

UNITED STATES INTERNATIONAL TRADE COMMISSION

PROTECTION IN  
MAJOR TRADING COUNTRIES

Investigation No. 332-65  
Under Section 332 of the Tariff Act of 1930

The reader is cautioned that the results of a study of this magnitude are subject to shortcomings in the data and the analytical tools.-



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UNITED STATES INTERNATIONAL TRADE COMMISSION

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## CONTENTS

	<u>Page</u>
Foreword-----	i
Introduction-----	1
Major Conclusion of the Study-----	3

### PART I

Nominal Protection in the United States and its Major Trading Partners-----	7
Matching Trade, Tariff, and Production Data-----	11
The data and analysis-----	17

### Tables

Table 1.--Nominal tariff rates and non-tariff barrier indices for major trading areas-----	22
Table 2.--Rank correlation coefficients, ranks, and summary statistics of the data in table 1-----	38
Table 3.--Nominal tariff rates and non-tariff barrier indices for major trading areas-----	44
Table 4.--Rank correlation coefficients, ranks, and summary statistics of the data in table 3-----	50
Table 5.--Rank correlation coefficients between the import weighted and unweighted tariffs in tables 1 and 3-----	55
Table 6.--Nominal tariff rates and non-tariff barrier indices for major trading areas by TC-SIC-----	61
Table 7.--Rank correlation coefficients, ranks, and summary statistics of the data in table 6-----	66

### Charts

Chart 1 - Nominal tariff profiles for U.S. Post- Kennedy-Round (PKR) tariff rates-----	29
Chart 2 - Bar graph of differences between U.S. nominal tariff averages and foreign nominal tariff averages-----	57

### PART II

Effective Tariff Protection in Major Trading Countries-----	70
Define-----	72
Calculations of Effective Tariff Rates-----	74
Effective Tariff Rates-----	76

CONTENTS--Cont.

Page

PART II - cont.

Tables

Table 8.--Effective tariff rates for major trading areas using import weighted nominal tariff averages-----	80
Table 9.--Rank correlations, ranks, and summary statistics of the variables in table 8-----	86
Table 10.--Effective tariff rates for major trading areas using unweighted nominal tariff averages-----	91
Table 11.--Rank correlations, ranks, and summary statistics for the variables in table 10-----	97
Table 12.--Rank correlation coefficients of the nominal and effective tariff rates from table 8 and 10-----	102
Table 13.--Overall averages of nominal and effective tariff rates for the United States-----	120

Charts

Chart 3 - Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States-----	104
Chart 4 - Bar graphs of the differences between U.S. and foreign average effective tariff rates-----	116

PART III

Towards Measurement of Comparative Advantage-----	121
The Data-----	126
Empirical Work-----	144
Trade Performance-----	152
Tariff Patterns-----	163
Comparative Advantage-----	166

Tables

Table 14.--Regression equations or factor comparative efficiency measures-----	146
Table 15.--Regression results for total factor costs for a two- and three-factor model-----	149
Table 16.--Rank correlation matrix of trade performance measures by IO-SIC-----	153
Table 17.--Regression results for trade performance measures-----	159
Table 18.--Regression results for tariff levels-----	164
Table 19.--Comparative advantage measures, their ranks, and associated data-----	168

CONTENTS--Cont.

Page

PART III - cont.

Charts

Chart 5 - Observed 1967 capital and labor requirements per dollar of value-added-----	128
Chart 6 - Observed 1970 capital and labor requirements per dollar of value-added-----	135

APPENDICES

Appendix A - Concordance relating the 5-digit Standard International Trade Classification (SITC) to the IO-SIC-----	A-1
Appendix B - Concordance relating the 5-digit Brussels Tariff Nomenclature (BTN) to the IO-SIC-----	B-1
Appendix C - Methodology of Effective Tariff Rate Calculation in the Study-----	C-1
Appendix D - Calculation of U.S. effective tariff rates with and without separate input tariff vectors-----	D-1
Appendix E - Concordance of the TSUSA to the IO-SIC-----	E-1
Appendix F - Variables Used in the Analysis in Part III General Data Sources-----	F-1

Tables

Table D-1.--U.S. effective tariffs using import weighted nominal tariff averages-----	D-3
Table D-2.--U.S. effective tariffs using simple nominal tariff averages-----	D-10



## FOREWORD

This report was prepared by the U.S. International Trade Commission as a part of its investigation 332-65. That investigation was initiated in 1970 at the request of the President, who asked that the U.S. Tariff Commission study the conditions of competition between U.S. and foreign industries and report to him the results of the study. Several reports were completed under this investigation and were forwarded to the President during 1972-73. 1/

On May 9, 1972, the Council on International Economic Policy (CIEP) requested that the Commission continue its work under investigation 332-65 and provide reports on specific topics related to the contemplated negotiations on tariffs and non-tariff barriers under the General Agreement on Tariffs and Trade. The Commission prepared several additional reports in response to the CIEP request, including this report on the levels of industry protection in the United States and its major trading partners.

This report was prepared principally by Dr. Vernon O. Roningen of the Commission's Office of Economic Research.

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1/ One of these reports was published as Competitiveness of U.S. Industries, TC Report 473, April 1972. Two other reports dealt with U.S. competitiveness with particular countries, and these reports were not subsequently published.





## Introduction

This study attempts to outline, on an industry basis, the levels of protection in the United States and its major trading partners. Comparisons are made of nominal tariff protection across industries and across countries. Additionally, some measurements of "effective" tariff protection are made for comparative purposes on a cross-industry and cross-country basis. <sup>1/</sup> The study also includes some semi-quantitative measures of nontariff barriers for comparison with tariff rates. A statistical analysis of the relationship between protection levels, trade performance, and some industry characteristics concludes the study.

Those interested in comparisons of levels of nominal tariff protection can concentrate on the data and analysis presented in Part I. Part II deals with the measurement of "effective" tariff protection, or the total effects of the tariff structure on Value-Added (VA) in each industry. Part II also presents measurements and some analysis of this type of protection on a cross-industry and cross-country basis. Part III concentrates on traditional economic analysis; here an attempt is made to understand protection levels and the resulting trade patterns via the traditional method of testing economic hypotheses.

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<sup>1/</sup> "Effective" tariff rates are rates on value-added in production rather than on the product itself. Output product tariffs add to value-added by raising sales prices, while tariffs on input materials raise production costs and lower value-added.

Value-added in the study is defined to be total sales minus material services and inputs. This version of value-added (which includes service purchases) is used so that a particular type of model can be used in Part III.

All studies of this magnitude suffer from data inadequacies, category "matching" or concordance problems, and the difficulties of choosing adequate analytical techniques. As far as is possible, the study attempts to outline clearly the problems encountered and the known shortcomings in the data. Whenever clear alternative methods and measurements are possible, tractable alternatives are presented. Judgments are outlined and readers are given as much of the data and analysis as possible so that they can form alternative judgments if they wish.

The information needed about protection and the questions to be answered are quite simple. For example: What are the levels and/or incidence of tariff and nontariff protection among industries in the United States and its major trading partners? How did protection change for sectors of the U.S. economy during the Kennedy round tariff reduction period and how have these changes affected production and trade patterns? Where does the United States have its natural comparative advantage (so that tariff negotiators may know where to bargain the hardest for concessions from trading partners of the U.S.)? Where does the United States have the least comparative advantage (so that adjustment assistance may be readily offered if concessions are granted)? What are the costs of protection to the U.S. economy as a whole and what possible effects might general tariff reductions have in helping to dampen inflation? The answers to some of these questions lie partially in the careful preparation and presentation of economic data. The answers to the more difficult questions lie in the use of the data in intelligent economic analysis. This study tries to provide guidance along these lines.

### Major Conclusions of the Study

The principal contribution of Part I lies in its presentation and comparison of several measures of nominal tariffs and a quasi-quantitative index of the incidence of Non-Tariff Barriers (NTB's) for both the United States and other countries. The study finds that general tariff patterns between the United States and its major trading partners are moderately correlated, with the rank nominal tariff pattern of the United States most similar to Canada's and least similar to Japan's. The same generalization holds true for NTB patterns, but with greater variability. The relationship between the U.S. tariff pattern and the average foreign tariff pattern is stronger than the relation of the U.S. pattern to individual country patterns. For each country studied, there is only a very weak relationship between its own tariff patterns and the pattern of incidence of its NTB's. Considering the implications of all the data in a body, the major trading countries' tariff patterns appear as moderately similar--as do their profiles of NTB incidence--but countries' own tariff and NTB patterns do not evidence much similarity.

Part II presents effective tariff (ET) rates for the United States and other countries, based on input-output relationships prevailing in the U.S. economy. Nominal and effective tariff rates are correlated quite closely on a ranking basis, indicating that the use of the nominal rate as a proxy for the ET rate is reasonable in a statistical analysis or in rank comparisons of tariff heights. Across countries, the rank

correlations show that if certain relationships hold between various sets of nominal rates, they will hold to a slightly lesser extent between the effective rates. For example, U.S. and foreign nominal tariff averages rank correlate at around 0.63, while U.S. and foreign effective tariff averages rank correlate at about 0.53. Generally, the overall variation in ET rates is much greater than that of nominal rates as among industries. Summary statistics indicate that the coefficient of variation for ET rates is well over twice that of nominal rates.

Comparing summary figures on overall nominal and effective tariff averages, it would appear that the cost of protection in the United States is a loss in real income of about five percent--down from 8 or 9 percent in 1965 but still more than half the 1965 cost. Considering that these costs do not include those of NTB's, further tariff negotiations can indeed play a role in increasing national welfare. However, it also is evident that if tariffs were eliminated the adjustment costs (through diminishing factor returns in certain sectors) probably would be as great as those following from the Kennedy Round reductions. The price effects of tariff elimination (i.e. any contribution to an anti-inflation effort), on the other hand, probably would be minimal.

Part III presents strong theoretical reasons for including the effective tariff rate in the measure of industries' comparative advantage in trade. There is also empirical evidence that encourages the supplementing of ET rates with measures of industries' relative health or comparative efficiency. A measure combining both of these aspects is proposed in this study and given preliminary estimates.

The study implies that foreign tariff reductions should be sought for sectors whose comparative advantage measures are high and which exhibit exporting characteristics, namely technology or professionalism and relative capital intensity. Protection can be safely bargained away for industries with a relatively high comparative efficiency or good general health. Adjustment assistance should be anticipated in industries which have low comparative advantage and are experiencing stiff import competition. These generally will be high tariff, low wage industries with low capital/labor ratios and few professionals in the work force.

Finally, trade performance and protection do not weigh heavily in the explanation of the existing status quo of industries. Therefore, the probable effects of reducing protection should be considered in the context of sector price and output behavior. Because trade does not drive the United States economy as much as it does the economies of other countries, the trade effects of protection changes should be fit into a framework that explains industrial performance reasonably well.

Trade negotiators may want some information at a more disaggregated product level than is provided in this study. Disaggregation below the level of the SIC means that researchers cannot tie into the wealth of data available from the Census of Manufactures and other sources. One may not be able to obtain data from existing sources to measure comparative advantage as defined in this part. However, one could crudely

approximate effective rates at the product level where the tariff rates exist. This could be done by using more aggregate input structures and tariffs and changing only the output tariff level in the ET formula.

It is important to note that when an industry as defined in this study produces many products, some of these products are competitive while others are not. The average industry comparative advantage is an average of all of its product performances. Hence it is important, even in a generally non-competitive industry, to identify the competitiveness of the various products. Removal of tariffs or NTB's, even in generally non-competitive industries, may affect only some of the product lines. Other products will be able to compete and should be so identified in the consideration of adjustment assistance.

## PART I

Nominal Protection in the United States and  
Its Major Trading Partners

The measurement of tariff protection levels in the form of tariff averages and of Non-Tariff Barriers (NTB's) is a difficult problem. NTB's defy simple measurement, whether in comparisons across products, in comparisons across industries and countries, or in comparisons with tariff levels. 1/ Tariff level measures themselves depend heavily on aggregation and concordance problems. These problems arise because tariff and trade data are not always available for all countries on the same classification basis. Hence, concordances must be used to move data to a comparable basis. If data and analysis are needed on an industry level, these problems are further complicated because trade and tariff data are generally compiled on a more detailed product basis, while industry production and employment data are available only on a more aggregate production process or enterprise basis. In this study the desire for certain types of analysis meant that all data had to be aggregated to various versions of the industry-based Standard Industrial Classification (SIC) scheme. 2/

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1/ An attempt has been made to document tariff and non-tariff barriers at the U.S. Tariff Commission. This study used data on tariff levels compiled by the General Agreement on Tariffs and Trade (GATT) and data on non-tariff barriers compiled and organized from several sources. See: Parts I, II, III, and IV of Trade Barriers, Report to the United States Senate and its Subcommittee on International Trade. U.S. Tariff Commission publication 665, Washington, D.C., April 1974.

