Estimating Price Trends of Industrial Countries' Exports to OPEC

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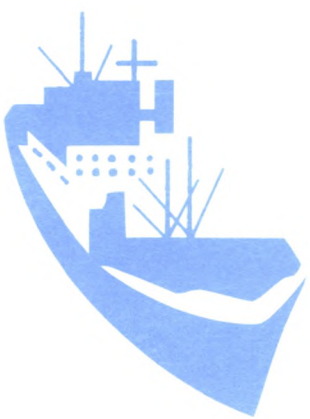

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U. S. Department of Labor
Ray Marshall, Secretary

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Julius Shiskin, Commissioner
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Preface

This bulletin reviews problems implicit in estimating price trends of industrial countries' exports to OPEC, describes the approaches used by investigators who have attempted to estimate these trends, and discusses the results obtained by using different price data. Estimates of industrial countries' export price trends presented at the end of this study are unique in that specification export price data, where available, are utilized in their construction. These price trends are restricted to merchandise trade and exclude transactions involving services and military goods. Bibliographic references are indicated in brackets and are listed at the end of the study.

This study was prepared in the Division of International Prices (Office of Prices and Living Conditions) of the Bureau of Labor Statistics by Edward E. Murphy and Jorge F. Perez-Lopez. The authors are grateful to Robert Gillingham, Irving Kravis, John Layng, John Suomela, and Jack Triplett for helpful comments and suggestions, to William Alterman, David Malmquist, and Glenn Stadsklev for system and programming assistance, and to Yu Ju Tien for translation of Japanese materials.

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Estimating Price Trends of Industrial Countries' Exports to OPEC

The trends of prices paid by members of the Organization of Petroleum Exporting Countries (OPEC)[1] for products purchased from the developed countries has recently received much attention in the context of the possible impact of imported inflation on the purchasing power of the oil exporters. Investigators who have attempted to estimate these trends have been faced with conceptual and data difficulties that have made it necessary to use restrictive assumptions and proxy variables that are not satisfactory in important respects.

Part I below discusses some of the basic problems in estimating price trends of industrial countries' exports to OPEC and describes the methodology followed by investigators who have developed their own estimates. The nature of export price indexes and export unit value indexes, the two types of external price data available for investigators to use for making their estimates, are described in Part II. Some conceptual and practical differences in the construction and uses of the two measures are also outlined. Export price data for the industrial countries are described in Part III and are used in Part IV to estimate industrial countries' export price trends to OPEC. Estimates obtained using different types of price data are compared with each other and with an estimate of the trend of prices received by OPEC per barrel of oil. Part V summarizes the findings.

Part I. The estimation problem

The main obstacle to analyzing the price trends of goods and services imported by OPEC from the industrial countries[2] is that import price data are not available for any of the OPEC members. An exception is Kuwait, for which an annual import unit value index is available with about a 2-year lag. In addition, Venezuela and Iran survey domestic wholesale selling prices of some imported products in their respective wholesale price indexes.[3] In general, however, domestic prices of imported goods are not satisfactory proxies for import prices because the former include, in addition to the import prices, domestic value added (unloading and wharfing charges; inland transportation; any further manufacture and/or handling; mark-ups and profits) and duties, if applicable. Since all these costs can vary independently with respect to the basic import prices, domestic price trends are generally considered to be poor proxies for import price trends.

Thus, in the absence of OPEC import price data, investigators have relied on export price trends of the countries that supply goods and services to OPEC in order to estimate import price trends for OPEC. This approach, however, encounters such conceptual questions and data limitations as:

(1) the nature of the proxy relation between a group of countries' export price trends to the world and the same group of countries' export price trends to a region or group of countries;

(2) the nature of the proxy relation between a group of countries' export price trends to the world and another group of countries' import price trends for the same internationally traded items;

(3) the lack of price trend data for internationally traded services and military goods; and

(4) the need to choose between two fundamentally different price measures—export price indexes and export unit value indexes—to estimate export price trends.

The first three points are discussed briefly in the following paragraphs. The fourth problem, though recognized in the literature on measurement of economic variables, appears not to have been treated in quantitative work of investigators who have attempted to estimate import price trends for OPEC. Because the two price proxies are different in both nature and performance, the fourth problem is discussed in detail in Part II.

Price trends of industrial countries' exports to the world as proxies for those to OPEC

Ideally, industrial countries' price trends of exports to OPEC should be calculated using prices of transactions with OPEC weighted by the value of shipments to OPEC. However, the industrial countries'

[1]In mid-1976, the members of the Organization of Petroleum Exporting Countries, which was created in 1960, were Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

[2]The "industrial" countries, as used throughout this paper, follow the designation of the International Monetary Fund. The countries are Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States. All are members of the Organization for Economic Cooperation and Development.

[3]For a description of the series see [27]. The series are published in [11].

merchandise export price measures currently available are constructed to represent price trends of exports to the world. Thus, the sample of products that enters into the calculation of either export price indexes or export unit value indexes refers to transactions with all partner countries, and not specifically with OPEC members. Further, the aggregation weights used to calculate the indexes refer to the distribution of industrial countries' exports to the world.

The use of trends of industrial countries' published export prices to the world to represent their export price trends to OPEC implicitly assumes:

(1) that price trends for industrial countries' merchandise exports to OPEC and to the world are the same and

(2) that the commodity composition of exports from the industrial countries to the world and to OPEC are the same.

No data are available to test the first assumption, i.e., whether or not some industrial countries practice price discrimination against or in favor of OPEC members. On the second assumption, there is some evidence indicating that the distribution of U.S. exports to the world and to OPEC are somewhat different at the aggregate product class level. It has not been feasible here to analyze the distribution of other industrial countries' exports to the world and to OPEC because of lack of resources. In any case, even if it were possible to determine the extent of the disparities in the two distributions, their impact on the published indexes could not be calculated since indexes using each of the countries' distribution of exports to the world and to OPEC as weights are not available.

Differences between industrial countries' export price trends and OPEC's import price trends

Using industrial countries' merchandise export prices to estimate OPEC import prices implicitly assumes that trends in these two measures are identical. Typically, however, there are differences between the price of a product paid to the exporter and the price for that same product paid by the importer as it arrives at the country of destination. In general, these price differences arise because in addition to the products' purchase price, the import price takes into consideration other charges involved in delivering the product to the importing country. In most cases, the buyer bears the costs associated with the movement of the goods from the exporting country to the importing country such as freight charges, insurance, demurrage, warehousing charges at the port, accessorial services (for example, protecting goods from damage from heat, cold or moisture) and heavy lift charges, if any, for loading the goods on board vessel. In addition, the buyer usually pays applicable export taxes, duties, and expenses in obtaining the proper importation documents. Further charges may occur if goods are transshipped or if title passes through an intermediary. These various transactions and shipping costs can be expected to result in a product's price being higher at the country of importation than at the port or land border of the country of exportation.

If trends in freight, insurance, and other service charges are different from trends in product prices, price trends of exports will be different from the price trends of imports. For example, if freight and insurance charges rise more rapidly than product prices, then import prices will rise more rapidly than the export prices for the same goods; if freight and insurance charges rise less rapidly than product prices, then the reverse will be true.

