1st sess., Part 1, June 20 and 21, 1963; Part 2, October 9 and 10, 1963; and Part 3, November 19 and 20, 1963; and 88th Cong., 2nd sess., Part 4, March 25 and 26, 1964; and Part 5, Appendix; and *Steel Prices, Unit Costs, Profits, and Foreign Competition,* Hearings before the Joint Economic Committee, 88th Cong., 1st sess., April 23 to 29, May 2, 1963. "C.I.F. Value of U.S. Imports," U.S. Tariff Commission, February 7, 1967, mimeo.

alternative would have been to confine our attention to price competitiveness in one particular region of the world such as Latin America or in Europe. Our procedure is in a sense a compromise designed to provide a general measure of price competitiveness without entailing the enormous work of the first alternative and without limiting its geographical coverage as would the second alternative.

In collecting prices from exporters, our problems of measurement were sometimes complicated by the differences in f.a.s. prices that were charged for shipment to different markets. The ideal solution would perhaps have been to treat the shipments to each destination as a different product and to combine the price trends or international price comparisons for the different destinations according to the relative importance of the imports of each. In fact, however, firms were often loath to supply us with all of the necessary information, and we usually obtained relatives for a few of the chief markets.

Exclusion of Service Components of Prices

Since our interest is in commodity trade we tried to exclude service components from the prices we compared. In addition to transport costs, to which we referred earlier, the main service additions to "pure" commodity prices that we encountered were for erection and construction, distribution, and inspection. Erection costs were often included in bids on such products as storage tanks; and construction costs, in bidding on electrical and communication equipment. In almost all cases, however, the commodity cost was shown separately.

We excluded service costs if they represented transactions for which the price was independent of the price and characteristics of the commodity. An example might be a specification by the buyer that all tenders include two weeks of mechanics' time. However, if the service component was not independent of the commodity offer, and/or was substitutable for a part of the commodity price, it was included. The costs of special packing for export were, for example, included. So, too, were the costs for extra engineering time on a bid offer from one country where the product was being offered in a less advanced stage of assembly than other offers.

The costs of inspection created a special problem, particularly since buyers, in evaluating bids, sometimes estimated more extensive inspection costs for products from some sources of supply than from others.

In other cases buyers specified that the seller provide inspection services at the factory before the goods were shipped, or more often, at the point of delivery after arrival or at the time when the equipment was placed in operation. We chose finally to regard inspection services as the final step in commodity production, but we recognize that the case for their exclusion from our indexes is almost as strong as the case for their inclusion. In any event, the effect on the indexes is small since the charges were almost always well under 1 or 2 per cent of the total cost to the purchaser. Of course, only relative differences in inspection charges by producers in different countries would alter the place-to-place indexes. It is even less likely that the time-to-time indexes would be affected.

Generally, we rejected retail prices because they included the costs of internal distributive services that could not be expected to reflect the relative competitive strength of the supplying countries in the same direct way as f.a.s. export prices. However, retail prices of outboard motors and automobiles covered the range of models and the countries of origin and destination much more comprehensively than the f.a.s. export prices we really wanted. In these cases, we based our analyses on the retail prices and tried to adjust the results to the desired price basis. (See the discussions of product categories 711.5 and 732.1 in Chapters 12 and 15.)

Price Concepts

The Comparability of Products and Prices

The logic of our indexes required that the entire bundle of internationally traded goods be priced in each country for which the indexes were prepared. This requirement gave rise to two sets of problems. First, the quality of the goods exported often differed from one country to another. Secondly, there were cases in which a country did not export a good. The first of these difficulties often merged into the second, the distinction between the two depending in a given case on our definition of the commodity.

The Quality Problem

In making both the time-to-time and the place-to-place comparisons, primary responsibility for maintaining the comparability of the products was placed upon the respondent. In some cases, as in nonferrous metals,

for example, this could be done rather straightforwardly, and only relatively minor problems arose. In such instances countries were exporting identical goods, usually to third countries, but not always to the same ones. In a few cases, such as aluminum, producing countries were actually exporting to each other's home markets. Usually, however, what appeared to be cross-exporting in the trade statistics turned out to involve different products traveling in the two directions.

Where there was less product homogeneity, the respondent had to determine what for his purposes were equivalent products. In some instances, as in the illustration relating to electric bulbs of 220 and 110 volts given in Chapter 3,[5] the equivalence was easy to establish. Where the differences in style or usage were not costless, the respondent, particularly if he was a purchaser, was frequently asked to evaluate the premiums or discounts which would be necessary to place him on the margin of indifference as between products of alternative design or quality among which he had to choose. Sometimes buyers felt unable to do this, and we could not obtain price relatives from them. We were not able, for example, to find buyers of typewriters who were very sure of their ability to make such estimates.