2/ Definitions of the pure SIC (four digit) numbers used in this study can be found in: Standard Industrial Classification Manual 1967, Bureau of the Budget, Office of Statistical Standards, Washington, D.C. The SIC code tries to classify industry data by types of production activities. This gives rise to obvious problems with product oriented classifications because essentially the same product can sometimes be produced by different processes.

Aggregation from one classification scheme for trade and tariff data to another (so that the trade and tariff data can match industry data) calls for complex concordances. Two guiding and sometimes conflicting principles led to data presentation in this study by two separate concordance schemes. The first principle was the dedication to a thorough study of protection via the "effective" tariff concept as pursued in Parts II and III of this study. This led to presentation of most of the data by an Input-Output based SIC (IO-SIC), which is the scheme of classification of the 1963 U.S. input-output table. 1/ The second principle was to provide the most detailed level of disaggregation possible and still be confident of reasonable matches of trade and production data given the concordances available for this purpose. 2/ This latter consideration led to the laborious preparation of the Trade Commission SIC (TC-SIC) which tried to provide the least possible aggregation of pure four-digit numbers that would allow matching of trade and industry data. Where data are presented by either scheme, the table

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1/ The definition of the input-output SIC and its relation to the pure SIC is found in a mimeographed tape description accompanying the large 478 sector 1963 input-output table on magnetic computer tape. This may be obtained from: The Interindustry Economics Division, Bureau of Economic Analysis, Department of Commerce, Wash., D.C. For most of the manufacturing sectors, IO-SIC numbers are identical to pure SIC numbers. However, the input-output table does aggregate some manufacturing industries and any of the mining and agriculture sectors. Stubs of the tables containing data on an IO-SIC basis will also contain the pure SIC numbers so that the reader may see exactly what industries are aggregated in the manufacturing sectors.

2/ The basic available concordances for matching trade, tariff and production data are found in a Commerce Department publication, U.S. Foreign Trade Statistics, Classifications and Cross Classifications 1970, U.S. Department of Commerce, Bureau of the Census, Wash., D.C., 20233, February 1971. Most of the Trade Commission concordance work done for this study began with computer tapes of the concordances in this publication.



stub will show the four-digit pure SIC's that were combined. While this study will rely most heavily on the IO-SIC because of its emphasis on an inter-industry analytical approach, it will present some tariff data and analysis by the TC-SIC where feasible. <sup>1/</sup> As is always true in economic analysis, organization of the data depends heavily on the analytical approach used. Aside from analytical gains which are to be made with each kind of concordance, hopefully the multiple presentation will alert the reader to the seriousness of the concordance problem.

Aside from concordance problems, there are also problems of aggregation. It is generally well known that tariff averages differ considerably depending upon how tariff rates are weighted when they are aggregated. It is also recognized that no weighting scheme is perfect since each type of weight may introduce its own types of bias into the average. Therefore, wherever possible, various types of aggregate measures are shown for comparison purposes. This will give the reader an overall feeling for the aggregation weighting problem, and he can pinpoint those sectors whose averages are the most sensitive to the weighting scheme involved. It is generally true that for both the concordance and aggregation problems, some sectors' averages are very sensitive to schemes used while other sectors' averages are not. These differing sector

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<sup>1/</sup> The IO-SIC has the disadvantage of over-aggregation for some manufacturing sectors and under-aggregation for others. In the latter case it was not possible to accurately match trade data to TC-SIC sectors for all traded products. However, it was possible to find reasonable tariff rates for all sectors. From the inter-industry analytical viewpoint, the TC-SIC does not cover all of the sectors in the 1963 input-output table and thus is unacceptable.

sensitivities must be kept in mind by the reader making cross-sector comparisons of protection levels and by the researcher using the various data in statistical analysis.

As much of the data as possible are presented in tabular form. Key variables for comparison also are presented in graphical form for quick visual comparison. Many of the tables are in related formats. Due to the mass of the data to be presented -- and the consequent large volume of tabular and graphic materials -- all tables and charts are presented at the end of Part I, following page 21 .

### Matching Trade, Tariff, and Production Data

In calculating tariff averages for the IO-SIC sectors, basic data on imports for consumption and Ad Valorem Equivalent (AVE) tariff rates for each TSUSA (Tariff Schedules of the United States Annotated) number were taken from Trade Commission computer tapes. They were combined in one tape, together with Post Kennedy Round (PKR) rates and concordance information relating the TSUSA to the "import based" SIC and the U.S. version of the Standard International Trade Classification (SITC). <sup>1/</sup> The final data tape had data on imports for consumption for 1965 and 1970. Data for 1970 were the most recent available when this study was initiated, and 1965 was the earliest year chosen because it minimized the extent of change in the TSUSA numbers. When the tape had been prepared, it was necessary to carry out several adjustments in order to find tariff

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<sup>1/</sup> The SITC is an official international 5-digit reporting system for trade data. It is used by most countries and by international agencies when publishing comparative trade data. The United States bases its own Schedule A import reporting codes and its Schedule B export reporting codes on the SITC. The U.S. version of the SITC refers to numbers used by the United States to report its trade data to the United Nations. These numbers differ slightly from the pure SITC in that some are not found in the official SITC and some have less than 5-digits. These exceptions are made when the United States feels that its own trade data reporting systems do not make the clear distinctions that are intended in the pure SITC.

The "import based" SIC is the version of the SIC matched to Schedule A numbers. This version is used for aggregation of U.S. import data to a SIC basis. A similar "export based" SIC is matched to Schedule B numbers for aggregating U.S. export data to a SIC base. Unfortunately, the "import based" and "export based" SIC numbers differ in some cases from the pure SIC. This occurs because product-grouped trade data do not always distinguish between similar products coming from different production sectors or processes.

Both product oriented and production activity oriented classification schemes have their own additions such as leftover categories for products or processes that can't be classified elsewhere.

rates for all IO-SIC sectors. This was done by splitting certain TSUSA numbers so that a tariff rate and some imports would be put into the IO-SIC categories that had none. The splitting procedure was somewhat arbitrary. This means that the tariff rates would be satisfactory but the corresponding import data might not be realistic for some sectors. Fortunately, very few sectors required this procedure. 1/

Finally, broad conversion factors were used to convert import data from an f.o.b. basis to a c.i.f. basis. This would make import figures a little higher and economically meaningful tariff averages a little lower. 2/

The source of data for foreign tariffs was a databank used in a previous Trade Commission study. 3/ These data were derived from a study done by the General Agreement on Tariffs and Trade (GATT) which put together, from national tariff schedules and data, a set of tariff averages for the 4-digit Brussels Tariff Nomenclature (BTN) scheme. Most major trading countries use this BTN system for their tariff schedules (the United States and Canada are two major exceptions). Thus, for a

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1/ The advantage of the TC-SIC concordance is that when trade data could not be knowledgeably assigned to two or more pure SIC categories, those SIC categories were combined. The TC-SIC is a modification of the U.S. import based and the U.S. export based SIC. The IO-SIC is a modification only of the U.S. import based SIC.

2/ There were only 20 conversion factors. These were obtained from the September 1967 issue of report FT990 which reports U.S. imports. Let: M=imports, T=tariff rate, R=tariff revenue, and C=a c.i.f. to f.o.b. conversion factor. Then  $R=T(f.o.b.) \times M(f.o.b.) = T(c.i.f.) \times M(c.i.f.)$  where  $M(c.i.f.) = M(f.o.b.) \times (1+c)$ . Thus  $T(c.i.f.) = T(f.o.b.) \times M(f.o.b.) / M(c.i.f.) = T(f.o.b.) / (1+c)$ .

3/ Trade Barriers, etc., op. cit.

meaningful comparison of U.S. and foreign protection levels, the GATT sources were relied upon since they have carried out a conversion of all tariffs to a common scheme.

The first step in the use of these data was the addition of a letter after some of the 4-digit BTN numbers. This allows a one-to-one correspondence of this new "5 digit" BTN with the SITC scheme. 1/ A concordance was then created between the pure SITC and the U.S. import based SITC. This allowed an indirect moving of GATT 4-digit BTN tariff rates to 5-digit BTN (the same 4-digit rate was applied to each 5-digit number), then to pure SITC, then to U.S. import SITC, and finally via data on the U.S. trade and tariff tape, to IO-SIC. There are possible sources of error in such a scheme. First, conversion by the GATT of U.S. and Canadian tariffs to BTN could have encountered problems. Second, the application of the same 4-digit rate to 5-digit BTN numbers suppressed any real variance in tariff rates that those 5-digit numbers might have had. The conversion of pure SITC to U.S. import-based SITC involves the same problem since the former scheme has a few more distinct numbers than the latter. Finally, the conversion from U.S. import-based SITC to IO-SIC has the problems inherent in that concordance.

Data on NTB's also came from a data file previously prepared for a Trade Commission study. 2/ It was compiled originally on a 5-digit

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1/ For a listing of the BTN (5-digit) - 5-digit SITC concordance see: Nomenclature for the Classification of Goods in Customs Tariffs, Customs Co-operation Council, 40, Rue Washington, B-1050, Brussels, Belgium, 1972.

2/ Trade Barriers, etc. op. cit.

BTN basis and was aggregated to the IO-SIC level according to the scheme described above.

As mentioned previously, tariff averages vary depending upon the weighting scheme used for aggregation. In the case of U.S. tariffs directly from U.S. sources, the study used import weighted and unweighted averages. (The import weights were 1970 imports.) 1/ Import weighted averages have the disadvantage of possibly understating the effects of high prohibitive tariffs which may cause low or zero import weights. Unweighted averages have the problem that they may count tariff rates of items that do not significantly enter trade on an equal basis with items which are heavily traded. It has been proposed that some of these difficulties might be overcome by using domestic production weights or world trade weights. However, neither was operationally available at the TSUSA level for use in this study. Thus, only import weighted and simple averages are presented for U.S. tariffs aggregated from U.S. sources. 2/ The GATT provided two tariff averages at the BTN level for its data set. One was an own-country import weighted average and the other was a simple average of line items in the countries' tariff schedules. This study takes these two starting 4-digit BTN averages and averages the results down to IO-SIC levels. Data on non-tariff

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1/ The use of 1970 imports to aggregate 1965 tariff rates added some advantages and some losses. It was an advantage to use constant weights for the 1965, 1970, and PKR rates so that one could minimize problems of tariff averages shifting due to changing weights. However, because of changes in TSUSA numbers some 1965 tariff rates were omitted in the averaging process. Hence, some 1965 rates seem to be out of line with the 1970 averages.

2/ In formulating the U.S. averages it was not possible to get away from import weighted averages at the TSUSA line item level since this method had to be used to convert many specific rates to ad valorem rates. The GATT would also have had to use some sort of import weights for this kind of conversion.

barriers were also averaged down to the IO-SIC level.

Data for the TC-SIC had the advantage of using direct concordances, which were prepared by the Trade Commission. Thus, U.S. simple tariff averages went directly from TSUSA to TC-SIC, while BTN tariffs went to SITC as outlined above and then directly to TC-SIC via a concordance. NTB measures went almost the same direct route used by the BTN-based tariffs. The TC-SIC also had the advantage of being able to convert U.S. trade directly from Schedules A and B to TC-SIC and international trade data directly from pure SITC to TC-SIC via modified official concordances.

International trade data for the IO-SIC went the same indirect route from pure SITC to IO-SIC as did the NTB data. U.S. import data went to the IO-SIC via the TSUSA TC-SIC concordance, and some export data went from the Schedule B export-based SIC to the IO-SIC.

Problems arise in the use of any concordance; the IO-SIC probably gives rise to more problems than the TC-SIC. However, the use of the data partly determines how serious the problems will be. If the objective is to correctly match trade and production data to get ratios such as imports to consumption or exports to shipments, correct and accurate concordances are essential. If the intention is to look at ratios of trade or tariff variables that have both been converted through the same imperfect concordance, then concordance errors may well cancel out, thus allowing an imperfect concordance to give meaningful ratios. For that reason, many researchers use variables such as export shares and trade

balances rather than variables that purport to be direct matches between trade and domestic production data. If variables such as import consumption ratios are used in a statistical analysis, rather than for observations of exact values, concordance defects may not greatly affect the statistical results. It is in these latter uses that this study applies concordances which might be deemed inadequate for other uses.