There is some indication that freight and other costs associated with the movement of products to some OPEC countries increased significantly immediately after 1973, partly as a result of congestion of port facilities in some OPEC countries brought about by the rapid growth in imports. For example, OPEC merchandise imports f.o.b. from all countries during 1972 and 1973 amounted to $14.7 and $21.4 billion, respectively. Imports increased to $39.0 billion in 1974 and $61.8 billion during 1975.[4] It was reported [36, p. 8] that this rapid rise in the volume of OPEC imports led to instances in 1974 and 1975 where ships waited up to 60 days to unload at OPEC ports and that demurrage charges of $4,000 per day per ship, spoilage, and other losses have not been uncommon [18]. Press reports [6] suggest that in some cases shippers resorted to expensive air transport in order to obtain timely deliveries. As such conditions become the rule, rather than the exception (and no attempt has been made here to determine actual conditions), then an index of OPEC import prices might rise faster than an index of export prices of goods to OPEC. On the other hand, as such conditions are moderated and these additional charges are reduced, changes in export prices and OPEC import prices might tend to converge.

Limited coverage of industrial countries' export price indexes

All of the industrial countries currently publish some sort of export price data for merchandise sales to the world. At the present time, however, none of these countries publishes a price series for exports of services. Since services made up about one-third of total OPEC

[4]Estimates in [11, p. 44]. Note that elsewhere in this same publication ([11, p. 37]), OPEC imports valued c.i.f. anomalously are shown to be less than its merchandise imports valued f.o.b.

imports in 1975 [11, pp. 44-50], the lack of any price data in this area poses a serious problem for which there is no ready solution.

Another related problem is that the export price data currently available generally refer directly to nonmilitary merchandise trade only. Price trends of military merchandise exports are not usually covered. In sum, the available export price data from the industrial countries are limited in that they refer to exports of nonmilitary merchandise, with sales of services not explicitly within the scope of the indexes.

Part II. Export prices and export unit values

Export unit value indexes have been used extensively, though often uncritically, as approximations to export price trends in most international trade studies. However, there are significant differences between the nature and performance of these data and those of export price indexes. This section describes the two measures and discusses some of the differences and limitations of each.

Export price indexes, constructed according to the specification approach, measure the export price trends of a sample of items or products chosen to represent the universe of a country's exports. The chosen items are fully described by their physical and performance characteristics (or specifications) as well as the conditions of sale (or purchase) such as discounts, size of transaction, credit terms, class of buyer or seller, and so forth. Export prices are then collected periodically for items with the same specifications and conditions of sale. Whenever changes occur in the specifications (such as quality changes) or the terms of transaction, prices are adjusted accordingly. Thus, specification export price indexes are designed to gauge pure price changes in a sample of products over time.

Export unit values for classes of products are calculated from customs documents by dividing the accumulated value of shipments in each class during a given period (generally a month) by the respective accumulated quantities. Period-to-period unit value relatives for each class then may be combined through any of a variety of weighting procedures to form indexes for larger aggregates of products. At the limit, when categories are sufficiently detailed, specification prices and unit values are the same. However, in practice this limit is seldom, if ever, reached because a product classification system with the level of detail that would be necessary to accomplish this would be too cumbersome for exporters to use. Export unit value indexes, calculated following the methods described above, are available for most of the major countries of the world and are published in national statistical publications. Also, they are reprinted in publications of international organizations.[5]

Since export price indexes and export unit value indexes are based on a sample of product groups or transactions, they are both subject to sampling errors. Export price indexes, by design, are constructed using reports on a sample of companies, products, and transactions.[6] Therefore, sampling errors may occur at each of the three levels of sampling. Export unit value indexes, although in theory are calculated using data covering all transactions, in practice use a judgmental sample since some transactions with erratic unit value behavior are excluded, as are groups for which quantity data are not available.[7] (The quantity definition problem does not arise in the construction of export price indexes.) Another factor that introduces sampling error is that, at least for the United States, export unit value indexes do not cover exports to every country. In addition to being affected by sampling errors, both export price indexes and export unit value indexes are affected by nonsampling errors (such as measurement errors).

Evidence of problems associated with the use of unit values as measures of price change appears in the recent literature on economic measurement. In virtually all cases, investigators have concluded that unit value indexes, as they currently exist, are poor measures of price change because they are affected by changes arising from the products themselves or from the circumstances surrounding the transactions. They have been found to be influenced by changes during and between periods in the composition of products in each class, by both short-term and secular changes in quality, by changes in shipment values due to changes in the amount of "service" provided to the buyer by the seller, by contract-shipment lags, and by changes in the circumstances of transactions (credit terms, shipping terms, packing, etc.) as well as by pure price changes. Export price indexes, however, are designed in such a way that adjustments can be made for these non-price changes so that they do not become erroneously incorporated into the indexes as price changes. While conceptually, at least, export price indexes can be considered to be measures of pure price change, changes in export unit value indexes reflect, in addition

[5]See, [11] world tables and country tables.

[6]Sampling and pricing procedures employed in the preparation of export price indexes are similar to those followed in domestic industrial price indexes. For a description of these procedures used in constructing export price indexes in West Germany see [23]; for Japanese methodology see [3]. Detailed specifications of products included in the Japanese indexes are given (in Japanese) in [2]. For the United States, [28] describes the methodology of the export price indexes and discusses both the judgmental and probability sampling procedures.

[7]This is illustrated by information shown in table 1 below.

to pure price changes, changes in any, all, or a number of factors outlined above. A brief summary of the findings of some of these studies follows. Readers already familiar with this literature may wish to skip to Part III.

After comparing price and unit value data in the development of deflators, the Subcommittee on Prices of the Interagency Committee on Measurement of Real Output [10] recommended more extensive use of specification price data, primarily because unit value measures tended to be affected by changes in product mix. An empirical study of unit values was undertaken by the Bureau of Labor Statistics (BLS) at the request of the Subcommittee. Using 25 items at disaggregated levels the study shows (p. 256) a "persistent tendency of unit values. . .to reflect shifts in product mix, usually to the lower end of the quality- or price line." Another study by the Federal Reserve Board for the Subcommittee suggests that (p. 256) "any gains in precision which may arise because unit values reflect a comprehensive universe representing actual transaction prices are offset by problems of product and transaction mix."

Several studies have investigated the performance of price indexes and export unit value indexes either by constructing the two types of indexes for the same categories or by comparing existing measures. Kravis and Lipsey [14] compared specification export price indexes with export unit value indexes for the United States constructed using similar weighting schemes for several export categories in SITC 7 and the metals portion of SITC 6. Based on a comparison of trends of the six two-digit groups that encompassed the products they studied for the period 1953-64, they conclude (p. 189) that the unit values were "erratically related to the international prices, rising much faster in 1953-1957, declining sharply in some cases in later years, and rising rapidly at other times relative to the international prices." Similar results were obtained by Murphy [15] in a study that compared U.S. export price indexes and export unit value indexes for seven four-digit export categories and by Holmes [9] for a comparison of the Canadian Industrial Selling Price Indexes and unit value indexes for 3,237 commodity categories. The similarity of the results of all three studies conducted at different levels of aggregation reinforces the position that trends in unit values are not good estimators of price trends. In sum, as W. Rostin [23] of the Federal Statistical Office states, in reference to the foreign trade price statistics of the Federal Republic of Germany,

> . . .the indices of foreign trade prices and the respective unit value indices. . .take a different course; at times, they even differ very strongly. . . This should not come as a surprise. . . .While in the case of a genuine price index, all changes which are not pure price movements are eliminated, changes in addition to pure price movements enter into an average value index without being filtered or corrected (p. 10).