In still other instances, however, the assignment of such premiums or discounts was quite usual and even customary. Purchasers of textile machinery, for example, were often quite ready to estimate the worth for their purposes of one machine compared to another. Sometimes such comparisons are made systematically, as by many purchasers of heavy electrical generating equipment, although the methods used vary from one purchaser to another; the analyses of the bids made by the buyers or their advisers frequently include "leveled up prices" or "evaluated prices," which represent efforts to reduce the bids to comparable bases. In a few instances we even ran across fairly sophisticated methods involving multiple regression techniques making the price variable dependent upon weight and other physical or engineering characteristics.

In general, buyers were apt to be more helpful in making these quality adjustments in place-to-place comparisons, while sellers' records generally enabled them to be of greater assistance in time-to-time adjustments.

For certain products on which we could obtain enough data on physical and engineering variables and prices for a wide variety of makes, models, or countries to explain the variation in prices satisfactorily, we

[5] Page 57.

ourselves used regression methods. Our procedures are discussed in the next chapter.

Unique Goods

The methods just described often sufficed where the quality or end-use differences between the products of two countries were small enough to warrant treating them as variants of a single product. As the differences become more important, however, these cases merged into the situation of "unique" goods, that is, goods that are produced in only one country.

For unique goods and for goods produced in more than one country but in different qualities and for which there is no satisfactory way of evaluating quality differences we had two choices. One was to use import prices for the country that did not produce the particular good or quality. In the place-to-place comparisons this solution understates the price at which the importing country could produce the good. Its disadvantage for the time-to-time indexes is that a change in the price in the supplying country is offset, *ceteris paribus,* by an equal change in that of the importing country, so that the index of competitiveness does not change (as it should in order to reflect the altered ability of the supplying country to sell the good in the importing country).

The alternative we chose was to exclude unique goods from the place-to-place indexes but to include them in the time-to-time indexes of the producing country. We treated quality variations for which we could not find a basis for price comparison in the same way. In actual practice, since the sample of items which we used to trace time-to-time movements in each detailed classification varied anyway because of the method of data collection, we often did not know whether a particular product for which we had, say, U.S. but not other prices, was or was not unique.

The exclusion of unique products from the place-to-place comparisons, whether by design or owing to the nature of the sample, biases these comparisons against the country for which unique products are relatively important in exports. While we are not able to quantify the importance of these products, our field work has convinced us of the validity of the general view that unique goods play a larger role in U.S. exports than in those of other countries.[6]

The latest models in some product lines, such as (during the period

[6] Cf. Irving B. Kravis, " 'Availability' and Other Influences on the Commodity Composition of Trade," *Journal of Political Economy,* April 1956.

covered by our study) computers, crawler tractors, and large transport aircraft, were available only in the United States. Less frequently something that might be classified as a completely new product, such as television receivers or transistors, appeared. We do not know how pervasive such situations were or how much of each country's exports they accounted for, but it would be easy to exaggerate the distortion. Even unique goods usually have close substitutes, sometimes in the form of the older generation of models, which are likely to be produced in more than one country and which the large majority of customers may find satisfactory or even preferable, considering the price difference. Our view, therefore, is that if it were possible to estimate price differentials for unique goods which could then be averaged in with price differences for common goods (using world trade weights), the overall price level comparisons would show the United States in a more favorable position than our price level indexes (such as those in Table 2.1) but not by large amounts.

Use of Domestic Prices

In most cases international specialization among the countries that concern us was incomplete, and there was domestic production within each country even though not all of the countries exported the good. For example, the United States specializes in the export of crawler tractors and the United Kingdom in the export of wheel tractors, but each country produces both types. At an earlier date the crawler tractor may have been unique to the United States but at the beginning of our period only the very latest models of it were. With few exceptions a valid price could be found for each product even in countries which did not export it.

In such cases, the requirement that all international goods be priced was satisfied by taking the domestic price.[7] For place-to-place comparisons it was sometimes necessary to adjust the domestic prices for quality differences just as was done with export prices.

We used domestic prices in place of export prices not only where exports were nil but also where they were small or sporadic. The justification for their use is that the country would be willing to export at these prices if there were any market, and that they can therefore be regarded

[7] In principle the domestic prices should have been f.a.s. port of export, but we usually found it much easier to obtain f.o.b. factory prices and often used relatives based on these.

as equivalent to offer prices. In any case, domestic prices played only a minor role in our indexes.

Use of Offer Prices

We asked buyers and sellers to provide actual transactions prices, net of all discounts, rather than list prices. To the best of our knowledge most of our indexes are based on the prices at which goods were actually exchanged. It is, however, possible to view our use of offer prices in bid data as an exception.

Data arising from formal competitive bidding constitute a large and important body of information used in this study, particularly in categories, such as electric power machinery, in which custom-built equipment is the rule. The documents recording such bidding usually provide elaborate specifications in terms of physical characteristics or performance (particularly in the case of machinery), notations of any deviations from advertised specifications, and the prices quoted by each bidder. For certain kinds of equipment there often are evaluations of quality differences in monetary terms, ending in an explanation of the basis for the final choice by the purchaser.