Comments on data procedures can be concluded with a description of the basic NTB data. The Trade Commission study made use of a databank that contained information on NTBs for several countries by product category. For each country, a matrix was created for 15 types of quantitative restrictions over 1,318 5-digit BTN numbers. The types of quantitative restrictions were: 1/

1. Bilateral quota
2. Global quota
3. Quota (unspecified)
4. Prohibited imports (embargoes)
5. State trading
6. Automatic licensing
7. Liberal licensing
8. Discretionary licensing
9. Licensing (unspecified)
10. Minimum price system
11. Seasonal restriction
12. Restriction (unspecified)
13. Export restraint
14. Suspended import restriction
15. Mixing regulation

A number "2" was placed in a cell (a particular restriction and a particular 5-digit BTN number) if the restriction applied to the entire BTN

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1/ Page 162, Vol. 4, Trade Barriers, op. cit.



number and "1" was placed there if the restriction applied to only some of the items in the BTN category. The Trade Commission report on NTB's used this type of information to create various aggregate frequency indices by broad BTN categories. This study starts with the same data and makes approximately the same type of calculation. The NTB matrix is run through the concordance, adding across restrictions and then dividing by the total number of possible restrictions in a particular SIC category (this total will be 2 times 15 restrictions times the number of BTN numbers finally ending up in a particular SIC category via the concordance). The index in a particular SIC category is then the actual number of NTB's as a percentage of the total number possible within the SIC category. Thus, the NTB indices serve as relative measures of the frequency of existence of known NTB's within various SIC categories. At a minimum, the numbers can be treated as dummy variables indicating whether or not a particular SIC category probably has some NTB's applied to it. <sup>1/</sup> To the extent that more types of restrictions against a product are associated with quantitatively stronger restrictions against the product, the NTB indices may have some quantitative dimension to them.

#### The data and analysis

The data in Tables 1 and 3 give information on levels of nominal tariff protection and on relative frequencies of NTB's for the United States and her major trading partners. Chart 1 (following Table 1) gives

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<sup>1/</sup> "Probably" is used because it may be possible, because of concordance problems, to have NTB's assigned to SIC sectors where they do not belong. This could happen because the concordance may apply the same BTN number carrying an NTB to more than one SIC sector.

tariff profiles for the United States using the PKR rates in column 4 of Table 1.

A glance at differences in the U.S. PKR tariff rates and the GATT U.S. (PKR) rates indicates that concordance and weighting problems do exist for many sectors. Caution is required when examining sectors whose US-sourced and GATT-sourced tariffs differ significantly. The U.S. rates from U.S. data probably are more nearly correct as a comparative sector by sector measure of tariff rates. However, the GATT data would be more appropriate in comparing relative U.S. and foreign rates. Table 2 and Table 4 give rank correlation matrices, ranks, and summary statistics for Table 1 and Table 2, respectively. In spite of the concordance problem, the rank correlation between the U.S. PKR (column 4) and the GATT U.S. PKR (column 5) is about 0.8 in both Tables 1 and 3. Thus, on an overall ranking basis the two measures do not differ much from each other.

Table 5 sheds some light on the weighting problem. It gives rank correlation coefficients between weighted and unweighted versions of both U.S. tariffs and GATT tariffs. The weighted and unweighted rates for U.S. tariffs rank correlate around 0.85, while the GATT rates range from 0.86 to 0.94. <sup>1/</sup> Although the differences in ranks are not large, the weighting problem (given a particular concordance) causes almost as much difference in the rankings as when rates are converted to SIC with the same weighting scheme but using a different concordance.

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<sup>1/</sup> One expects the GATT rates to be more highly correlated since weighting differences occur only in going from country tariff schedules to the BTN. Simple averaging was used from the BTN to the IO-SIC for the GATT rates for both tables 1 and 3.

There are two measures of the average tariffs and NTB frequency indices of U.S. trading partners. Columns 9 and 16 of Tables 1 and 3 are simple averages of the measures for the EEC, Canada, Japan, and the United Kingdom. Columns 10 and 17 are weighted averages of the measures of 16 countries where the weights are shares of overall U.S. exports to these countries. 1/ The rank correlation coefficients between these measures are about 0.95 both for tariffs and NTB's. Hence, either of them can serve as a good proxy for restrictions facing the United States.

The general tariff patterns between the United States and its major trading partners are moderately correlated. The rank nominal tariff pattern of the United States seems to be the most similar to Canada's and the least similar to Japan's. The same generalization holds true for NTB patterns, except that there is more variability inasmuch as the correlation coefficients between U.S. and foreign patterns range between 0.18 and 0.61. Again, the U.S. is most similar to Canada and least similar to Japan. 2/

Chart 2 gives a graphical summary of differences between U.S. and foreign tariffs. The graph presents the simple differences between the U.S. rates in column 5 and the "average" foreign rate in column 10 of Table 3.

The relation between the U.S. tariff pattern and the average foreign tariff pattern is stronger than the relationships of the U.S. pattern

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1/ See table footnote for formula.

2/ Caution must be taken not to associate the NTB frequency indices too strongly with the possible magnitudes of the NTB's. It is quite possible that a sector has only a small NTB incidence but that these particular NTB's have large economic effects.

to individual country patterns. (In the former case there is a rank correlation coefficient of about 0.63.) Also, for NTB's the correlation between the U.S. pattern and the average foreign pattern is at the upper end of the scale of country-by-country correlations. Thus, on the average there is a moderate relationship between U.S. and foreign tariff patterns and U.S. and foreign NTB incidence patterns.

It is quite significant that for each country there is a very weak relationship between its own tariff patterns and the NTB incidence pattern. The relationship is weak but positively significant for the EEC and Japan. The relationship is not statistically significant for the United States and Canada, using weighted tariffs. There is a weak positive relationship for the United States when unweighted tariff averages are used.

Table 6 gives unweighted averages of U.S. and foreign tariffs by TC-SIC. Table 7 gives the rank correlations, ranks, and summary statistics of the variables in Table 6. The U.S. tariff rates were converted directly from TSUSA to TC-SIC, the GATT rates and the NTB indices were converted from 4-digit BTN to 5-digit BTN to pure SITC and then directly to TC-SIC via a newly created concordance. Therefore, the GATT rates for some sectors differ from those by IO-SIC in Table 4.

For the TC-SIC, the rank correlation of U.S. tariff rates and NTB frequency indices is slightly positive and a bit stronger than in the

data by IO-SIC. Other general relationships between tariff rates (United States and foreign) and NTB's seem to hold statistically about the same as indicated with the IO-SIC data.

On an overall basis, the data indicate that countries' tariff patterns are moderately similar, countries' NTB patterns are moderately similar, but countries' own tariff and NTB patterns are not.













Table 1.--Nominal tariff rates and non-tariff barrier indices for major trading areas--Cont.

(Using trade weighted averages)

IO-SIC	SECTOR DESCRIPTION (PURE SIC)	U.S. TARIFFS (PERCENT) (DIRECTLY FROM TSUSA)			GATT TARIFF AVERAGES (PERCENT)						NON-TARIFF BARRIER INDICES (PERCENT OF TOTAL POSSIBILITIES)							
		1965	1970	PKR	US	EEC	CAN-ADA	JAP-JAN	CAN-UK	FOR-LIGN	EEC	CAN-ADA	JAP-JAN	UK	CAN-UK	FOR-LIGN		
																	11	12
3972	WATCHCASES-----	(3972)	43.0	25.8	19.8	21.4	6.5	20.0	15.2	14.7	13.3	0.0	0.7	0.0	0.0	0.0	0.4	0.0
3911	JEWELRY, PRECIOUS METAL-----	(3911)	23.8	16.2	11.9	14.7	7.8	12.3	15.4	11.6	10.7	0.0	1.1	0.0	1.3	0.0	0.8	0.4
3912	JEWELRY, FINDINGS & MATERIALS-----	(3912)	17.7	26.3	18.8	12.7	9.4	14.4	14.9	12.4	11.9	0.0	0.4	0.0	2.2	0.0	0.0	0.6
3913	LAPIDARY WORK-----	(3913)	7.5	5.1	3.7	7.0	2.2	3.3	5.3	3.7	3.2	0.0	0.0	0.0	0.0	0.0	0.5	0.2
3914	SILVERWARE & PLATED WARE-----	(3914)	13.1	11.1	10.2	10.7	11.2	13.3	11.5	13.1	12.1	0.0	1.4	0.0	2.7	0.0	1.5	0.9
3931	MUSICAL INSTRUMENTS & PARTS-----	(3931)	19.0	13.9	10.5	8.8	8.1	12.7	9.0	10.5	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3941	GAMES & TOYS-----	(3941)	29.7	20.4	14.9	11.1	10.1	16.2	11.6	11.9	12.2	0.7	0.9	0.7	0.0	0.0	0.7	0.4
3942	TOYS-----	(3942)	30.7	21.8	16.5	10.6	11.0	16.1	11.0	12.4	12.6	0.4	1.6	0.4	0.0	0.1	1.1	0.6
3943	CHILDREN'S VEHICLES, EXCEPT TRICYCLES-----	(3943)	14.4	9.8	7.2	12.2	11.6	16.5	7.5	11.7	12.3	0.0	2.0	0.0	0.0	0.0	1.3	0.5
3949	SPORTING & ATHLETIC GOODS, N.E.C.-----	(3949)	16.8	12.1	9.5	9.3	8.6	15.8	11.3	12.3	11.9	0.4	0.3	0.0	0.0	0.0	0.2	0.0
3951	PENS & MECHANICAL PENCILS-----	(3951)	28.9	20.4	14.7	10.0	8.4	13.0	11.6	10.9	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3952	LEAD PENCILS & ART GOODS-----	(3952)	14.8	10.4	7.8	8.1	8.2	16.6	11.1	11.2	11.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3953	MARKING DEVICES-----	(3953)	18.4	14.4	10.4	11.3	8.4	15.2	14.5	11.7	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3954	CARBON PAPER & INKED RIBBONS-----	(3954)	6.6	4.2	3.1	4.8	13.0	10.5	7.1	11.8	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3961	COSTUME JEWELRY-----	(3961)	31.5	24.3	18.5	13.0	9.0	11.2	10.5	10.1	9.4	0.9	0.7	0.0	0.0	0.0	0.4	0.2
3962	FEATHERS, PLUMES & ARTIFICIAL FLOWERS-----	(3962)	23.7	21.0	18.6	9.0	12.8	14.6	12.0	12.7	12.8	1.3	1.6	1.5	0.0	0.0	1.2	0.9
3963	BUTTONS-----	(3963)	15.3	17.4	15.4	16.4	12.6	22.4	11.5	16.6	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3964	NEEDLES, PINS, & FASTENERS-----	(3964)	28.4	17.2	13.3	9.8	7.2	15.9	11.1	11.4	11.1	0.0	0.0	0.0	1.8	0.0	0.7	0.5
3971	ROOMS & BRUSHES-----	(3971)	19.2	13.8	10.2	9.5	9.7	9.3	7.3	9.7	9.1	0.0	0.5	0.0	0.0	0.0	0.3	0.0
3972	HARD SURFACE FLOOR COVERINGS-----	(3972)	13.2	8.2	5.9	5.6	11.0	20.0	8.8	12.4	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3983	MATCHES (SIC 3999 IN 1967)-----	(3983)	17.1	9.6	7.0	9.1	8.3	12.6	3.8	8.1	8.6	3.3	1.3	1.7	0.0	0.0	1.0	0.0
3984	CANDLES (SIC 3999 IN 1967)-----	(3984)	18.4	12.9	9.2	10.0	8.0	20.0	7.5	11.4	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3984	MORTICIANS' GOODS-----	(3984)	17.3	12.1	8.8	8.9	7.5	4.8	11.3	8.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3993	SIGNS & ADVERTISING DISPLAY-----	(3993)	17.5	10.6	7.8	9.5	7.5	9.5	10.0	9.3	8.7	0.0	0.7	0.0	0.0	0.0	0.0	0.0
3995	UMBRELLAS, PARASOLS & CANES (SIC 3999 IN 1967)-----	(3995)	18.5	18.4	18.3	17.2	12.2	12.8	10.1	12.1	12.1	0.0	1.6	0.0	0.0	0.0	1.0	0.3
3999	MANUFACTURES, N.E.C.-----	(3999)	15.1	9.7	7.1	6.6	5.5	8.2	7.4	7.0	6.7	0.1	0.3	0.1	0.3	0.0	0.3	0.1
4101	SCREW MACHINE PRODUCTS-----	(3451)+																
	BOLTS, NUTS, SCREWS, RIVETS, & WASHERS-----	(3452)+	7.7	5.4	4.1	5.1	7.3	12.9	6.3	9.2	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4204	VALVES & PIPE FITTINGS-----	(3494)+																
	FABRICATED PIPE & FABRICATED PIPE FITTINGS-----	(3498)+	14.1	9.2	8.1	6.8	8.7	9.4	10.2	9.5	9.0	0.0	0.2	0.0	0.0	0.0	0.2	0.1
4703	SPECIAL Dies & TOOLS, DIE SETS-----	(3544)+																
	MACHINE TOOL ACCESSORIES-----	(3545)+	13.6	10.8	7.8	9.9	6.2	13.1	8.1	9.2	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4503	CURRENT-CARRYING WINDING DEVICES-----	(3643)+																
	INDUCENT-CARRYING WINDING DEVICES-----	(3644)+	15.0	10.6	7.7	10.6	7.9	17.1	9.2	10.7	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5701	RADIO & TELEVISION TUBE ELECTRON TUBES, EXCEPT CATHODE RAY-----	(3671)+																
	CATHODE RAY PICTURE TUBES-----	(3672)+																
	TRANSMITTING, INDUSTRIAL & SPECIAL PURPOSE ELECTRON TUBES-----	(3673)+	11.5	8.9	6.4	7.5	13.8	5.4	14.1	12.6	10.6	0.0	2.7	6.7	3.3	0.0	2.4	1.3