In spite of the findings cited above, Gordon [7] states that unit values are superior to specification prices as applied in the capital goods portion of the U.S. Wholesale Price Index (WPI). The reason for this, he argues, is that though the WPI seeks to obtain transaction prices, list prices that do not show actual discounts are obtained for some products and, therefore, WPI series for these products tend to show less price change than actually occurs. Gordon believes these discounts are reflected in unit values.[8] However, Popkin and Gillingham [22, p. 307] point out that Gordon's analysis rests on the assumption of the validity of unit value indexes as measures of transaction prices, although there is little justification given by Gordon to support its acceptance. In fact, examination by Popkin and Gillingham of the data used by Gordon indicates severe product mix problems which undermine Gordon's conclusion that the unit values are superior measures of transaction prices.[9] In apparent recognition of this criticism, Gordon in a later paper [8] concludes that " the important function served by unit value data is to pinpoint the areas where further research on transaction pricing is likely to have a high benefit-cost ratio." This seems to imply acceptance of the recommendation of the Subcommittee on Prices [10, p. 257] that price measures rather than unit values be used unless there is positive evidence that price measures are unusuable.

The studies cited above have dealt either with conceptual and measurement differences between prices and unit values or with disparities in the behavior of price and unit value indexes for product categories at different levels of aggregation. Notwithstanding these differences and their effects on price and unit value indexes at disaggregated levels, there are at least two additional factors that may be partially responsible for disparities in the behavior of published aggregate export price indexes and export unit value indexes as they currently exist.

(1) Where a country publishes both an export price index and an export unit value index the sample of products included in the two measures is likely to be different. Since detailed information on the product sample used by each of the countries in the preparation of the two external price measures is not available, it has not been possible either to determine the extent to

[8]For further background on the general problem of list prices, see [25]. Their principal recommendation for dealing with this problem is that greater reliance be placed on collecting prices from buyers. That solution, one of several that could be proposed, is not practical in the case of export price indexes.

[9]See also [26, p. 63 and note 33].

which differences in product samples affect the comparisons or to make any adjustments to eliminate this source of differences.

(2) In most cases, individual country export unit value indexes are calculated by the Fisher formula, while export price indexes generally are constructed using the Laspeyres formula. Again, it has not been feasible to gauge the effect of this difference in the aggregation formula on the behavior of the aggregate indexes.

Some investigators argue that the major difference between price and unit value indexes, especially at aggregate levels, is one of lags, i.e., that changes in prices show up at a later date as changes in unit values; hence, the argument runs, unit value changes reflect price changes of earlier periods. While there is a measure of truth in this line of reasoning, severe problems remain if price changes are to be inferred from unit value changes as illustrated by the following.

Since monthly aggregate export price indexes as well as export unit value indexes are available only for Germany and Japan, lagged relationships between the two price measures can be estimated only for these two countries. For the period 1970 to 1975, the logs of monthly export price changes for Japan and Germany distributed over periods of up to 6 months were able to explain 55 and 70 percent, respectively, of the observed variation in the log of the change in their export unit values for the current month. Interestingly, over the period examined, the relation between changes in unit values and changes in lagged export prices is statistically different between the two countries and statistically unstable within each of the countries. The relatively large amount of variation in unit value changes that cannot be explained by changes in export price indexes, together with relations that are different between and unstable within the two countries, make it quite risky to infer changes in one index from changes in the other. Nor can export price behavior in other countries be reasonably expected to conform to the unit value relations of either Germany or Japan.

Moreover, an interesting logical question arises here. In order to estimate a relation between export price indexes and unit value indexes for a given country, both series must be available. However, if both are available, unless there is evidence to the contrary, analysts ought to prefer to use the export price series rather than the unit value series which is a proxy for the price series.

In addition to the inadequacies of unit values as measures of price change discussed above, another, less widely recognized problem tends to plague export unit value indexes, namely, that the unit values of many exported commodities are not included in the published unit value indexes. For the United States, for example, the official export unit value indexes for 1973 were calculated from unit values for categories accounting for 42.2 percent of the total value of U.S. exports; the remaining 57.8 percent was covered by imputation. (See table 1.) Categories are not included in the U.S. unit value indexes, and hence are covered by imputation, for either of the following reasons [32, p. 31]:

(1) Since export unit values are derived by dividing an export dollar value by a comparable quantity figure (pounds, tons, bushels, number of units, etc.), they

Table 1. Coverage in 1973 of indexes of U.S. export unit values, by economic class

(in millions of dollars)

Economic class	Percent of total	All commodities		Covered commodities		Noncovered commodities	
		Total value	Percent of class	Value	Percent of class	Value	Percent of class
U.S. domestic exports, total[1]	100.0	69,707.2	100.0	29,379.1	42.2	40,328.1	57.8
Crude foods	12.6	8,804.0	100.0	7,852.1	89.2	951.9	10.8
Manufactured foods	5.1	3,523.6	100.0	2,079.0	59.0	1,446.6	41.0
Crude materials	11.2	7,826.4	100.0	6,066.1	77.5	1,760.3	22.5
Semimanufactures	13.3	9,249.4	100.0	3,706.5	40.1	5,542.9	59.9
Finished manufactures	57.8	40,303.8	100.0	9,675.4	24.0	30,628.4	76.0

[1] Excludes military grant-aid.

SOURCE: Foreign Trade Division, Bureau of the Census. See Index Numbers of U.S. Exports and Imports, 1919 - 1971 (Bureau of the Census, 1972).

cannot be calculated for those classes where quantity data are not available, e.g., computers;

(2) Even where quantity data are available, categories consisting of a mixture of unlike items are often excluded.

Ordinarily, imputation is a procedure used in scientific sampling. However, in this instance it is clear that the proportion of products that must be covered by imputation in the unit value indexes is the consequence of the peculiar nature of unit values themselves, and is not a result of a scientific and replicable sampling procedure. Hence, there are unknown biases in the product sample covered by the unit value indexes.

In this regard, it is interesting to note that there is a strong inverse relation, by major economic class, between the relative importance of each class of exports in the total value of U.S. exports and the share of the value of exports for which unit values are calculated in that class. For example, it can be seen in table 1 that export unit values were calculated for categories corresponding to 89.2 percent of the value of exports of crude foods while crude foods accounted for 12.6 percent of the value of U.S. exports. Yet, export unit values were calculated for categories covering only 24.0 percent of the value of finished manufactures, though this category accounted for 57.8 percent of the value of U.S. exports. Given this inverse relationship, a question exists as to whether or not the unit value index for U.S. exports to the world adequately reflects the movement of unit values of all U.S. exports, a question which is quite apart from the problem of whether or not the index of unit values represents the movement of actual prices.

As previously noted, price indexes are based on a sample of transactions for a sample of products. Thus, it is clear that most products are not included directly in price indexes. Instead, their price movements are covered by imputation from the price movements of the sampled products. For unit value indexes, whether or not a class of products is included in an index appears to depend on the classification system. Even when a class of products is included, it is not possible to adjust for changes in the composition and quality of products in each class or for changes in the terms of transactions.