In the place-to-place comparisons based on these bid data, the price used was the lowest offered by each country. Our main reason for discarding higher bids was that only the low bids influence the purchaser in his decision to buy from one country rather than another. The exclusion of higher bids also eliminated some which were obviously not seriously intended to win the order. Their purpose may have been to gain information on the prices offered by the other bidders or to insure that the company would continue to be invited to bid. Prices were as of the date of the bid; we used these prices even when they were subject to escalation and subsequent information about the actual price paid was available.[8]

Low bids rejected by the buyer because of doubts about the reliability of the supplier, the quality of the product, or the supplier's ability to supply the whole order or whole succession of orders were not used in our indexes.[9]

[8] We did not compare fixed prices with prices subject to escalation unless it was clear that the buyer regarded them as equivalent. In a few cases the comparison was made by assuming the maximum escalation permitted in the bid proposal.

[9] In some instances, one supplier was selected for further negotiation after the bids were opened. We did not take account of any price concessions that were obtained in this manner, since we could not know how far other bidders might have been willing to adjust their prices had they been confronted with a similar opportunity.

Place-to-place comparisons were thus made from bid data by comparing the lowest f.a.s. offer price from each country that had at least one bidding firm that met the specifications. Since only the winning bid could represent a price actually paid, the interpretation that may be placed on these comparisons deserves some comment.

The bidding data can be thought of as falling in a range between two types. One involves a highly detailed set of specifications, with the choice made on a price basis among bids meeting the specifications, with no consideration of bids not meeting them, and no allowance for performance beyond that specified. The second type is for a more standard product, such as a locomotive or electric generating equipment, for which some characteristics are specified but for which the customer evaluates positive or negative deviations from specifications, for example, efficiency in generating equipment.

In the first case the bid data supply not only a point along the supply function of the winning bidder, as would be the case for transactions prices, but also points on the supply functions of the losing bidders—points which might rarely or never show up in transactions prices because these companies would usually win bids for different combinations of characteristics. An example of this type might be U.S.-company bids on locomotives with diesel engines and hydraulic transmissions. International transactions prices for U.S. companies would show mainly or entirely data for locomotives with electric transmissions, but the use of unsuccessful bids supplies us with U.S. prices for the diesel-hydraulic combination as well—a characteristic of U.S. production relationships that we would otherwise miss.

The second type of bidding gives information on several points on the purchaser's consumption surface, as when a utility company evaluates various efficiency measures of electrical generating equipment in terms of the gain from greater output or the loss from possible failure to meet peak loads. Here again, the use of unsuccessful as well as winning bids in the price comparison greatly increases the amount of information available, because the unsuccessful bids would be excluded from an index based only on transactions prices. The inclusion of the unsuccessful bids means that a price comparison is contained in each purchasing decision rather than, as with transactions prices, only in the totality of purchase decisions.

One consequence of this type of price comparison may seem disturbing at first sight. The prices of two machines of similar function but different

quality characteristics will be evaluated differently by different purchasers, even though the same nominal prices are offered to both purchasers. One may evaluate machine A as lower in price and the other may evaluate machine B as lower, because each is looking for a somewhat different mix of qualities in the product. The U.S. purchaser, for example, may be willing to pay a premium for a machine that will reduce breakdown time and maintenance man-hours; the European buyer may not value this quality so highly but may be willing to pay more for a machine that is adapted to short runs of a number of different variants of the end product. The same machines are available to both buyers but each has a different product mix in mind, and thus the price comparisons they make will differ.[10] Both comparisons will enter our interspatial indexes, and properly so since each reflects prices as seen by a purchaser and each determined a purchasing decision.

The Problem of Intracompany Transactions

A sizable part of international trade consists not of arms-length transactions between independent economic units but of intracompany movements of goods or sales to separate but affiliated companies.[11] The prices

[10] Price comparisons of this type are quite common in the analysis of such problems as choice among methods of transport. In comparing the price of two modes of travel the user will consider not only the nominal cost of each but also the time involved. Thus a price comparison by a laborer between a one-hour bus ride for 25 cents and a twenty-minute train ride for a dollar will differ from the same comparison made by a well-paid executive, because they will give different evaluations to the quality variable, i.e., time, associated with each price. If transactions prices alone were used, time would be evaluated at the single price of $1.25 per hour. Comparisons among modes of travel based on both time and money cost are discussed in Leon N. Moses and Harold F. Williamson, Jr., "Value of Time, Choice of Mode, and the Subsidy Issue in Urban Transportation," *Journal of Political Economy*, June 1963; and John F. Kain, "The Commuting and Residential Decisions of Central Business District Workers," *Transportation Economics*, New York, Universities–National Bureau Conference Series 17, 1965.