Source: Compiled from data at the Trade Commission. IO-SIC refers to the Input-Output related Standard Industrial Classification as defined in the 478 sector 1963 U.S. input-output table. Pure SIC refers to the pure SIC codes that are found in the definition of the SIC in 1967. PKR refers to Post-Kennedy-Round tariff rates. The GATT tariff averages and non-tariff barrier indices come from data compiled for previous study: Trade Barriers, Report to Subcommittee on International Trade, U.S. Tariff Commission Pub. 665, Washington, D.C., April 1974.

Note: The U.S. tariffs used 1970 imports as averaging weights. The GATT tariffs use own-country import weights to average to the 4 digit BTN level; no weighting is used to aggregate down to the IO-SIC level.

The GATT rates are PKR rates.

Columns 9 and 16 contain averages of the average tariffs and NTB indices, respectively, for the EEC, Canada, Japan, and the United Kingdom.

Columns 10 and 17 contain weighted averages of the tariffs and NTBs respectively, of several countries. The weights were total shares of 1970 U.S. exports to these countries. If  $\bar{t}$  ave. denotes a tariff average, the averaging formula is as follows (the same one was used for NTBs):

$t_{ave} = 0.034t_{Australia} + 0.0025t_{Austria} + 0.328t_{Canada} +$   
 $0.0084t_{Denmark} + 0.0433t_{Belgium} + 0.0608t_{Netherlands}$   
 $+ 0.0547t_{France} + 0.0966t_{Germany} + 0.0494t_{Italy} + 0.0040t_{Ireland}$   
 $+ 0.1707t_{Japan} + 0.0061t_{Norway} + 0.0047t_{Portugal} + 0.02t_{Sweden}$   
 $+ 0.0237t_{Switzerland} + 0.0913t_{United\ Kingdom}.$

The weights sum to unity.

The IO-SIC sectors presented are those which had trade data assigned to them. IO-SIC sectors which do not produce goods are not shown here but are shown in Appendix D.

CHART 1

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates

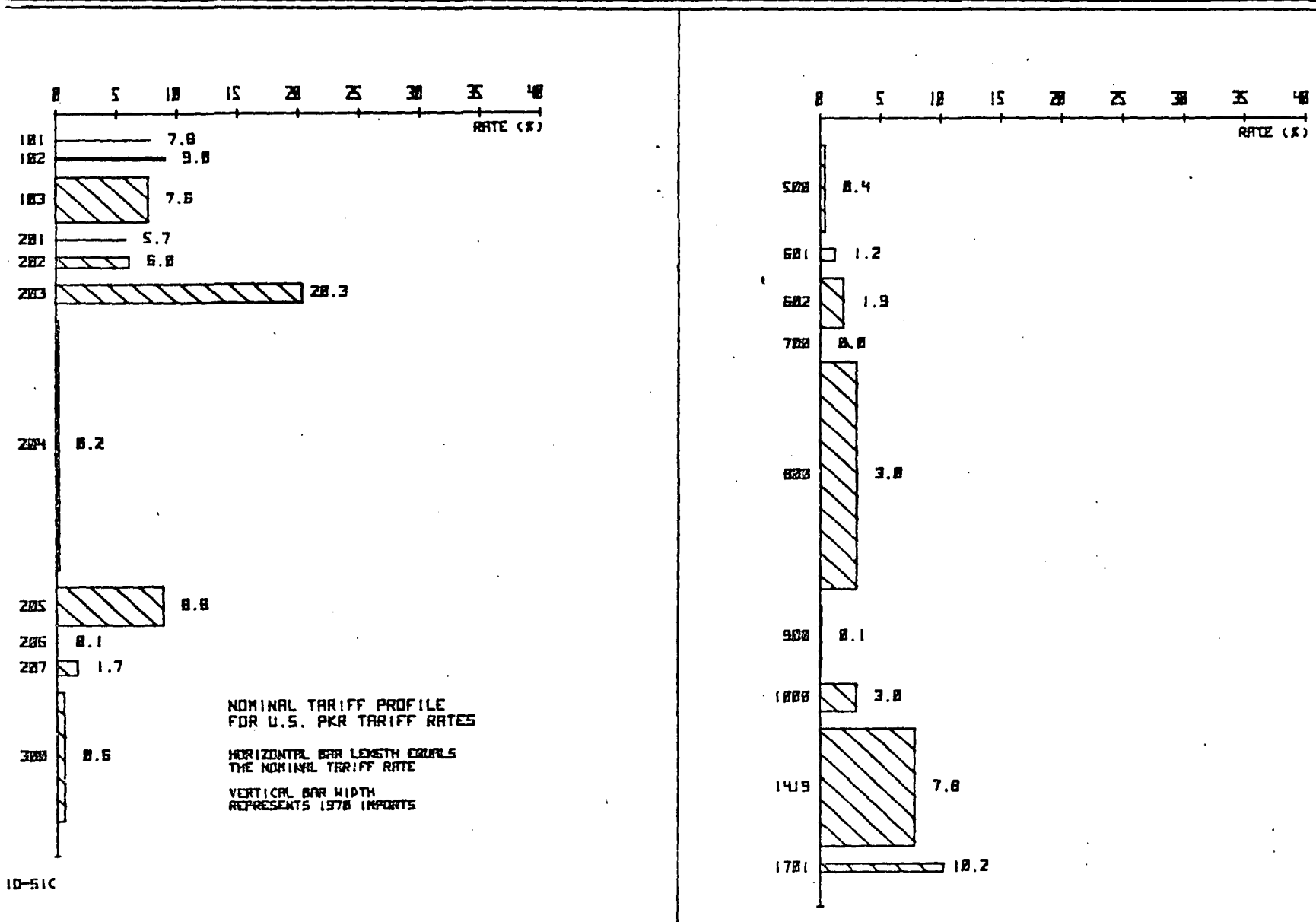


CHART 1--Cont.