Part III. Data

The basic data used here to estimate alternative measures of industrial countries' export price trends to OPEC are all taken from publicly available sources. The data include:

(1) Aggregate export unit value indexes to the world for each of the 14 industrial countries;

(2) Aggregate export price indexes to the world for 2 of the 14 countries and a specially constructed export price index for the United States; and

(3) Weights for aggregating these indexes across countries.

Currently, all 14 industrial countries publish aggregate export unit value indexes for all merchandise exports to the world. Additionally, the Federal Republic of Germany [24] and Japan [1] publish both export price indexes for disaggregated product categories and an aggregate measure for their merchandise exports.[10] The Netherlands and the United States currently publish export price indexes for selected export categories but do not produce an aggregate series because coverage of all exports on a sample basis is not yet complete. Since only the aggregate export price series were used in this analysis, except for the United States, data for the Netherlands were not included. Export price indexes for Canada and Sweden, which are based on a combination of export prices and export unit values, were not included either.

For the United States, disaggregated export price indexes are currently available [29] for a significant number of categories of exports; these indexes have been published by the BLS for the third month of each quarter since March 1974, chiefly for the finished manufactured goods in SITC 7, and selected categories in SITC 5, 6, and 8. In addition, export price data for wheat, sorghum, corn, and soybeans are published monthly by the U.S. Department of Agriculture (USDA) in [35].

An estimated index of U.S. export prices to the world was constructed using the export price data from BLS and USDA, together with published domestic U.S. wholesale price series for milled rice and beans [30]. (Note that although official price indexes have been used here to construct an aggregate for the United States, the aggregate itself is not an official price index.) The export price series that were used covered, on a sample basis, categories that accounted for 65.4 percent and 73.7 percent of United States exports to the world and to OPEC, respectively, in 1973 (See table 2.) These figures include the sampled values and also the imputed values of U.S. exports in categories in SITC sections 7 and 0 where the internal coverage was very high. U.S. export price trends for the categories of products which were not covered by these price series were approximated by price index series for the appropriate categories of the U.S. WPI (published monthly [30]), after they were arranged according to the system used for classifying and recording U.S. exports [33].[11] Thus,

[10]Export price indexes are also published by other countries such as Australia, Bulgaria, and Czechoslovakia. See [27].

[11]The risks of using domestic price trends as proxies for export price trends are well known and are described in detail in [12] and [13]. See also [15].

Table 2. U.S. exports to the world[1] and to OPEC[2] during 1973, by SITC section

SITC section	Description	U.S. exports				Value of U.S. exports to the world and to OPEC covered by U.S. export prices to the world[3]			
		To world	Percent	To OPEC	Percent	To world	Percent	To OPEC	Percent
	Total	$70,241,414,891	100.00	$ 3,334,973,423	100.00	([4])	([4])	([4])	([4])
	Total, SITC 0-8	68,541,162,293	97.58	3,284,705,624	98.49	$45,912,926,561	65.36	$ 2,459,117,583	73.74
0	Food and live animals	11,930,201,785	16.98	589,766,770	17.68	11,930,201,785	16.98	589,766,770	17.68
1	Beverages and tobacco	1,008,149,385	1.44	49,329,433	1.48	0	0	0	0
2	Crude materials, inedible, excluding fuels	8,380,210,878	11.93	122,532,361	3.67	2,762,207,817	3.93	8,237,940	0.25
3	Mineral fuels, lubricants, and related materials	1,670,507,236	2.38	19,137,834	0.57	0	0	0	0
4	Oils and fats, animal and vegetable	683,948,562	0.97	53,065,094	1.59	0	0	0	0
5	Chemicals	5,749,508,582	8.19	243,446,386	7.30	1,155,853,604	1.65	34,369,833	1.03
6	Manufactured goods classified chiefly by material	7,161,550,701	10.19	370,463,370	11.11	1,589,874,461	2.26	95,205,364	2.85
7	Machinery and transport equipment	27,864,580,137	39.67	1,698,676,502	50.94	27,864,580,137	39.67	1,698,676,502	50.94
8	Miscellaneous manufactured articles, nec	4,092,505,027	5.83	138,287,874	4.15	610,208,757	0.87	32,861,174	0.99
9	Commodities and transactions not classified according to kind.	1,700,252,598	2.42	50,267,799	1.51	–	–	–	–
						Value of U.S. exports to the world and to OPEC for which WPI data were used			
	Total					([4])	([4])	([4])	([4])
	Total, SITC 0-8					$ 22,628,235,732	31.22	$ 825,588,041	24.75
0	Food and live animals					0	0	0	0
1	Beverages and tobacco					1,008,149,385	1.44	49,329,433	1.48
2	Crude materials, inedible, excluding fuels					5,618,003,061	8.00	114,294,421	3.42
3	Mineral fuels, lubricants, and related materials					1,670,507,236	2.38	19,137,834	0.57
4	Oils and fats, animal and vegetable					683,948,562	0.97	53,065,094	1.59
5	Chemicals					4,593,654,978	6.54	209,076,553	6.27
6	Manufactured goods classified chiefly by material					5,571,676,240	7.93	275,258,006	8.25
7	Machinery and transport equipment					0	0	0	0
8	Miscellaneous manufactured articles, nec					3,482,296,270	4.96	105,426,700	3.16
9	Commodities and transactions not classified according to kind					–	–	–	–

[1] U.S. exports to the world include both military and nonmilitary sales.
[2] U.S. exports to OPEC refer only to nonmilitary sales.
[3] On a sample basis.
[4] Not applicable since SITC has been excluded.

SOURCE: Calculated from data in U.S. Exports - Schedule B Commodity by Country, Report FT - 410, December 1973 (Bureau of the Census, 1974).

a price index which is a composite of U.S. export prices to the world and domestic U.S. industrial prices was calculated using as weights the value of U.S. exports to all destinations in detailed categories in 1973. This general aggregation procedure, described in detail in [16], yields a standard Laspeyres index of prices. It should be noted, however, that there are two important differences between the U.S. export price index to OPEC estimated in [16] and the index of U.S. export prices to the world estimated here.

(1) The former study used both published and unpublished export price data from the BLS, while here only published export price data have been included so that others may reproduce the results.

(2) The estimate prepared here uses as weights the value of U.S. exports to the world in detailed categories, while in the earlier study U.S. exports to OPEC were used as value weights.

Export unit value indexes for the industrial countries, export price indexes for Germany and Japan, and the special export price measure for the United States were combined into aggregate measures (shown in tables 3 and 4) using weights corresponding to each of the industrial countries' shares in the total dollar value of exports to OPEC in 1974 calculated from [19]. Trade flows from the industrial countries to two OPEC members, Qatar and Gabon, were not included because of lack of data.

Part IV. Industrial countries' price trends of exports to OPEC: Some alternative calculations

The data described above on export unit value indexes, export price indexes, and weights are used in this section to obtain two estimates of the behavior of export prices from the industrial countries to OPEC. Both export unit value and price indexes for the industrial countries are used to prepare estimates of their export prices to OPEC. The methodology followed, which is to combine individual country's aggregate export price trends into an aggregate measure for all industrial countries, adheres closely to that in other studies in order to facilitate comparison among the results. Estimates of trends of prices received by OPEC per barrel of oil are also compared with the different extimates of industrial countries' export price trends prepared here.