On a more general level, the role of time in purchase decisions is discussed in Jacob Mincer, "Market Prices, Opportunity Costs, and Income Effects," *Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld*, Stanford, Cal., 1963, and in Gary S. Becker, "A Theory of the Allocation of Time," *Economic Journal*, September 1965. Mincer suggests that the usual assumption that equal market or nominal prices represent equal opportunity costs to buyers often produces biased estimates of demand relationships, such as imputing price effects to the influence of income. He was mainly concerned with the omission of the cost of time in cross-sectional demand studies, but the outcome of his suggestions is a set of price comparisons which differ among purchasers even when the market prices are identical for all. The suggested comparisons are thus similar to those arrived at in this study through analysis of purchaser's evaluation of bids.

[11] Some data are available on the extent of exports by U.S. parent companies to affiliates in foreign countries during the period of our study. In 1963, more than three-quarters of the $5 billion of parent company exports to countries in which affiliates were established went through these affiliates. More than a third of all U.S. exports of manufactures of the type produced by U.S. companies abroad ($13.3 billion) were

and values attached to these goods in published trade data and in company records (and probably in most unit value indexes) are not necessarily market valuations. Frequently they may be determined by tax advantages or by bookkeeping convenience. The same kinds of problems affect data on exports of other industrial countries, but probably to a smaller extent, and data on exports by U.S. firms located in foreign countries.

We encountered the problem of intracompany trade in two types of situation. One is that of the U.S. company which exports to its own foreign subsidiary, which then assembles and/or distributes the product in the foreign country. Particularly for place-to-place comparisons it seemed inappropriate to compare the price at which the company sold to its subsidiary with a foreign wholesale price. In some cases it was impossible to make a comparison because the U.S. sale was not at the same level of completion (e.g., knocked-down cars) as the foreign product for which we could get data. However, even where the products were physically in the same state we were uncertain of the meaning of the price charged to the subsidiary. For example, the parent company might prefer to accumulate profits in a Swiss distributing subsidiary rather than in the U.S. parent company. In these cases we usually asked for the price at the first sale to an independent foreign purchaser, even though that was a domestic sale, rather than the price associated with the export movement.

The second type of problem was encountered where foreign sales of the U.S. company and its foreign subsidiaries were centralized in one trading company, and where export prices did not vary by country of manufacture. In such a case a buyer in any country purchases not from the local U.S. subsidiary but from the international company, which then decides whether to fill the order from local production or from the company's plants in other countries. Clearly there can be no relation between the prices paid by purchasers and the flow of trade, or between price movements and shifts in trade. The pattern of trade is determined by the decisions of the parent or international company rather than by those of the purchaser.

sold through foreign affiliates in that year, $3.4 billion through manufacturing affiliates and $1.2 billion through distribution affiliates. Of exports to manufacturing affiliates, $2.2 billion were to companies in primary and fabricated metals, machinery, and transport equipment, that is, the groups covered in this study (Samuel Pizer and Frederick Cutler, "U.S. Exports to Foreign Affiliates of U.S. Firms," *Survey of Current Business*, December 1965).

Since the international company makes the decisions which affect trade flows, the logical place to look for prices influencing trade flows is within the international company rather than the ultimate purchasers. Thus, we considered the final purchase as a domestic transaction between the purchaser and the local affiliate, and the purchase by the international company from its manufacturing affiliate as the international transaction. If the basis for the international company's decisions was the transfer prices it paid to different affiliates, we used these prices. If these were not the basis (e.g., if they were all identical), the best price measure was the cost of production in the various countries. This seemed closest to the idea of the price paid by the international company, and closest to the price which would determine the movement of trade. Accordingly, we have in a few cases used cost rather than price data in our indexes. (See, for example, the discussion of office machinery, SITC commodity group 714, in Chapter 12.)

Aggregation Methods

The Problem of Weights

Compared to other universes of commodities for which price indexes are desired, exports and imports are characterized by rapid changes in composition. Such changes, which reflect in part the sensitivity of trade flows to shifts in relative prices, occurred, for example, in the U.S. trade position in steel and textiles during the period of our study. The conventional export and import price indexes based on a single country's weights provide no satisfactory way of coping with such changes in the relative importance of goods in a single country's trade.

Even frequent changes in weights do not resolve the problem. A commodity characterized by rising prices and declining exports will be given progressively smaller weights with each revision and thus will have a diminishing influence on the measure of price competitiveness. The use of world trade weights and the concomitant expansion of commodity coverage beyond base-period exports and imports get around such difficulties.

More important, world manufactured exports represent the appropriate universe of prices for assessing the changing price competitiveness of a developed industrial economy such as that of the United States. The U.S.

economy—through its exports and imports and as a result of the comprehensive range of its manufacturing production—actually is confronted by a potential market whose structure can best be adequately indicated by the commodity composition of world trade. A change in the U.S.-foreign price relationship of a four- or five-digit category of manufactured goods that looms large in world trade will be more likely to affect the U.S. trade balance, whether or not the United States has been a big factor in trade before or not, than if the price shift occurs for a good less important in world trade.