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates

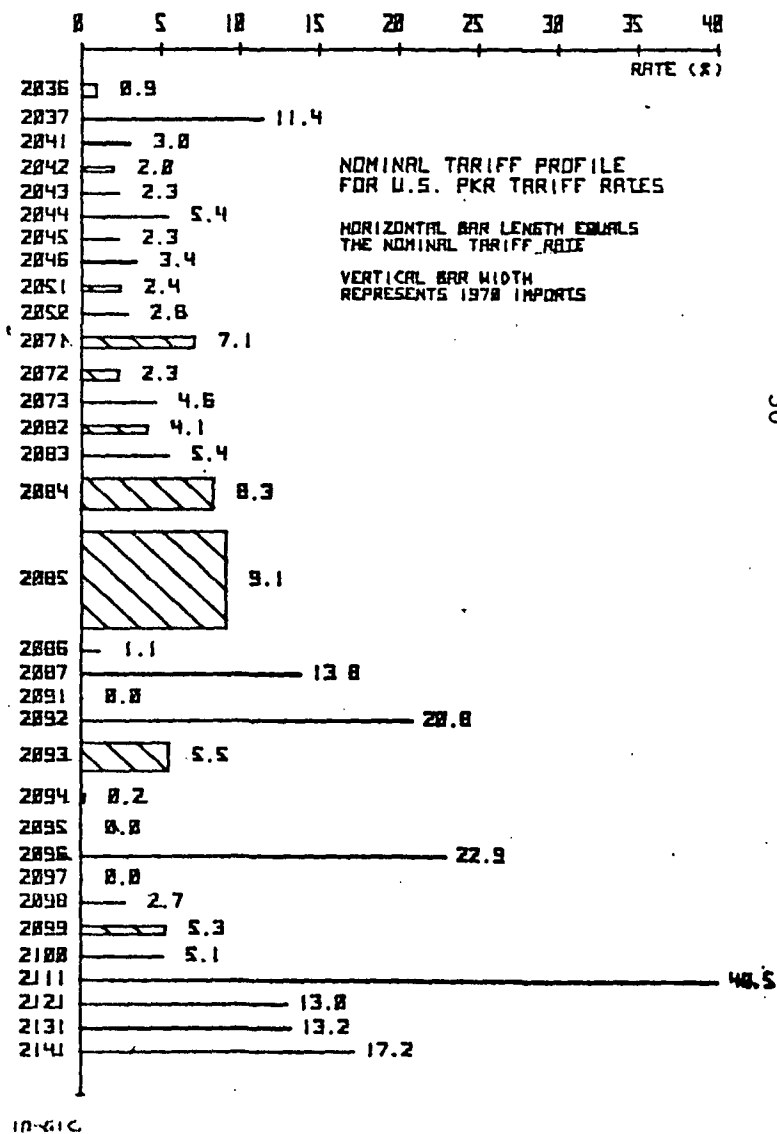
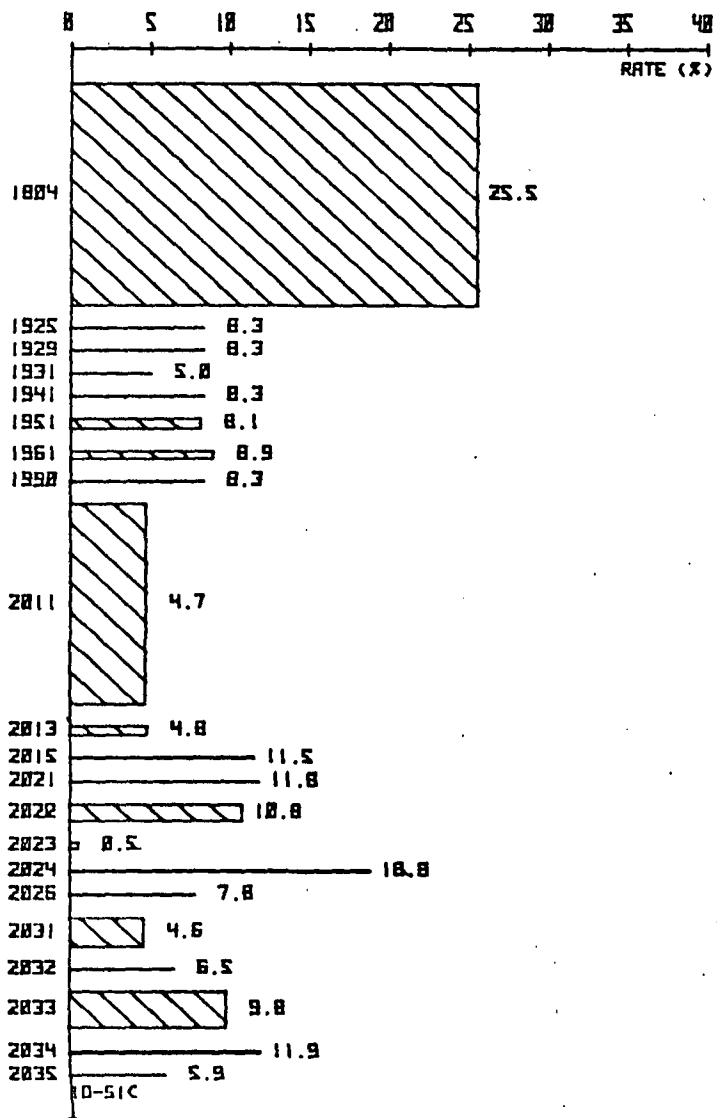
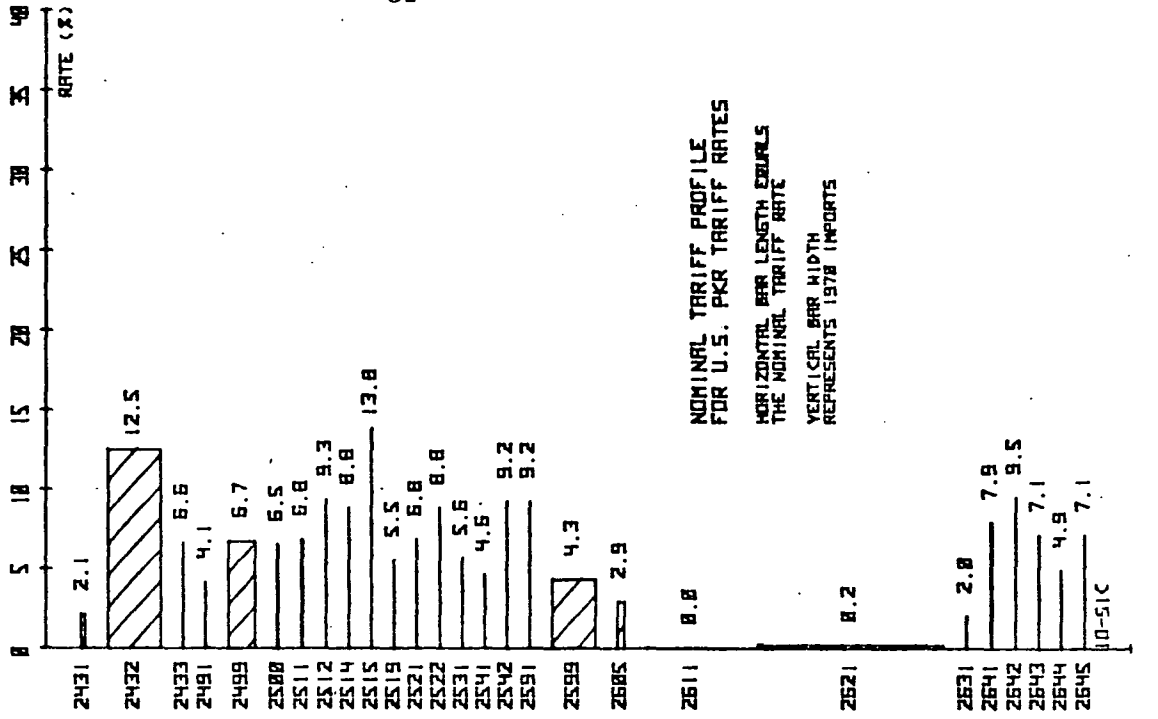
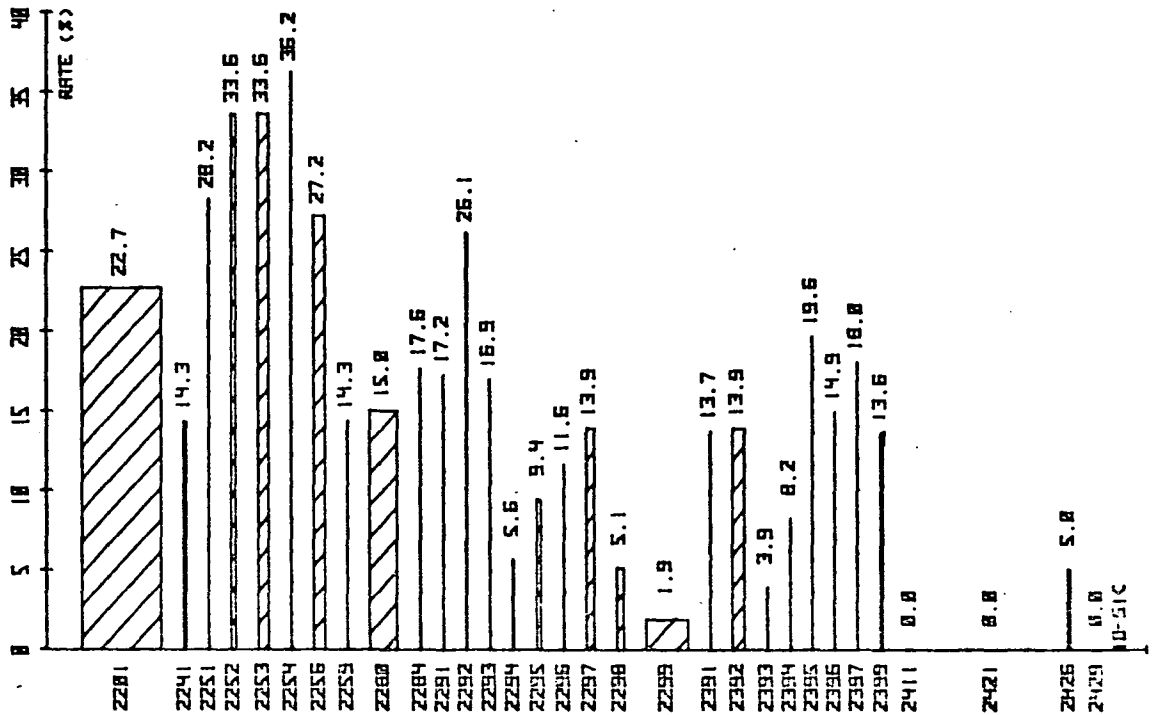


CHART 1--Cont.

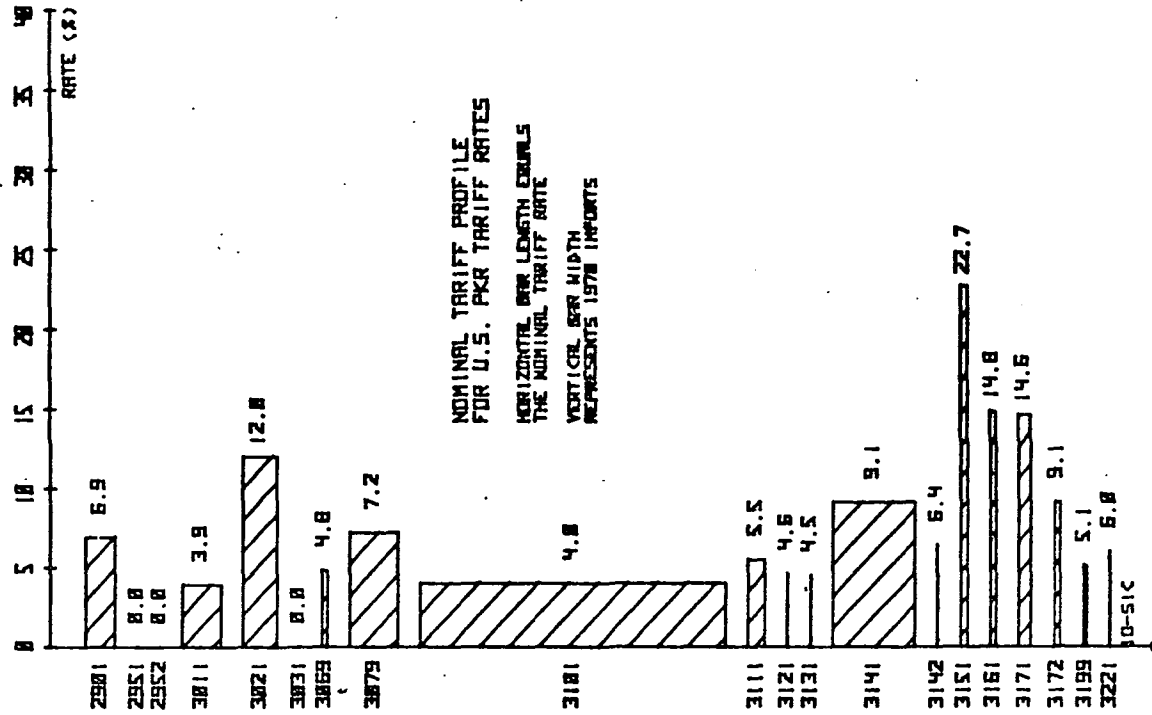
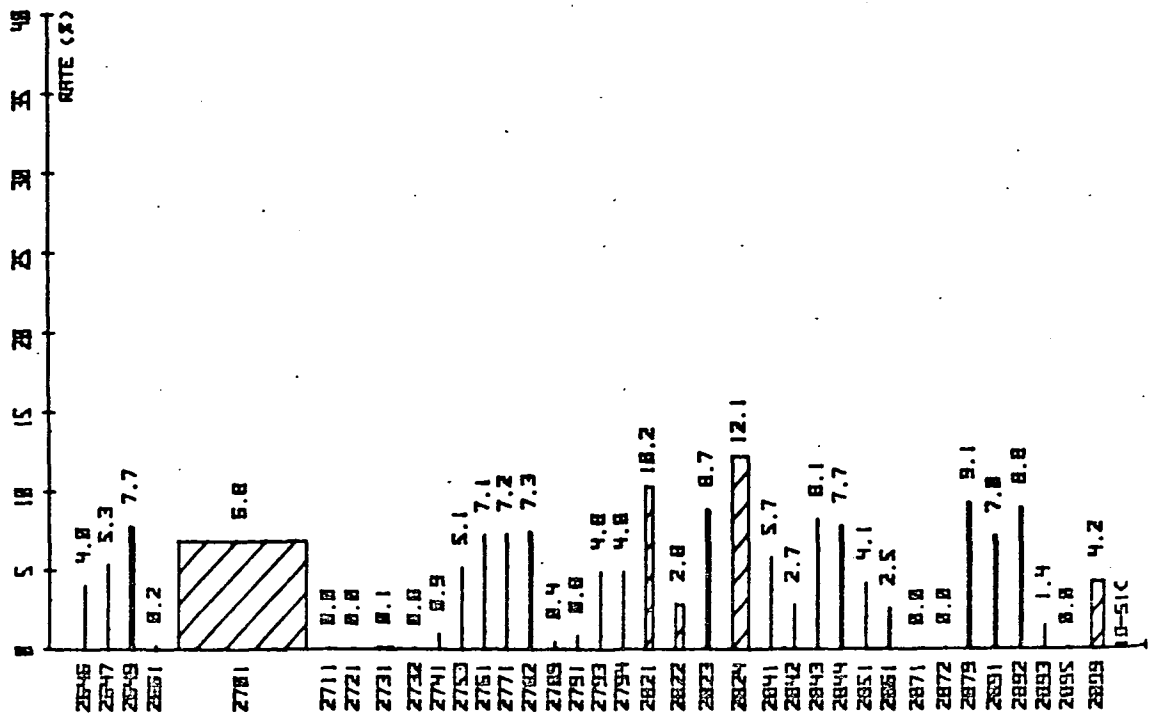
Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates



NOMINAL TARIFF PROFILE  
FOR U.S. PKR TARIFF RATES  
HORIZONTAL BAR LENGTH EQUALS  
THE NOMINAL TARIFF RATE  
VERTICAL BAR WIDTH  
REPRESENTS 1978 IMPORTS

CHART 1--Cont.