The estimates of industrial countries' export price trends to OPEC carried out here are primarily in terms of dollars since oil is sold in world markets for dollars and, therefore, the receipts of the oil exporting countries are in dollars. (Indexes in national currencies are also shown in the tables, for information purposes only.) It should be noted that changes in either export prices or export unit values of the industrial countries expressed in dollar terms are influenced by changes in the exchange rates of each of the industrial countries' currencies *vis-a-vis* the dollar, as well as by each country's inflation rate as stated in its national currency. Thus, during times when the dollar has a general tendency to depreciate against other currencies, changes in export prices in dollar terms will exceed price changes expressed in national currencies. This appears to have been the case from the beginning of 1973 through the second quarter of 1975. However, as the dollar appreciates in relation to other industrial countries' currencies, changes in export prices in dollar terms will be smaller than if they were measured in national currencies. This latter situation appears to have prevailed from 1975 III to 1976 II so that, despite substantial domestic inflation in some industrial countries during this period, the commensurate decline of their exchange rates meant that the amount of dollars necessary to purchase a set of goods in those countries did not change very much.

Export price trends: Estimates for Germany, Japan, and the United States

Two aggregate measures of export price changes for Germany, Japan, and the United States were calculated, one based on export prices and the other one on export unit values, weighted by each country's share of exports to OPEC in 1974.[12] The results are summarized in table 4.

Comparisons of the two aggregate indexes show significant differences in their behavior.[13] From 1970 II to 1973 IV, period-to-period changes in the aggregate export price index exceeded changes in the export unit value index in four out of five instances. Beginning with 1974 I and extending through 1975 IV, the opposite pattern emerged: the quarter-to-quarter changes in the export price index were substantially lower than changes in the export unit value index in every instance. During 1976, however, the export price index showed a much larger increase than the unit value index during the first quarter, while the export price index showed smaller increases than the export unit

[12]In 1974, Germany, Japan, and the United States accounted for 59.4 percent of the industrial countries' exports of nonmilitary goods to OPEC. For these three countries alone, the export shares for 1974 were: Germany, 25.4 percent; Japan, 32.9 percent; and the United States, 41.7 percent. See [19].

[13]Data are presented here that use a wide choice of base periods for comparisons such as the one given. The indexes calculated in this paper for the period 1970-73 show changes between the second quarters of successive years because only second-quarter data are available for the United States for years prior to 1974. Index values for the United States have been interpolated for 1973 III and 1973 IV as described in footnote 3 of table 3.

Table 3. Export price indexes for Germany and Japan, and specially constructed U.S. price index to the world, 1970-76[1]

(Indexes in dollar terms; 1970 annual average=100)[2]

Year and quarter	Germany		Japan		United States
1970 II	99.7	(99.7)	100.1	(100.1)	100.0
1971 II	104.9	(103.5)	101.5	(101.5)	103.9
1972 II	121.1	(105.1)	114.2	(97.7)	105.5
1973 II	149.3	(111.6)	139.5	(102.7)	125.5
III	172.2	(112.6)	145.6	(107.2)	129.0[3]
IV	165.8	(115.5)	153.2	(116.9)	148.2[3]
1974 I	168.3	(125.6)	163.6	(132.8)	149.6
II	191.1	(130.7)	179.6	(139.2)	148.6
III	188.0	(134.1)	182.3	(149.2)	158.2
IV	196.1	(135.1)	178.3	(148.6)	164.2
1975 I	212.8	(135.9)	172.6	(140.6)	159.2
II	211.7	(136.2)	169.8	(137.9)	157.6
III	195.7	(136.5)	165.6	(137.1)	163.9
IV	193.4	(137.2)	163.8	(138.1)	161.9
1976 I	199.2	(140.1)	165.8	(139.3)	166.2
II	203.0	(141.9)	169.4	(140.8)	167.4
III	206.5	(142.8)	173.8	(140.5)	163.5

[1] For Germany and Japan, unweighted average of monthly values. For the United States, estimate for the last month of each quarter, unless otherwise noted.

[2] For the U.S. measure, June 1970=100.

[3] Interpolated using estimates for 1973 II and 1974 I and changes in U.S. wholesale prices for all categories for June-September 1973 and December 1973-March 1974. See Wholesale Price Indexes, Supplement 1974. (Bureau of Labor Statistics, 1975).

SOURCES:

Germany and Japan -- Data in national currencies from International Financial Statistics (International Monetary Fund, August 1976 and more recent issues). Data in dollar terms calculated from export price data in national currencies and exchange rates in same. Export price indexes are weighted internally using value of exports to the world.

United States -- Export price measure for the United States uses export price data published by the Bureau of Labor Statistics and the U.S. Department of Agriculture and domestic prices for some categories, weighted using the value of U.S. exports to the world in 1973. For methodology and important assumptions in the construction of the measure see Edward E. Murphy and Jorge F. Perez-Lopez, "U.S. Export Prices and OPEC Oil Prices," Monthly Labor Review, November 1975, table 7 and part III of this paper.

NOTE: Figures in parentheses are indexes in national currencies.

Table 4. Aggregate measures of export price trends for Germany, Japan and the United States weighted by each country's share of exports to OPEC in 1974, selected quarters and period-to-period percent changes, 1970-76

(Indexes in dollar terms; 1974 I=100)

Year and quarter	Export unit value indexes				Export price indexes			
	Index		Percent change		Index		Percent change	
1970 II	64.5	(74.6)	--	--	63.0	(72.8)	--	--
1971 II	66.7	(76.9)	3.4	(3.1)	65.2	(75.0)	3.5	(3.0)
1972 II	72.0	(76.4)	8.0	(-0.7)	70.7	(74.9)	8.4	(-0.1)
1973 II	83.9	(81.5)	16.5	(6.7)	85.6	(83.0)	21.1	(10.8)
III	92.0	(86.0)	9.7	(5.5)	91.2	(85.3)	6.5	(2.8)
IV	94.7	(91.1)	2.9	(5.9)	97.1	(93.6)	6.5	(9.7)
1974 I	100.0	(100.0)	5.6	(9.8)	100.0	(100.0)	3.0	(6.8)
II	108.9	(104.8)	8.9	(4.8)	106.4	(102.3)	6.4	(2.3)
III	112.3	(111.3)	3.1	(6.2)	109.1	(108.2)	2.5	(5.8)
IV	117.2	(115.8)	4.4	(4.0)	111.2	(109.9)	1.9	(1.6)
1975 I	122.6	(117.9)	4.6	(1.8)	111.2	(106.7)	0.0	(-2.9)
II	121.0	(116.3)	-1.3	(-1.4)	110.0	(105.6)	-1.1	(-1.0)
III	116.3	(114.9)	-3.9	(-1.2)	108.5	(107.3)	-1.4	(1.6)
IV	114.2	(114.0)	-1.8	(-0.8)	107.3	(107.1)	-1.1	(-0.2)
1976 I	115.2	(114.5)	0.9	(0.4)	109.7	(109.2)	2.2	(2.0)
II	117.1	(116.0)	1.7	(1.3)	111.4	(110.2)	1.6	(0.9)
III	120.5	(118.0)	2.9	(1.7)	111.7	(109.3)	0.3	(-0.8)

NOTE: Figures in parentheses refer to aggregate measures calculated from country indexes in national currencies.