It might be argued that the logic underlying the use of world trade weights leads ultimately to the use of world production or consumption as weights. After all, the potential market for the producers of a given good in a given country is not merely the volume of that good which is internationally traded, but includes all those markets currently being supplied by home-produced goods. However, the disadvantage of using world production or consumption weights is that the relative importance of goods is often substantially different in world trade and in world production. Some goods—because they are in universal demand, homogeneous, valuable in relation to their bulk, or available only from one or a few sources—move more extensively in world trade than others. Thus even if we take world production or consumption as a first approximation to the proper weights, we must adjust these weights to allow for the greater relevance of some products and prices to international trade. We can define the degree of relevance as the probability that any particular transaction in that product, chosen at random, will cross international borders, and we can measure this probability as the ratio of exports (or imports) of this commodity to total production (or consumption). The weight for any commodity is thus

$$\frac{\text{value of exports}}{\text{value of production}} \text{ (value of production)}$$

which reduces to the value of exports as a weight.

If these differences in the "tradability" of goods change only slowly, world trade weights will yield a more sensitive indicator of price competitiveness in international trade than world consumption or production, and one more closely related to changes in trade flows.

On a more practical level, we point out that at present there are no world consumption or production data sufficiently detailed for weighting

fairly narrow commodity groups. Accordingly, the weights for our new indexes have been derived in principle from world trade data, and in practice from exports of the OECD countries. The advantages and disadvantages of this weighting scheme, which permits the measures of a country's price competitiveness to be affected by prices of goods no longer important in its trade, have been discussed earlier.[12]

For any uses that require measures based on individual-country or other weights, it is a simple matter to reweight our subgroup or item indexes, as we have done for U.S. and other countries' export weights and for weights based on different years (see Chapter 2). The essential characteristic of the data, for all of these purposes, is that prices be collected for each country for the same commodities or commodity groups.

Aggregation for Price Competitiveness Indexes

The time-to-time and place-to-place indexes for the most detailed classifications employed in the study—generally four-digit categories, but sometimes more detailed breakdowns—were based on simple averages of price relatives.[13] The weights discussed in the preceding section were applied to these four-digit or more detailed categories to build up indexes for the two- and three-digit groups.

There are several possible alternative methods of aggregating the indexes for four-digit or smaller subgroups to reach the estimates of price competitiveness for three-digit or larger groups. Our method was to calculate indexes of price competitiveness at the lowest level, usually four-digit, and to aggregate these. At this detailed level, the index of price competitiveness ($P_{F/S}$) for a period was calculated from either time-to-time or place-to-place observations, the choice depending on our judgment as to which was superior in terms of the number of observations and the reliability of the data.

The summary international price indexes and the summary international price levels presented in Chapter 2 are derived from $P_{F/S}$ indexes and are consistent with them. The international price indexes for each

[12] See Chapter 3.

[13] There are technical grounds for preferring a geometric over an arithmetic mean (the former meets the time reversal test and the latter does not). However, the extra burden of computing geometric means would have been great because the calculations at this level of detail were not done by computer, and the difference in result would probably have been slight.

country other than the United States are derived from the U.S. international price index (based on time-to-time data) and the $P_{F/S}$ indexes relating U.S. price movements to those of the other country. The international price levels are the levels for the best year, in terms of the availability of data, extrapolated to other years by the $P_{F/S}$ indexes.

These summary indexes provide the most consistent comparisons among countries and over time that we can extract from our data, but they are not necessarily the best international price indexes for any one country or the best international price level estimates for any one year. For example, the summary international price index for Germany is the best for comparison with the movements of the U.S. price index, but it may omit certain subgroups because data on them were not available for the United States. For estimating the price movement for Germany or the United States separately, the summary international price indexes may be less appropriate than the indexes aggregated directly from time-to-time data,[14] which often include some time-to-time data not incorporated into the summary indexes. However, the summary international price indexes do incorporate some place-to-place observations which, when combined with a time-to-time index for any one country, provide estimates of international price movements for the foreign countries which might otherwise be unavailable. In some products this advantage outweighs the omission of some time series data, and the summary index is superior to the one calculated exclusively from time-to-time data even as an estimate of the one country's price movements.

Instead of casting the basic aggregation in terms of the price competitiveness index, we could have aggregated the international price indexes for each country and calculated price competitiveness from the aggregate country price indexes, or we could have aggregated the place-to-place price level comparisons and calculated price competitiveness by comparing aggregate price levels in different years.

The preference for aggregating the price competitiveness indexes is based on some purely technical advantages, on sampling advantages, and on certain economic considerations as well. The technical advantage of aggregating the subgroup indexes of price competitiveness is that we can then combine time-to-time and place-to-place data in one group index. Were we to aggregate either type by itself we would lose any subgroups

[14] These are the ones described in Chapter 1. They are given, along with the summary indexes, in Appendix C.

for which only the other type of data was available, or we would have to use some subgroup indexes that were inferior to those of the other type. This was an important practical consideration since the availability of each type of data varied widely from one commodity sector to another.

Some further considerations, revolving around the problem of bias in sampling, suggest the advantages of using the same set of commodities in both countries being compared rather than the best price index for each country, which might include some commodities in each not covered in the other country. This comparability of commodity coverage is characteristic of aggregates of price competitiveness indexes but could also be achieved by calculating price indexes for each country confined to those product groups covered in the index for the country being compared with it.