Nominal tariff profiles for U.S. Post Kennedy-Round (PKR) tariff rates

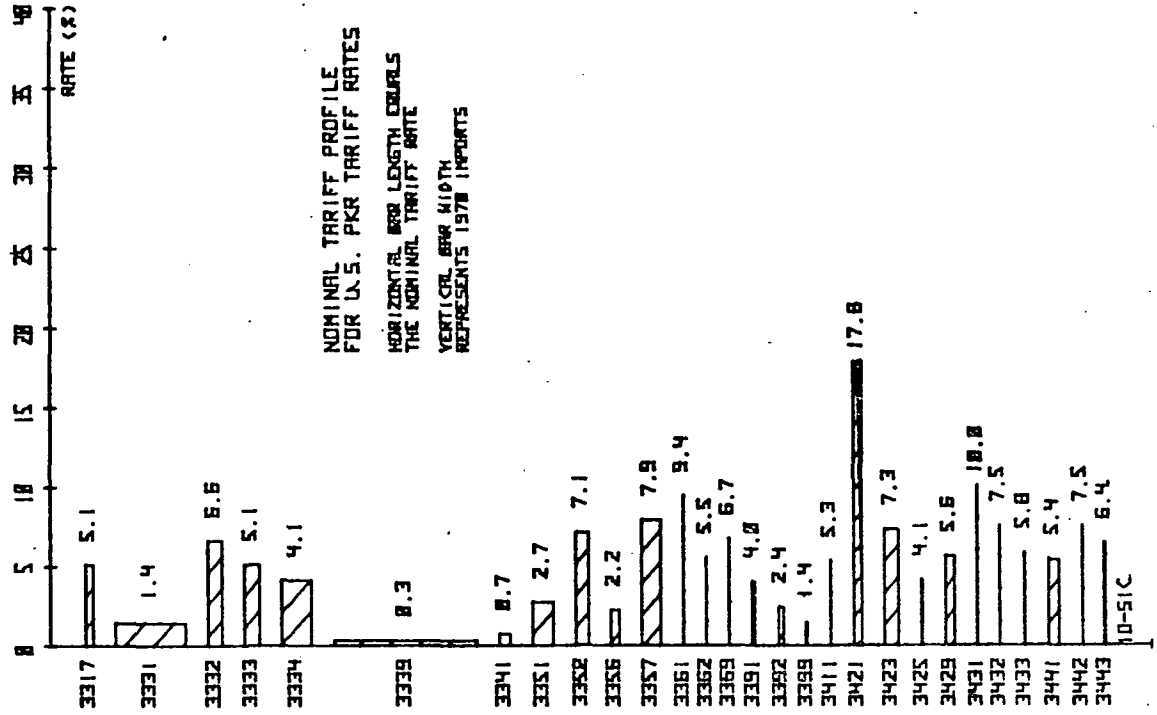
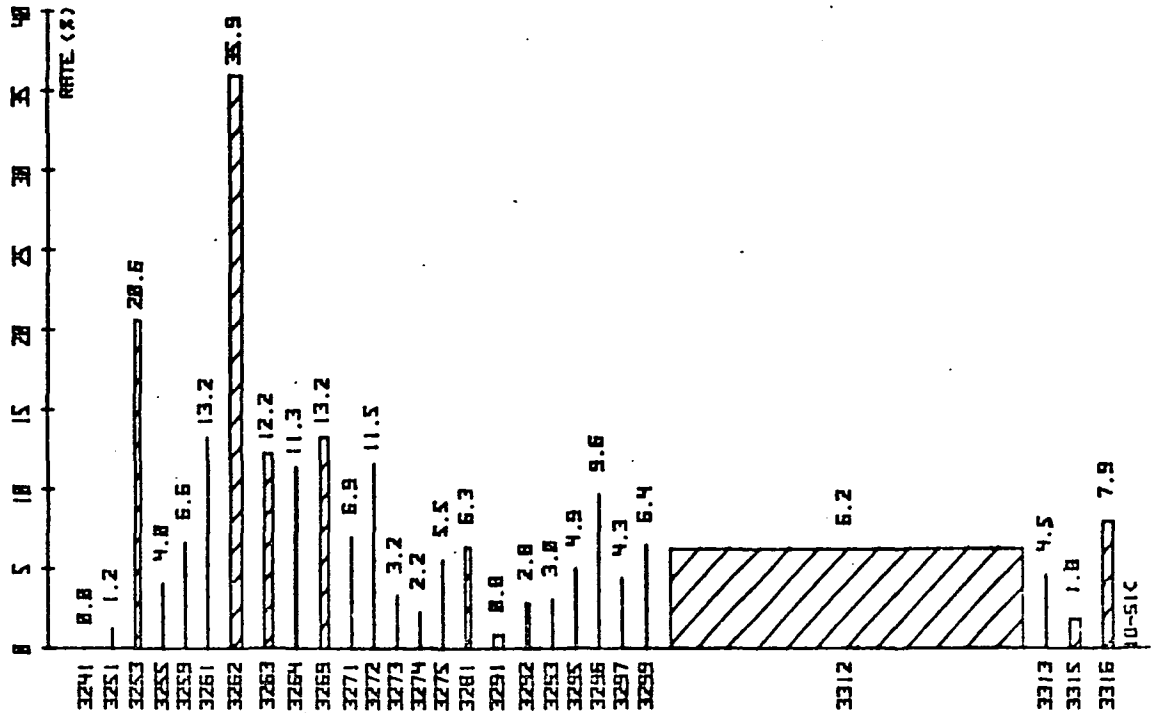


NOMINAL TARIFF PROFILE  
FOR U.S. PKR TARIFF RATES  
HORIZONTAL BAR LENGTH CORRELATES  
THE NOMINAL TARIFF RATE  
VERTICAL BAR WIDTH  
REPRESENTS 1978 IMPORTS



CHART 1--Cont.

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates



NOMINAL TARIFF PROFILE  
FOR U.S. PKR TARIFF RATES

HORIZONTAL BAR LENGTH CORRELATES  
THE NOMINAL TARIFF RATE

VERTICAL BAR WIDTH  
REPRESENTS 1978 IMPORTS

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates

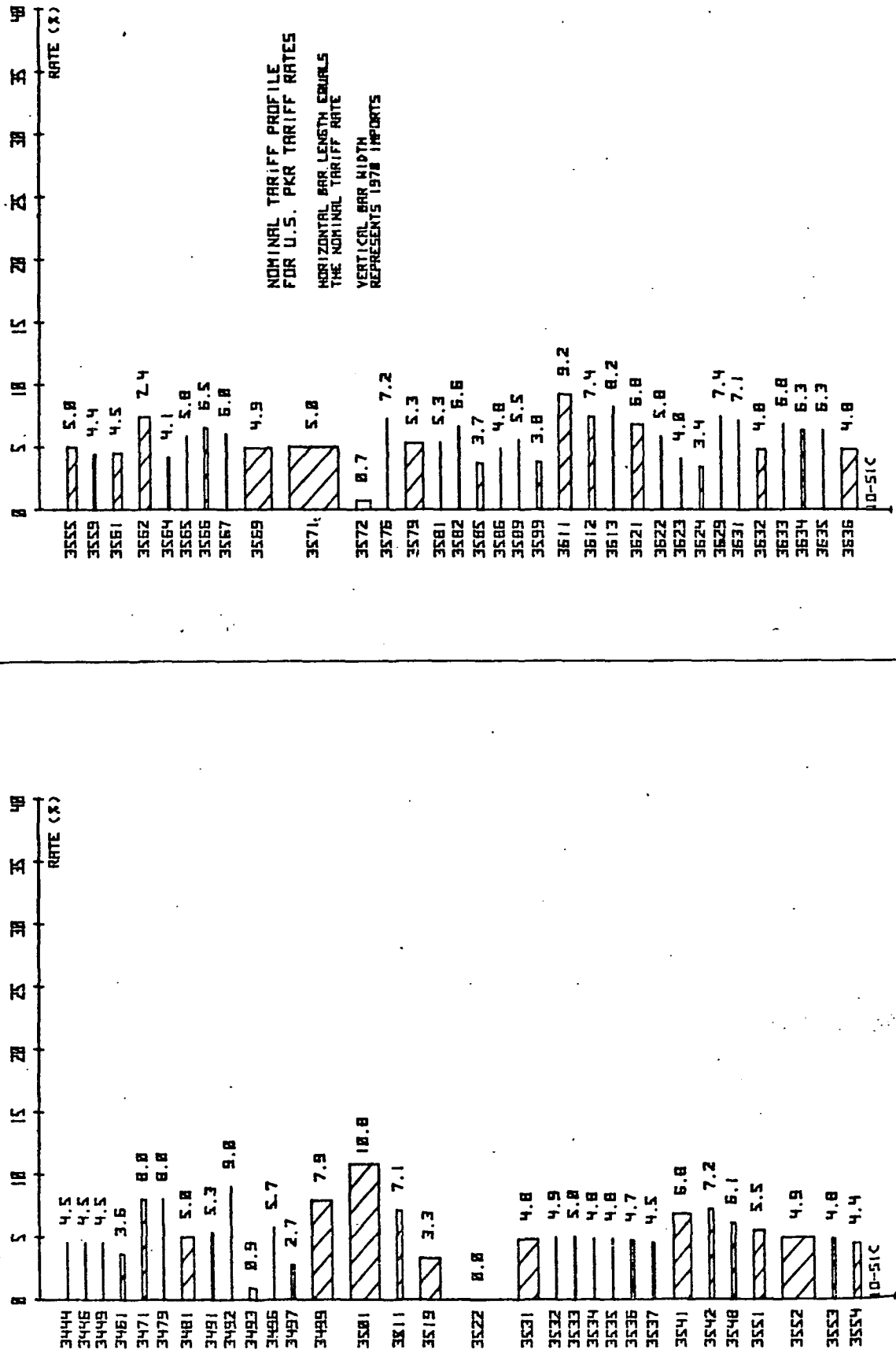
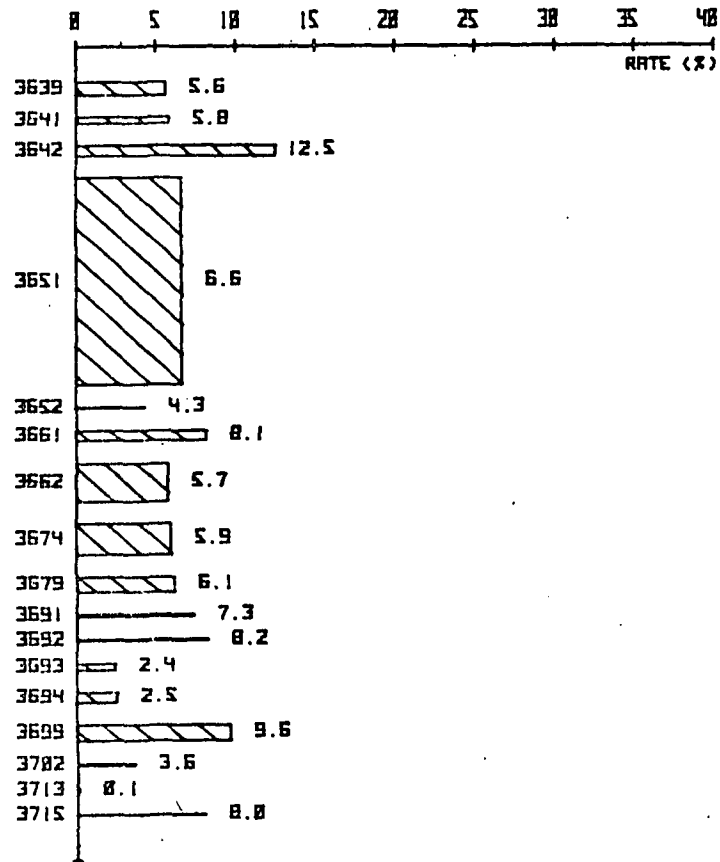
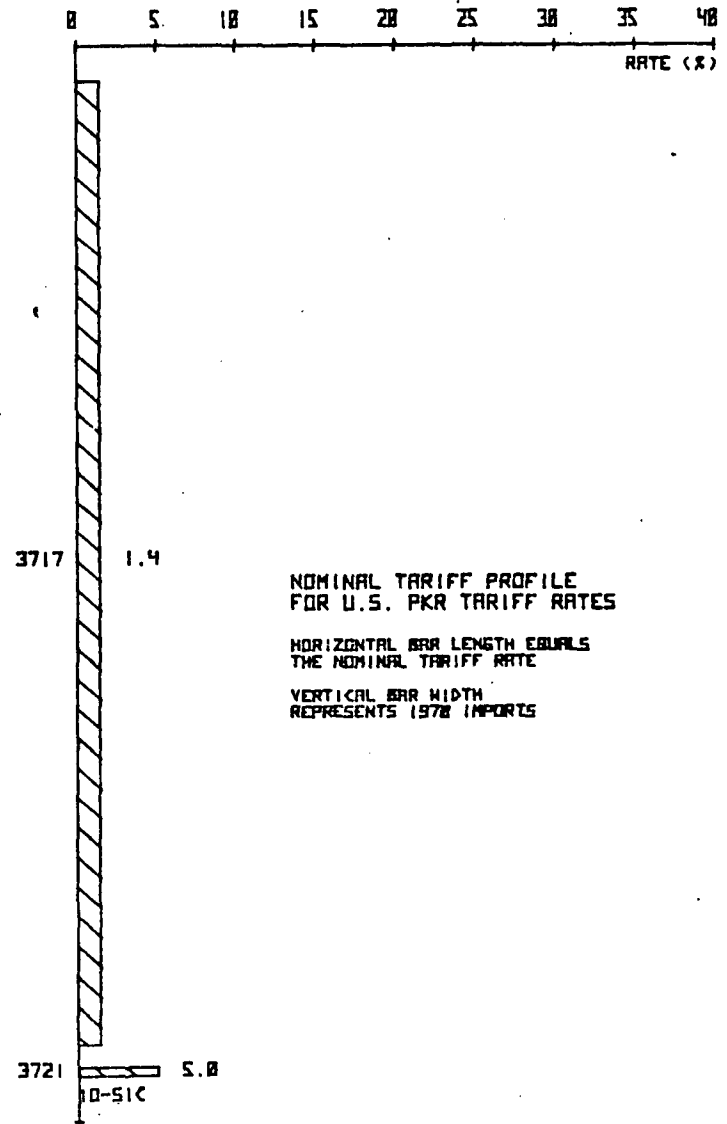


CHART 1--Cont.