SOURCES: Export unit value indexes - International Financial Statistics (International Monetary Fund, August 1976 and more recent issues).
Export price indexes - Table 3.

value index for the second and third quarters. On balance, over the entire period 1970 II to 1976 III, the increase of export prices was about one-half that of export unit values.

Since comparisons of rates of change often are sensitive to the choice of base period, two tables were prepared to show all the possible combinations of period-to-period changes. To facilitate comparison of the two measures, table 5 shows the percent changes of the aggregate export unit value index for Germany, Japan, and the United States between any two periods, while table 6 refers to the corresponding changes in the aggregate export price index. For example, for the period 1974 I to 1975 I, the export unit value index of the three countries increased by 22.6 percent, while the export price index increased by 11.2 percent. Between 1975 III and 1976 III the export price index rose by 2.9 percent, while the export unit value index rose by 3.6 percent. From 1974 I to 1976 III the increase of export unit values was 20.5 percent compared with an 11.7 percent increase of export prices. Thus, increases in the three countries' export prices to OPEC for some periods are substantially larger, in some cases about twice as large, when an export unit value index is used than when an export price index is employed.

Export price trends: Estimates for all industrial countries

Other investigators who have attempted to assess the export price performance of the 14 industrial countries (e.g., [21], [5]) have relied entirely on these countries' export unit value indexes. However, in addition to arguing that unit value indexes have serious limitations as measures of price change, it was shown in the preceding section that the unit value indexes for Germany, Japan, and the United States have generally, though not always, increased more rapidly than their corresponding export price indexes. Since these 3 countries account for 59 percent of industrial countries' exports to OPEC, it is clear that the choice of unit value indexes to measure their export price performance will have a significant effect on a measure for the 14 industrial countries as a whole. An indication of this effect can be shown by substituting the export price indexes of the 3 countries for their export unit value indexes in a calculation that uses unit value indexes for the remaining 11 countries. (See table 7.)

In table 7, column 2 it may be seen that from 1974 I to 1975 I, roughly the period covered by the other studies, the export price inflation of the 14 industrial countries was 26.7 percent when measured by unit values alone.[14] This figure is reduced to 20.0 percent (in column 1) when export price indexes are substituted for the unit value indexes for Germany, Japan, and the United States. For the period 1974 I to 1975 III, the period of the first oil price freeze, the unit value index increased by 20.7 percent and the index using a combination of prices and unit values increased by 16.1 percent. Beginning with the second oil price freeze effective on October 1, 1975, the unit value index increased by 3.1 percent while the index using both prices and unit values increased by 2.4 percent.[15]

In conclusion, the different alternative estimates presented above indicate that there has been inflation in the prices of exports from the industrial countries to OPEC during the period examined. However, the magnitude of this estimated increase was shown to be influenced by the choice of data used. Industrial countries' export price trends to OPEC estimated by using export unit value indexes for each country tended to indicate higher price changes than when a combination of export unit value indexes and export price indexes (where available) was used. This occurred because of the significant differences in the trends of the export unit value indexes for Germany, Japan, and the United States compared with those of the export price indexes.

Comparison of industrial countries' merchandise export price trends with oil price trends

At the same time that industrial countries' export prices were rising, the price received by OPEC for each barrel of oil exported also underwent changes. OPEC countries' oil export prices traditionally have been keyed to the price of Saudi Arabian light crude, 34 degrees API, f.o.b. Ras Tanura, which is often referred to as the marker or benchmark crude. Thus, trends in the price of the marker crude, calculated following [16], are used here to indicate price trends for all OPEC countries. (Price received per barrel rather than posted prices have been used since posted prices are not transaction prices but rather accounting values on which the oil exporting countries levy revenue-producing taxes and royalties.)

Following the large increases of posted prices for crude oil in late 1973 and early 1974 (the increase effected in early 1974 was made retroactive to January 1, 1974), the posted prices were "frozen" at the new

[14]Using preliminary export unit value data, [21] and [5] found increases of 22.5 percent and 23.1 percent, respectively, over this period; the 26.7-percent figure above uses later revised export unit values for each of the countries published in [11] aggregated in a manner consistent with the two studies.

[15]The second oil price freeze period is approximated here by the period 1975 III to 1976 III. Export unit value data for 1976 III were not available for France and Norway at the time of the preparation of this study. PIRINC, in a later study [20], forecasted a 2.7-percent increase in industrial countries' export prices (actually unit values) to OPEC from 1975 III to 1976 III.

Table 5. Percent changes in aggregate measure of export prices for Germany, Japan, and the United States weighted by trade with OPEC, as measured by export unit value indexes, 1970-76

Year and quarter, from 19–	Year and quarter, to 19–															
	71 II	72 II	73 II	73 III	73 IV	74 I	74 II	74 III	74 IV	75 I	75 II	75 III	75 IV	76 I	76 II	76 III
70 II	3.4	11.6	30.1	42.6	46.8	55.0	68.8	74.1	81.7	90.1	87.6	80.3	77.1	78.6	81.6	86.8
71 II		8.0	25.8	37.9	42.0	49.9	63.3	68.4	75.7	83.8	81.4	74.4	71.2	72.7	75.6	80.7
72 II			16.5	27.8	31.5	38.9	51.3	56.0	62.8	70.3	68.1	61.5	58.6	60.0	62.6	67.4
73 II				9.7	12.9	19.2	29.8	33.9	39.7	46.2	44.2	38.6	36.1	37.3	39.6	43.6
73 III					2.9	8.7	18.4	22.1	27.4	33.3	31.5	26.4	24.1	25.2	27.3	31.0
73 IV						5.6	15.0	18.6	23.8	29.5	27.8	22.8	20.6	21.6	23.7	27.2
74 I							8.9	12.3	17.2	22.6	21.0	16.3	14.2	15.2	17.1	20.5
74 II								3.1	7.6	12.6	11.1	6.8	4.9	5.6	7.5	10.7
74 III									4.4	9.2	7.8	3.6	1.7	2.6	4.3	7.3
74 IV										4.6	3.2	–0.8	–2.6	–1.7	–0.1	2.8
75 I											–1.3	–5.1	–6.9	–6.0	–4.5	–1.7
75 II												–3.9	–5.6	–4.8	–3.2	–0.4
75 III													–1.8	–0.9	0.7	3.6
75 IV														0.9	2.5	5.5
76 I															1.7	4.6
76 II																2.9

SOURCE: Calculated from table 4.