The advantage of using comparable commodity coverage can be analyzed by thinking of each commodity price movement in a given country as being composed of several elements. The first is the change in the general price level for the country (C) which is attributable to such variables as the stage of the business cycle or monetary developments. The second is the change in price for that commodity or its industry (I) throughout the world as a whole, attributable to factors such as the rate of growth of the industry, the development of new technology in the production of the commodity, or shifts in world demand for the commodity, as from changes in income or the development of substitutes. The third element is a residual (R) incorporating all other factors which operate on the price of the commodity in a particular country. These might include restrictions or trade barriers which insulate a country's prices for a particular product from the influence of developments abroad, or innovations in production which have not yet spread to other countries. Factor C does not account for any sampling variability in estimating, for a group of commodities, either price movements in one country or price competitiveness between two, because it is assumed to be constant within each country. Factor R contributes to variability in the estimates of both price and price competitiveness. Factor I contributes to sampling variability in price indexes and therefore also to sampling variability in price competitiveness indexes calculated from aggregates of price movements, if prices in the two countries are sampled

separately. It does not contribute to variability in an index calculated directly from individual observations on price competitiveness or in one calculated from aggregates of identical price series in both countries because in those cases the I factor affects both countries' price movements in the same way. In any one country's price index, however, the I factor does contribute to sampling variability because the index calculated will reflect the characteristics of the industries that enter the sample.

The sample of commodities in each country's best international price index can be thought of as containing two parts: one consisting of commodities also included in the other country's index and one of those not covered. If the sampling in each country had been random, the advantage of a larger sample in each country, and therefore of a better estimate of each country's price, might outweigh the addition of variability from the I factor. Whether it does or not will depend on the importance of the I factor relative to the R factors. The evidence of the nonelectrical machinery items suggests that the I factor is relatively large, i.e., that the worldwide differences among industry price movements may often outweigh the country differences. This is indicated by the greater similarity of price competitiveness indexes than of price indexes for different commodity groups.

In fact, the selection of commodities is not random, and we cannot, therefore, be certain that the expected value of the price changes for the group of commodities not common to both countries is the same as for the common set. It may be much easier to find data on office machines in one country and on agricultural equipment in another. In such a case, the addition of noncommon commodities may involve adding, to a set of comparisons between corresponding commodity groups, a comparison between one country's prices of adding machines and another country's prices of plows.

The aggregation of subgroup indexes of price competitiveness rather than of the international price indexes is based also on the design of the study of comparative prices. We made all comparisons on a set of world trade weights at the finest level of detail available, four-digit or five-digit SITC codes. Two aircraft engines, for example, are compared with each other, even though they are not identical in specification, since they are in the same four-digit subgroup, which is not further subdivided. The air-

craft engines are not compared with automobile engines, since they are in a different subgroup. This is clearly a sensible separation but one could argue that some of the smallest groups we use should be further subdivided. The aircraft engines, for example, should probably be divided into rough size categories, since large engines for transport aircraft do not compete with small engines for business or private aircraft. On the other hand, none of these comparisons is relevant to competition across subgroup lines, as between copper and aluminum, or aluminum and steel.

Finally, aggregation of the price competitiveness indexes is more appropriate to the analysis of price-quantity relationships in international trade. If competition takes place only within the finest subdivisions, the price influences on trade movements may be represented by the subgroup indexes of price competitiveness and the elasticities of substitution between different countries' exports of these subgroups.[15] For each subgroup the price competitiveness index is the denominator of the formula for the elasticity of substitution, plus 1. That is, for commodity X exported by countries F (foreign) and S (United States) in years 0 and 1, the elasticity of substitution (ES) will be

$$ES_{F/S} = \frac{\%\text{ change in relative quantities}}{\%\text{ change in relative prices}} \tag{1}$$

In terms of the index of price competitiveness (see Chapter 1) and a corresponding index of relative quantity change we can rewrite (1) as

$$ES_{F/S} = \frac{Q_{F/S} - 1}{P_{F/S} - 1} \tag{2}$$

There is, of course, a necessary relationship among relative prices, quantities, and proceeds. In this notation it is:

$$TC_{F/S} = P_{F/S} \times Q_{F/S} \tag{3}$$

where TC is an index of relative export revenues (R).