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates



10-SIC



NOMINAL TARIFF PROFILE  
FOR U.S. PKR TARIFF RATES

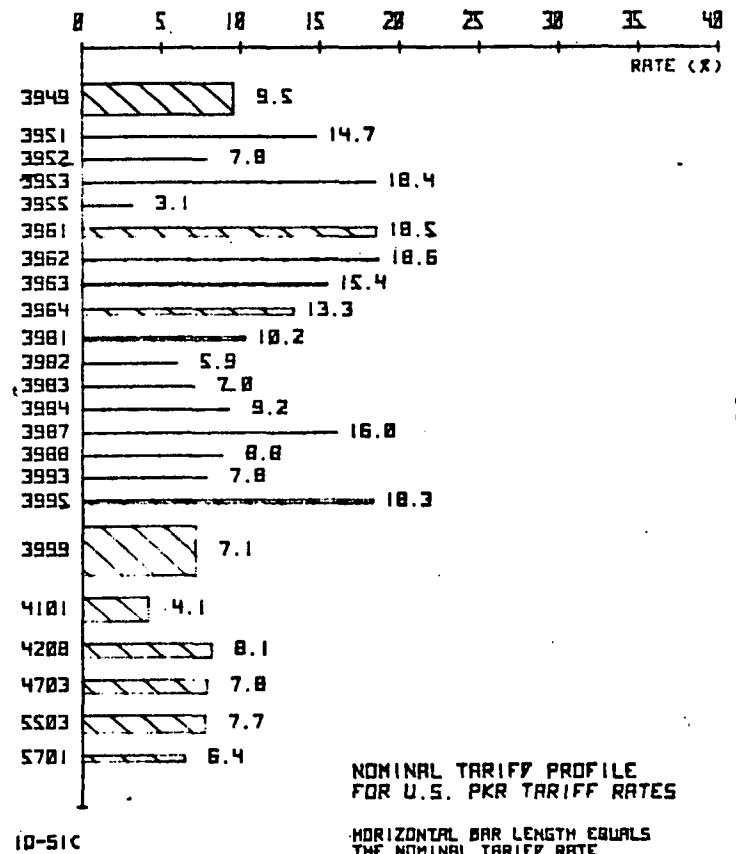
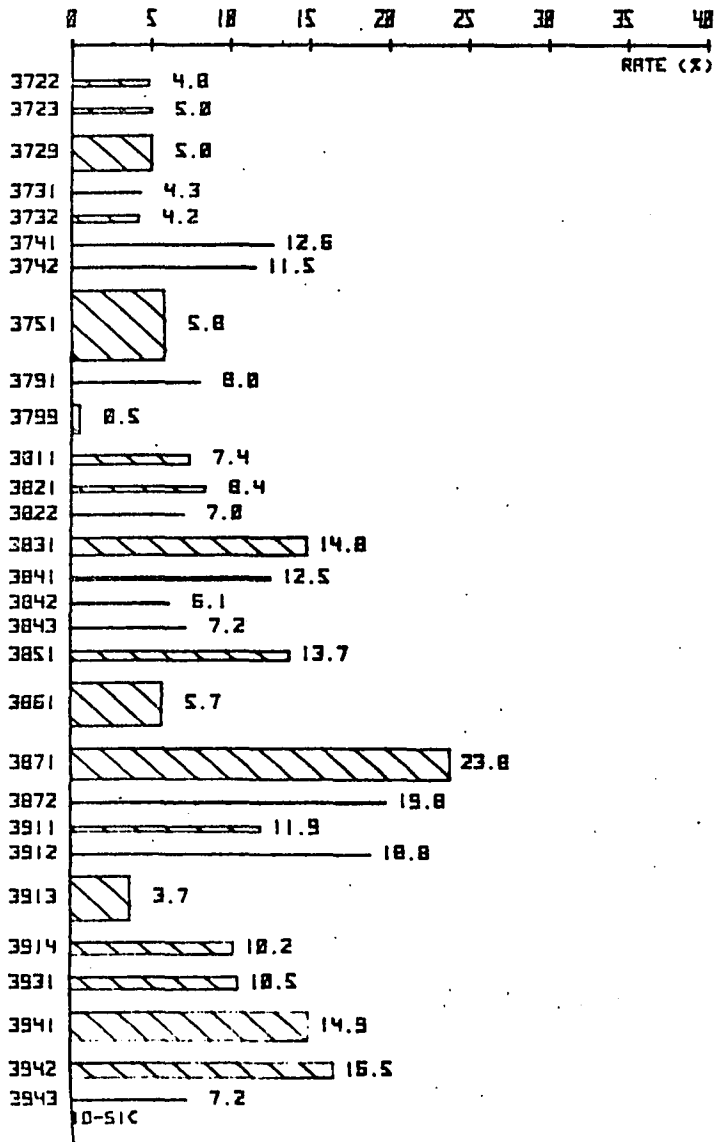
HORIZONTAL BAR LENGTH EQUALS  
THE NOMINAL TARIFF RATE

VERTICAL BAR WIDTH  
REPRESENTS 1978 IMPORTS

10-SIC

CHART 1--Cont.

Nominal tariff profiles for U.S. Post-Kennedy-Round (PKR) tariff rates



NOMINAL TARIFF PROFILE FOR U.S. PKR TARIFF RATES

HORIZONTAL BAR LENGTH EQUALS THE NOMINAL TARIFF RATE

VERTICAL BAR WIDTH REPRESENTS 1978 IMPORTS

Source: The PKR nominal tariff rates come from column 4 of Table 1. The 1970 import weights that are represented by bar widths were calculated from data of the U.S. International Trade Commission.

Note: Tariff profiles are intended as visual aids in summarizing average tariff weights and the amount of trade affected by those tariff weights. The shaded area of the bar roughly represents the duty collected on imported goods that are thought to be competitive with U.S. products.













Source: Compiled at the U.S. International Trade Commission.

Note.--The numbers in parentheses refer to the column numbers of the data in the previous table.

The short abbreviated names at the beginning of the table and in the summary statistics are assigned names of the variables in the Trade Commission computer databank.

Data with identical values are given the same rank. Tied ranks are adjusted for in the Spearman rank correlation coefficient tabulations.













Table 3.--Nominal tariff rates and non-tariff  
barrier indices for major trading areas--Cont.

(Using simple tariff averages)

10- SIC	SECTOR DESCRIPTION  (SIC)	U.S. TARIFFS (PERCENT) (DIRECTLY FROM 15USA)			GATT TARIFF AVERAGES (PERCENT)						NON-TARIFF BARRIER INDICES (PERCENT OF TOTAL POSSIBILITIES)									
		1965	1970	PKN	EEC CAN- JAI- US EEC ADA AM UK WTD.				US	CAN- JAI- EEC ADA AM		CAN FOR- JAI EFTA UK UK WTD.								
					5	6	7	8		9	10	11	12	13	14	15	16	17		
3872	WATCHCASES-----	(3872)	38.0	26.5	18.9	20.1	6.5	20.0	17.5	15.5	13.8	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3911	JEWELRY, PRECIOUS METAL-----	(3911)	44.8	29.0	17.2	16.2	8.8	9.7	17.4	11.5	10.5	0.0	1.1	0.0	1.3	0.0	0.0	0.0	0.0	0.0
3912	JEWELRY, FINISHED & MATERIALS-----	(3912)	39.5	27.5	19.8	15.8	10.2	11.1	10.1	12.6	11.7	0.0	0.4	0.0	2.2	0.0	0.0	0.0	0.0	0.0
3913	LAPIDARY WORK-----	(3913)	11.2	7.7	5.4	10.7	3.6	2.9	6.1	5.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3914	SILVERWARE & PLATED WARE-----	(3914)	28.8	18.4	12.8	17.4	10.5	11.0	17.1	13.5	12.0	0.0	1.9	0.0	2.7	0.0	0.0	0.0	0.0	0.0
3931	MUSICAL INSTRUMENTS & PARTS-----	(3931)	15.8	10.9	8.2	9.4	8.0	11.8	8.7	10.2	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3941	GAMES & TOYS-----	(3941)	27.0	18.0	13.0	11.6	10.9	14.4	11.2	12.2	12.5	0.0	0.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3942	DOLLS-----	(3942)	28.3	20.7	16.2	10.6	10.5	13.7	12.1	11.8	11.7	0.4	1.6	0.4	0.0	0.0	0.1	0.1	0.0	0.0
3943	CHILDREN'S VEHICLES, EXCEPT BICYCLES-----	(3943)	12.4	8.8	6.4	10.6	12.3	13.3	7.5	11.1	11.4	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3949	SPORTING & ATHLETIC GOODS, N.E.C.--	(3949)	15.0	11.0	8.6	9.8	8.0	13.4	11.4	12.0	11.5	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3951	PENS & MECHANICAL PENCILS-----	(3951)	18.2	20.5	16.1	12.4	7.7	13.1	17.7	11.1	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3952	LEAD PENCILS & ART GOODS-----	(3952)	13.5	11.6	7.3	10.5	7.5	13.5	11.3	10.8	10.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3953	MARKING DEVICES-----	(3953)	18.4	18.4	18.4	14.7	6.8	14.7	14.5	11.2	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3955	CARBON PAPER & INKED PAPER-----	(3955)	6.9	4.3	3.2	5.4	13.2	10.3	7.1	11.4	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3961	COSMETIC JEWELRY-----	(3961)	27.9	21.2	16.9	14.1	9.4	8.9	13.1	10.5	9.6	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3962	FEATHERS, PLUMES & ARTIFICIAL FLOWERS-----	(3962)	18.5	13.8	11.4	11.8	12.1	16.3	12.0	13.1	13.3	1.3	1.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0
3963	BUTTONS-----	(3963)	17.3	15.0	11.9	17.5	11.5	19.5	9.4	12.8	13.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3964	BEEDLES, PIPS, & FASTENERS-----	(3964)	29.8	19.7	15.2	15.8	7.3	12.5	11.8	10.9	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3981	BROOMS & BRUSHES-----	(3981)	22.5	28.3	18.7	22.5	9.2	9.1	8.0	9.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3982	HARD SURFACE FLOOR COVERINGS-----	(3982)	13.9	7.4	5.5	7.8	11.0	19.6	8.0	12.5	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3983	MATCHES (SIC 1989 IN 1967)-----	(3983)	6.2	6.4	7.3	6.8	8.3	13.0	10.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3984	CANDLES (SIC 1999 IN 1967)-----	(3984)	18.4	12.9	9.2	10.0	8.0	20.0	7.5	11.4	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3988	MORTICIAN'S GOODS-----	(3988)	16.1	11.3	8.3	9.1	7.5	6.1	12.5	9.6	7.9	0.0	0.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0
3993	SIGNS & ADVERTISING DISPLAY-----	(3993)	17.5	6.1	4.5	4.5	7.5	13.5	10.0	10.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3995	UMBRELLAS, PARASOLS & CANES (SIC 1999 IN 1967)-----	(3995)	21.6	18.9	17.2	16.9	11.1	10.7	13.3	12.1	11.6	0.0	1.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0
3999	MANUFACTURE, N.E.C.--	(3999)	21.3	15.4	11.5	8.5	5.5	7.7	8.0	7.1	6.7	0.1	0.5	0.1	0.5	0.0	0.3	0.1	0.1	0.1
4101	SCHW-MACHINE PRODUCTS-----	(3451)++																		
	NUTS, NUTS, SCREWS, RIVETS, & WASHERS-----	(3452)++																		
4208	VALVES & PIPE FITTINGS-----	(3494)++	12.6	8.8	6.7	6.4	6.8	13.5	10.6	10.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FABRICATED PIPE & FABRICATED PIPE FITTINGS-----	(3498)++	12.2	7.3	6.3	8.1	8.4	7.0	10.1	9.0	8.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4703	SPECIAL DIES & TOOLS, DIE SETS-----	(3544)++																		
	MACHINE TOOL ACCESSORIES & MEASURING DEVICES-----	(3545)++	15.7	13.6	10.6	9.8	6.1	13.2	8.5	9.8	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5503	CURRENT-CARRYING WIRING DEVICES-----	(3643)++																		
	NONCURRENT-CARRYING WIRING DEVICES-----	(3644)++	29.1	18.4	13.8	13.7	7.9	14.6	9.2	10.4	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5701	RADIO & TELEVISION TYPE ELECTRON TUBES, EXCEPT CATHODE RAY-----	(3671)++																		
	CATHODE RAY PICTURE TUBES-----	(3672)++																		
	TRANSMITTING, INDUSTRIAL & SPECIAL PURPOSE ELECTRON TUBES-----	(3673)++	12.2	10.7	8.1	10.5	9.8	8.8	12.7	9.7	8.5	0.0	2.7	6.7	3.5	0.0	2.7	5.5	0.0	0.0

Source: See table 1.