Table 6. Percent changes in aggregate measure of export prices for Germany, Japan, and the United States weighted by trade with OPEC, as measured by export price indexes, 1970-76

Year and quarter, from 19–	Year and quarter, to 19–															
	71 II	72 II	73 II	73 III	73 IV	74 I	74 II	74 III	74 IV	75 I	75 II	75 III	75 IV	76 I	76 II	76 III
70 II	3.5	12.2	35.9	44.8	54.1	58.7	68.9	73.2	76.5	76.5	74.6	72.2	70.3	74.1	76.8	77.3
71 II		8.4	31.3	39.9	48.9	53.4	63.2	67.3	70.6	70.6	68.7	66.4	64.6	68.3	70.9	71.3
72 II			21.1	29.0	37.3	41.4	50.5	54.3	57.3	57.3	55.6	53.5	51.8	55.2	57.6	58.0
73 II				6.5	13.4	16.8	24.3	27.5	29.9	29.9	28.5	26.8	25.4	28.2	30.1	30.5
73 III					6.5	9.7	16.7	19.6	21.9	21.9	20.6	19.0	17.7	20.3	22.2	22.5
73 IV						3.0	9.6	12.4	14.5	14.5	13.3	11.7	10.5	13.0	14.7	15.0
74 I							6.4	9.1	11.2	11.2	10.0	8.5	7.3	9.7	11.4	11.7
74 II								2.5	4.5	4.5	3.4	2.0	0.9	3.1	4.7	5.0
74 III									1.9	1.9	0.8	–0.6	–1.7	0.6	2.1	2.4
74 IV										0.0	–1.1	–2.4	–3.5	–1.4	0.2	0.4
75 I											–1.1	–2.4	–3.5	–1.4	0.2	0.4
75 II												–1.4	–2.5	–0.3	1.3	1.5
75 III													–1.1	1.1	2.7	2.9
75 IV														2.2	3.8	4.1
76 I															1.6	1.8
76 II																0.3

SOURCE: Calculated from table 4.

Table 7. Aggregate measures of export price trends for 14 industrial countries weighted by each country's share of exports to OPEC in 1974, for the years 1970-76

(Indexes in dollar terms; 1974 - I=100)

Year and quarter	Aggregate measures for 14 industrial countries as measured by:			
	Export price indexes for Germany and Japan, special measure for the United States, and unit values for the remaining 11 industrial countries		Export unit value indexes	
1970 II	64.0	(72.0)	64.5	(72.6)
1971 II	66.7	(74.6)	67.6	(75.4)
1972 II	72.5	(75.2)	73.5	(76.1)
1973 II	87.3	(83.0)	86.3	(82.1)
III	93.7	(85.9)	94.2	(86.3)
IV	97.4	(92.4)	95.9	(90.9)
1974 I	100.0	(100.0)	100.0	(100.0)
II	109.0	(104.9)	110.5	(106.3)
III	112.7	(110.7)	114.5	(112.5)
IV	115.9	(113.1)	119.4	(116.6)
1975 I	120.0	(112.3)	126.7	(118.9)
II	119.7	(111.6)	126.2	(117.9)
III	116.1	(113.6)	120.7	(118.1)
IV	115.1	(114.3)	119.3	(118.5)
1976 I	116.5	(117.2)	119.8	(120.4)
II	117.2	(120.7)	120.6	(124.1)
III	118.9	(121.7)	124.4	(126.5)

NOTE: Figures in parentheses refer to aggregate measures in national currencies of each country.

SOURCES: Export unit values — International Financial Statistics (International Monetary Fund, August 1976, and more recent issues). Export price indexes — Table 3.

January 1, 1974, levels until the end of September 1975. On October 1, 1975, a 10-percent increase in posted prices was implemented and prices were again "frozen," until late 1976. Apparently, some of the price differentials were revised in order to bring into line some of the higher priced crudes, but the price freeze that began October 1, 1975, was still in effect at the time of this writing. It is interesting to note, however, that although posted price levels remained unchanged during the first price freeze (January 1974 to September 1975), price received by Saudi Arabia for exports of light crude rose by 9.6 percent as a result of adjustments to the tax and royalty rates effected during late 1974 and early 1975. (See [16, pp. 40-41].) To illustrate, percent changes in price received for specific time periods are shown in table 8.

During a time (1974 I to 1975 III) that approximates the period of the first oil price freeze, the increase in the export prices of merchandise from Germany, Japan, and the United States to OPEC was estimated at 8.5 percent using export prices, and at 16.3 percent using unit values. For all 14 industrial countries together, the increase was 16.1 percent using a combination of export prices for Germany, Japan, and the United States, and export unit values for the remaining 11 countries, and 20.7 percent based on the export unit values for all 14 countries. These estimates compare with the 9.6-percent estimated increase of OPEC's price of crude oil during this period.

For the more recent period (1975 III to 1976 III) that covers about the same time as the second oil price freeze, the increase of export prices of Germany, Japan, and the United States was estimated at 2.9 percent using export prices and at 3.6 percent using unit values, based on the most current data available. For the 14 industrial countries, the increase in export prices to OPEC during this same period was estimated at 2.4 percent using export prices for Germany, Japan, and the United States and unit values for the remaining 11 countries, and 3.1 percent based on the export unit values for all 14 countries. OPEC price per barrel increased by an estimated 10 percent at the beginning of this period. (This 10-percent increase in the price per barrel series probably overstates the increase for all exported OPEC crude oil since some downward adjustments took place in the posted prices of several types of crude oil.)

For the entire period that follows the large oil price increases, i.e., from 1974 I to 1976 III, estimates of the increase of export prices from Germany, Japan, and the United States to OPEC were 11.7 percent using export prices or 20.5 percent using unit values. Estimates for the 14 countries together were 18.9 percent using export prices for Germany, Japan, and the United States and unit values for the remaining 11 countries, and 24.4 percent based on the export unit values for all 14 countries. During this period, OPEC price per barrel rose by an estimated 20.6 percent.

Table 8. Comparison of percent changes in alternative estimates of industrial countries' export prices to OPEC and in estimates of OPEC's oil price per barrel

(Percent changes calculated from indexes in dollar terms)

Period	Germany, Japan, and the United States using—		14 countries using—		Estimates for OPEC price per barrel
	Export prices	Export unit values	Export price indexes for Germany and Japan, special measure for the United States, and unit values for the remaining industrial countries	Export unit values	
1974 I to 1975 III[1]	8.5	16.3	16.1	20.7	9.6
1975 III to 1976 III[2]	2.9	3.6	2.4	3.1	10.0
1974 I to 1976 III[3]	11.7	20.5	18.9	24.4	20.6
1970 II to 1976 III	77.3	86.8	85.8	92.9	1,033.1

[1] Time period chosen to approximate time span of the first OPEC oil price freeze.

[2] Time period chosen to approximate time span from beginning of the second OPEC oil price freeze to most current time.

[3] Time period chsoen to approximate time span from beginning of the first OPEC oil price freeze to most current time.

SOURCES: Germany, Japan, and the United States – Table 5 and 6. All industrial countries – calculated from Table 7. OPEC revenue per barrel – calculated using data in Murphy and Perez-Lopez, "U.S. Export Prices and OPEC Oil Prices," table 7, and more recent data.

Over a longer period, from before the large oil price increases to the most current period (1970 II to 1976 III), the price received by OPEC per barrel of oil was estimated to have increased by 1,033.1 percent while estimates of export prices of Germany, Japan, and the United States rose by 77.3 percent using export price indexes and 86.8 percent using export unit value indexes. The corresponding figures for the 14 industrial countries were 92.9 percent using export unit values for all countries and 85.8 percent using a combination of export unit value indexes and export price indexes where available.

Part V. Summary

Estimation of the trend of OPEC import prices is made difficult by the absence of import price indexes for goods and services for the individual members of OPEC. Until this situation is remedied, the analysis of the trend of OPEC import prices will need to rely upon export price information of the countries that are the suppliers of goods and services to OPEC. Additional data problems arise because none of the industrial countries publishes export price data for exports of services or of military goods. The only price data on industrial countries' exports currently available refer to export prices of merchandise sold to all destinations.