For any subgroup consisting of a single commodity, any one of the terms, $TC_{F/S}$, $P_{F/S}$, and $Q_{F/S}$ may be readily derived from the other two. Where some aggregation is involved, however, matters are somewhat more complicated. Assume, for example, that we wish to derive a rela-

[15] For simplicity we are ignoring here that part of international competition which takes place on the domestic markets of the two countries being compared.

tive quantity index between countries A and B for two equally weighted commodities, X and Y. The overall relative quantity index taking $\bar{Q}$ as the average of the Q's, is

$$\bar{Q}_{F/S} = \frac{(Q_{F/S})_x + (Q_{F/S})_y}{2} \tag{4}$$

In terms of ES and P, this is

$$\bar{Q}_{F/S} = \frac{\{ES_x[(P_{F/S})_x - 1] + 1\} + \{ES_y[(P_{F/S})_y - 1] + 1\}}{2} \tag{5}$$

It is apparent from (5) that the relative quantity index ($\bar{Q}_{A/B}$) cannot be derived from any aggregate price competitiveness index because the quantity index depends on the covariance between elasticity of substitution and change in price competitiveness ($P_{F/S} - 1$). Only if these two are assumed to be uncorrelated can the aggregate relative quantity change be calculated from the average price competitiveness and the average substitution elasticity within the aggregate.

No such calculation can be made from price competitiveness indexes derived from aggregates of international price indexes because it is difficult to define any relationship between these and any average of substitution elasticities. We are thus led to the aggregation of price competitiveness indexes as having more economic content than price competitiveness measured from aggregated international price indexes.

The decision to aggregate primarily in terms of indexes of price competitiveness gives us two alternative international price indexes for each country except the United States in each group and division: a preferred one, obtained for each three- and two-digit group by using the U.S. international price index based on time-to-time data together with the U.S. index of price competitiveness relative to each country; and a second one based on the aggregation of the time-to-time international price indexes themselves. The results of the two aggregation methods are presented in the tables of Appendix C, the former as the extrapolated (E) indexes, the latter as the aggregated (A) indexes. We can see there that the differences are minor for the study as a whole and even for the two-digit divisions, but that they are of considerable importance in some of the three-digit groups.

Differences between the extrapolated and aggregated international price indexes occur for two reasons. One is that the international price

index number formula implied by the aggregation of price competitiveness indexes and estimation from the U.S. international price index is different from that implied by straight aggregation of the foreign international price indexes. The second is that the extrapolated price indexes for foreign countries were derived from place-to-place data in a number of groups for which the time series data were inadequate for use in the international price indexes. This was the case most frequently among the indexes for iron and steel.

We cannot leave the question of aggregation without referring to our methods of treating subgroups for which no price data were available.

Table 4.1
International Price Indexes Under Two Methods of Aggregation; All Covered Commodities, 1953, 1957, 1961–64
(1962 = 100)

	1953	1957	1961	1962	1963	1964
United States						
Full value	87.9	97.0	99.4	100.0	99.5	101.0
Covered value	88.5	97.2	99.4	100.0	99.5	100.9
United Kingdom						
Full value	87.4	96.7	99.9	100.0	100.4	104.1
Covered value	88.0	97.0	99.8	100.0	100.5	104.3
EEC						
Full value	89.3	96.4	98.6	100.0	99.9	102.6
Covered value	89.3	96.6	98.6	100.0	99.9	102.5
Germany						
Full value	87.4	94.3	98.0	100.0	99.6	102.0
Covered value	87.4	94.3	98.0	100.0	99.6	102.0
Japan						
Full value			101.6	100.0	95.9	101.1
Covered value			101.1	100.0	96.2	100.5

Note: In the full-value indexes, each three-digit SITC group is weighted by the importance of that group in OECD exports. In the covered-value indexes, each three-digit SITC group is weighted by the importance in OECD exports of the subgroups in that group for which price indexes were computed.

Each method involved some assumptions regarding the universe of prices being sampled and the characteristics of the sampling method. The principles involved have been discussed elsewhere,[16] but the practical issue here was to decide whether to give each two-digit division and each three-digit group its full weight in world, or OECD, trade in aggregating or to give it only the weight of the commodity items within it for which price data were collected.

Giving each group its full weight implies that the commodity stratification was a good one and that price changes, price competitiveness, or the price level of any commodity for which we do not have data is more likely to resemble that of other commodities in its group than the average of all commodities. The considerable agreement between the proportion of price and price competitiveness series changing in a given direction and the direction of movements of the indexes suggests that our stratification of commodities was a meaningful one and that the aggregations using full group weights are appropriate.

In fact, as can be seen in Table 4.1, the differences between the two weighting systems are very small, mainly because coverage levels are so high. In the international price indexes for all machinery, transport equipment, metals, and metal products, the difference was greater than one-half of one percentage point in only four out of thirty cases and greater than one percentage point in only one case. Three out of the four largest discrepancies were in 1953, when the data were weakest. In half the cases there were no discrepancies at all between the two methods.

Appendixes

Copy of Instructions Left with Respondent Firms

International Price Comparison Study

Instructions for Collection of Purchase Prices and Price Offers

The purpose of this study is to compare the prices at which U.S. sellers offer machinery, vehicles, and metal products with prices at which U.K., Common Market, and Japanese companies offer the same products. The products included in the study are those covered by the following parts of the Standard International Trade Classification (SITC):

[16] See Robert E. Lipsey, *Price and Quantity Trends in the Foreign Trade of the United States*, Princeton University Press for NBER, 1963, Chap. 5.

Division 67	Iron and steel
Division 68	Nonferrous metals
Division 69	Manufactures of metals, n.e.s.
Section 7	Machinery and transport equipment
Division 81	Sanitary, plumbing, heating and lighting fixtures and fittings
Group 861	Scientific, medical, optical, and controlling instruments
Group 864	Watches and clocks
Group 891	Musical instruments, sound recorders, and reproducers and parts and accessories thereof
Group 894	Perambulators, toys, games, and sporting goods
Group 897	Jewelry and goldsmiths' and silversmiths' wares

The National Bureau has not selected any standard list of commodities for all respondents to use. We ask each cooperating company or government agency to pick out several items in each three-digit SITC group and, if possible, in the more important four-digit groups with which it has had purchasing experience. The essential characteristic of each item selected is that the respondent be able to make a precise comparison, either place to place or time to time. To make a place-to-place comparison, he must know the price at which a U.S. seller is offering the product at a given time and the price at which a seller in the United Kingdom, the Common Market, or Japan is offering the identical or a comparable product at the same time. To make a time-to-time comparison he must know the price at which a particular product is offered by one country at two different times.

Ideally we would wish to have both place-to-place and time-to-time comparisons for each individual commodity for all countries and all years, such as would fill out the following table completely:

Product: 100 lbs. of 8d common bright steel nails

	USA	UK	Germany	France	Other EEC	Japan
1953						
1957						
1961						
1962						
1963						
1964						

In practice, however, such complete comparisons are rarely possible. The company may have bought one type of nail in 1953 and be able to compare U.S. and German prices for it, but it may have bought a different type in 1957 and be able to compare the United States with Germany for that type. The company may have a U.S.-Japanese comparison for a third type of nail and might have consistently purchased a fourth type from the United States over a period of years and thus be able to supply time-to-time data only for that. Any unit of information is useful to us provided that it compares at least two countries' prices at one date or one country's prices for at least two dates.

Other criteria for selection of products are that they be important in international trade and, preferably, typical of the SITC groups they are in.

In the case of complex machinery, of course, it is almost never possible to find absolutely identical products offered from two countries. Our aim is to get as close as possible to the criteria used by the purchaser in deciding which product to buy. In some cases, such as electrical generating equipment and transformers, specific measures of differences in quality are often calculated, and these can be added to the base prices to make comparisons. If there is formal competitive bidding, a set of requirements is imposed by the buyer, and only the offers meeting the specifications should be considered. Sometimes the buyer can make a judgment as to the value to him of specific features present in one machine and not in another. Even qualitative comparisons which can be expressed only roughly in value terms are of interest to us. In all cases it is important that precise specifications be included with the prices collected and that qualitative differences which enter into the purchaser's decision be described to help us classify the commodity and, in some instances, to help us understand the price relationships.

The time periods covered by the study are midyears 1953, 1957, 1961, 1962, 1963, and 1964. If data are not available for these midyears, prices for other nearby dates can be used. The date of each price and each offer should be listed.

F.a.s. prices are preferred, but f.o.b. prices are also acceptable. Even delivered prices can be used if necessary, but in that case it should be carefully noted whether tariffs and other costs are included. If possible, estimates of transportation and insurance cost should be collected.

Where both unit price and total value of a bid or contract are available they should be collected. In any case, the size of the total order in quantity terms should be indicated. In some cases, one order or bid contains many specific items (such as different sizes of the same product). If quantities or values are available on each item individually they should be recorded, as well as the prices, if they are given. The quantities or values are useful for estimating the relative importance of the various items included.

The specifications supplied should be detailed enough to permit classication into five-digit SITC codes. That means, for example, that electrical machinery must always be distinguished from nonelectrical, that the particular metal used in metal products (other than machinery and vehicles) must be specified, that insulated wire be separated from noninsulated. Measures of capacity or average output of a machine should be given if they are available, as well as weight, speed of operation, efficiency, and, in general, whatever qualitative factors the purchasing agency considers important.

Information about nonprice factors in the selection of products is also of great interest. Delivery periods offered by various sellers should be recorded, where they are given, and other factors such as financing arrangements, tied loans, compatibility with existing equipment, service facilities, experience of producer, should be noted whenever they have played an important role in the choice of supplier.

Form Used for Gathering Price Data

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NATIONAL BUREAU OF ECONOMIC RESEARCH
INTERNATIONAL PRICE COMPARISON STUDY

Product (Identify briefly and attach description or specification circular if available)

_____

_____

_____

_____

Unit_____
(each, dozen, etc.)

Country of origin	1964	1963	1962	1961	1957	1953
United States						

1. Please indicate net U.S. and net foreign selling price for products of comparable quality.
2. If quality differs between countries or over time indicate in space below.
3. F.a.s. price is preferred; please note if f.o.b. or other basis is used.
4. Subject to the condition that comparable quality be maintained over time, the lowest price quoted by a satisfactory source of supply is desired, both for U.S. and for the foreign price.
5. Please return this report even if partially complete.