The use of industrial countries' merchandise export price trends to the world to estimate trends of OPEC import prices from those countries is based on two assumptions:

(1) that each country's export price trend for merchandise shipments to the world is a suitable proxy for its merchandise shipments to OPEC, and

(2) that trends of freight, insurance, and other charges associated with transporting and delivering products from an exporting to an importing country behave in the same manner as the export prices of those products.

These assumptions have not been tasted here. However, some unsystematic evidence was noted regarding the latter assumption which suggests that freight and other costs associated with the movement of products to some OPEC countries increased significantly during 1974 and 1975, partly as a result of congestion of port facilities at points of importation, and thus, may have behaved differently from product price trends, at least in those years.

Considerable data exist that may be used to estimate the merchandise export price trends of the principal industrial countries. These data are of two types: export unit value indexes and export price indexes. There are several studies that have shown theoretically and empirically that unit value indexes are inferior to price indexes as measures of price change.

A comparison of aggregate indexes of export unit values with indexes of export prices for Germany, Japan, and the United States has shown that there are substantial differences in the behavior of the two series during the period covered, and that the choice of proxy variable for measuring export price trends has an important bearing on the estimate of OPEC's imported inflation. Within the stated limitations of the measures, it has been estimated here that export prices of merchandise from Germany, Japan, and the United States, which account for 59 percent of industrial countries'

merchandise shipments to OPEC, increased by 77.3 percent from the second quarter of 1970 to the third quarter of 1976 and by 11.7 percent from first quarter 1974 to third quarter 1976. A measure of export prices for Germany, Japan, and the United States and export unit values for the other 11 industrial countries increased by 85.8 percent and 18.9 percent for the same two periods, respectively. In contrast, the price received by OPEC per barrel of oil is estimated to have increased by 1033.1 percent from second quarter 1970 to third quarter 1976, and by 20.6 percent from first quarter 1974 to third quarter 1976.

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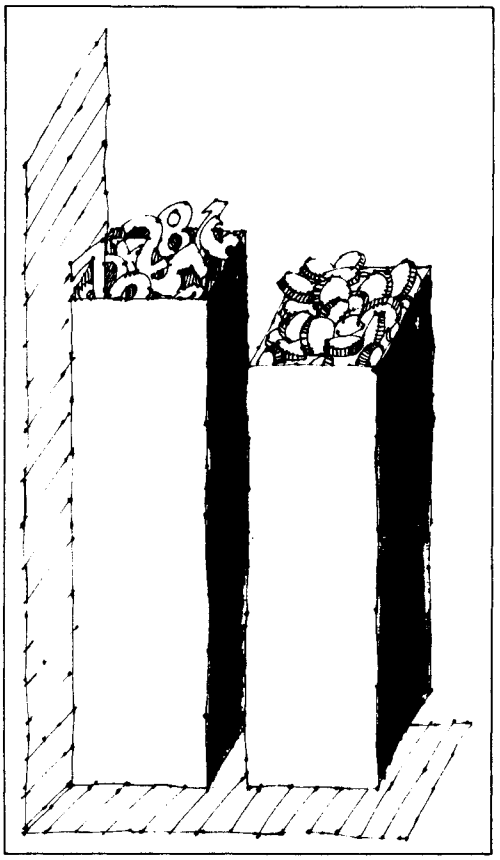

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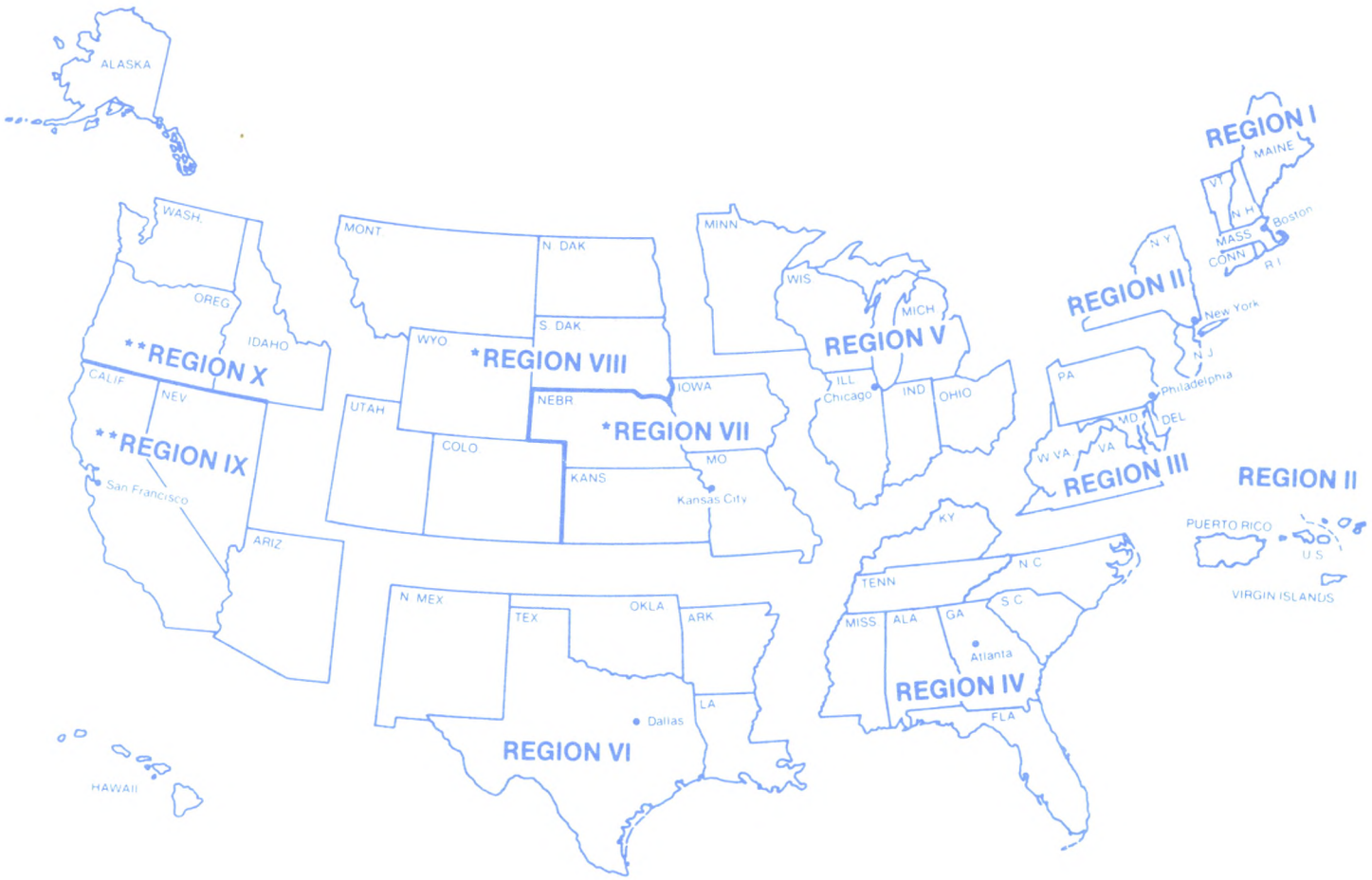

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