Note: The non-tariff barrier indices are exactly the same as those presented in table 1. They are given again so that the reader may compare the frequency of non-tariff barriers with average tariff levels.











Table 5.--Rank correlation coefficients between the import weighted and unweighted tariffs in tables 1 and 3

VARIABLE	(NO)	(FOR 378 OBSERVATIONS)
USTT6570	( 2)	
USTT7070	( 3)	
USTTPK70	( 4)	
USUT65	( 5)	
USUT70	( 6)	
USUTPK	( 7)	

SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)
( 2)	*****	0.922	0.839	0.877	0.810	0.764
( 3)	46.310	*****	0.938	0.829	0.856	0.813
( 4)	29.934	52.639	*****	0.745	0.790	0.843
( 5)	35.462	28.781	21.601	*****	0.925	0.864
( 6)	26.785	32.046	25.008	47.100	*****	0.905
( 7)	22.964	27.054	30.376	33.251	41.307	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 376

VARIABLE	(NO)	(FOR 374 OBSERVATIONS)
GWNTUS	( 2)	
GWNTFC	( 3)	
GWNTCAN	( 4)	
GWNTJAP	( 5)	
GWNTFCJU	( 6)	
GWNTACTY	( 7)	
GUNTUS	( 8)	
GUNTEFC	( 9)	
GUNTCAN	(10)	
GUNTJAP	(11)	
GUNTEFCJU	(12)	
GUNTACTY	(13)	

SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)
( 2)	*****	0.510	0.569	0.430	0.636	0.632	0.860	0.505	0.562	0.388	0.624	0.618
( 3)	11.448	*****	0.448	0.435	0.747	0.735	0.522	0.956	0.438	0.448	0.723	0.726
( 4)	13.344	9.674	*****	0.372	0.782	0.861	0.488	0.460	0.919	0.339	0.725	0.786
( 5)	9.198	9.324	7.720	*****	0.686	0.618	0.457	0.446	0.417	0.915	0.686	0.638
( 6)	15.892	21.683	24.192	18.161	*****	0.979	0.607	0.742	0.774	0.638	0.949	0.947
( 7)	15.731	20.926	32.701	15.156	92.492	*****	0.588	0.729	0.827	0.578	0.926	0.948
( 8)	32.558	11.815	10.778	9.922	14.745	14.006	*****	0.542	0.509	0.447	0.622	0.605
( 9)	11.290	62.689	9.982	9.617	21.363	20.459	12.449	*****	0.461	0.469	0.760	0.767
(10)	13.105	9.389	45.110	8.840	23.582	28.364	11.412	10.020	*****	0.368	0.771	0.836
(11)	8.120	9.677	6.950	43.725	15.956	13.672	9.635	10.243	7.639	*****	0.702	0.637
(12)	15.393	20.194	20.326	18.199	58.197	47.196	15.321	22.552	23.386	18.998	*****	0.981
(13)	15.177	20.358	24.549	15.999	56.902	57.669	14.661	23.041	29.570	15.930	98.238	*****

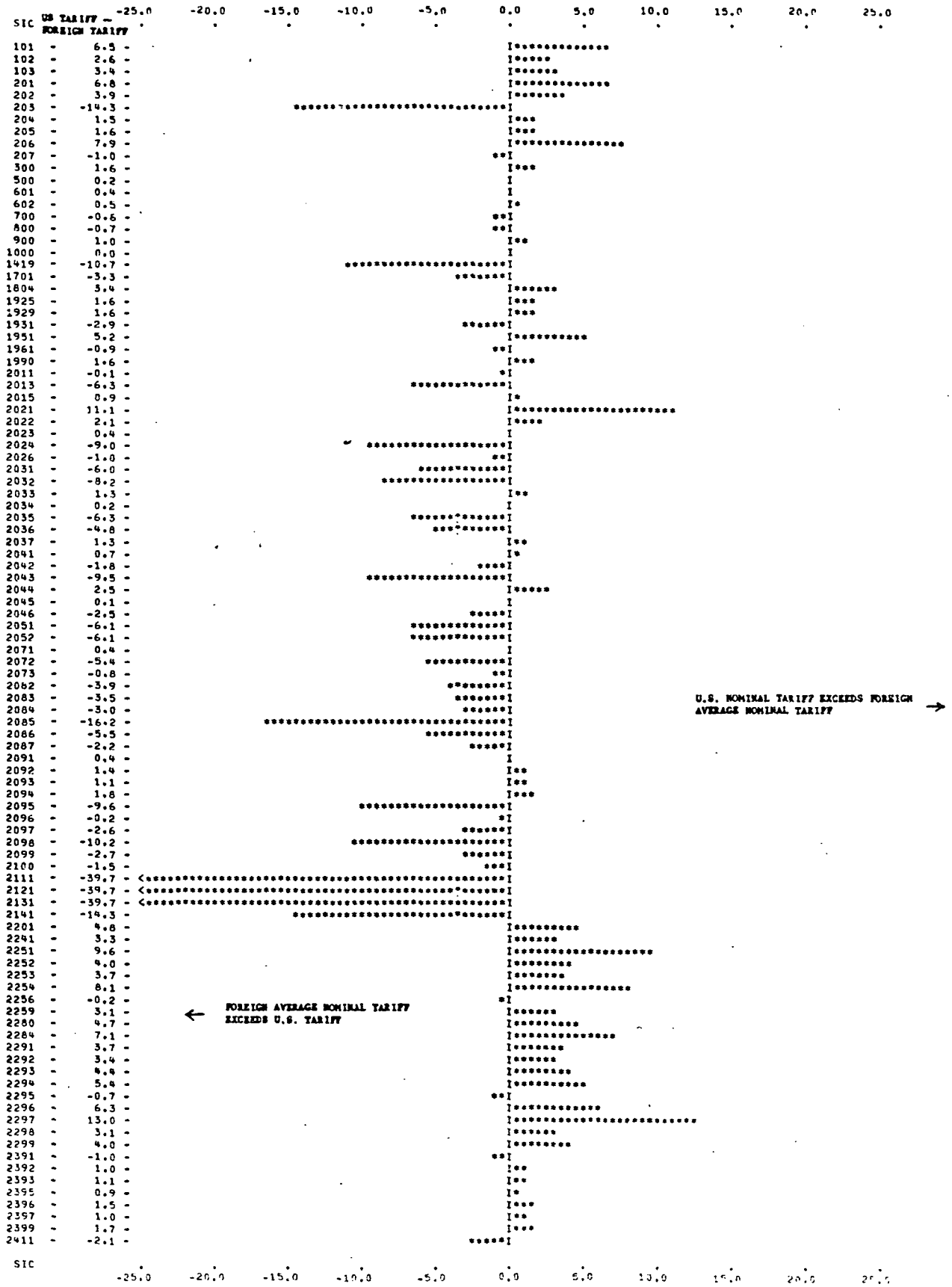
THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 372

Source: The upper matrix--variables 2, 3, and 4 are from columns 2, 3, and 4 of table 1; variables 5, 6, and 7 are from columns 2, 3, and 4, respectively, of table 3.

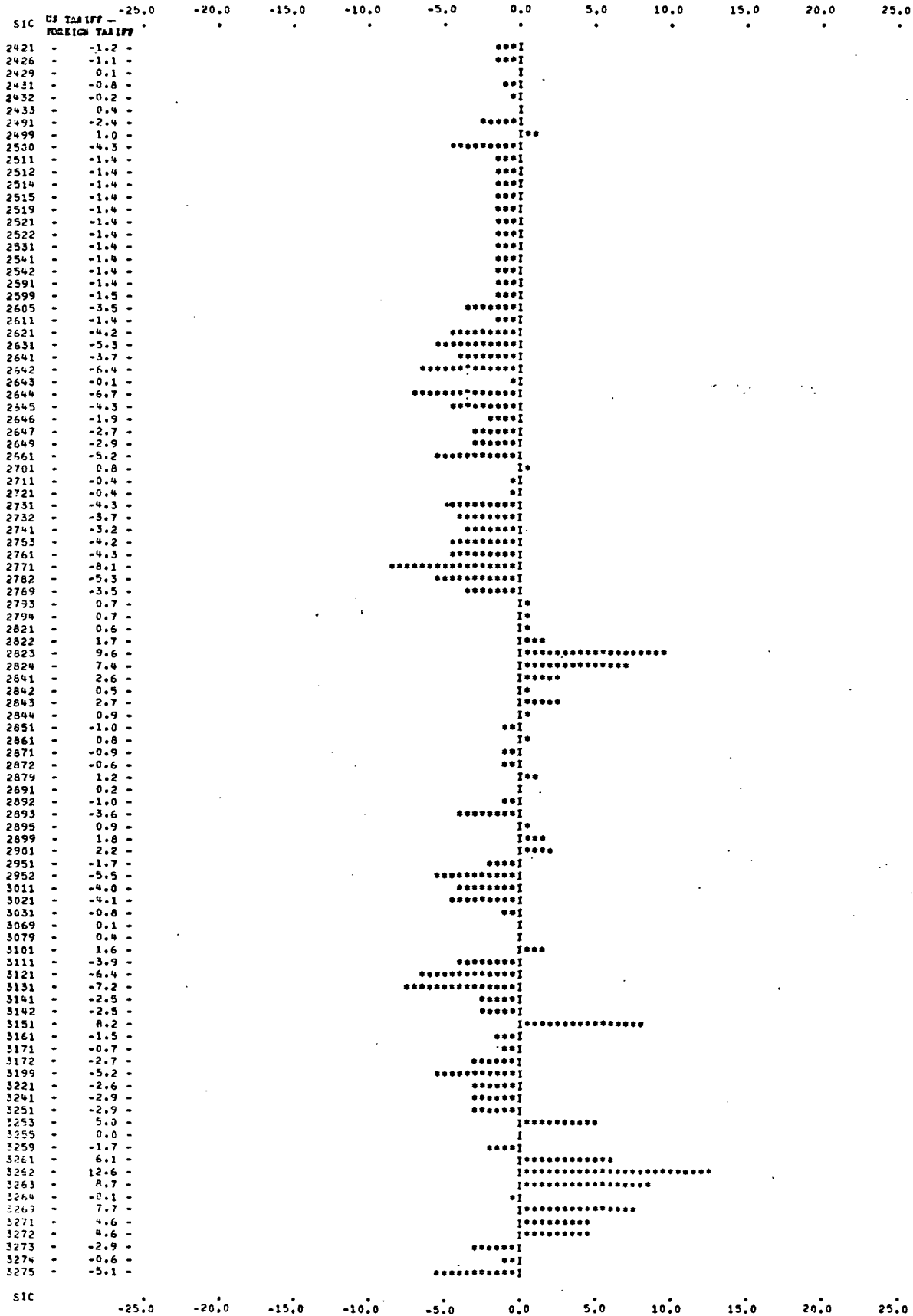
The lower matrix--variables 2-7 are from columns 5-10 of table 1, and variables 8-13 are from columns 5-10 of table 3.



Bar graph of differences between U.S. nominal tariff averages and foreign nominal tariff averages



Bar graph of differences between U.S. nominal tariff averages and foreign nominal tariff averages



Bar graph of differences between U.S. nominal tariff averages and foreign nominal tariff averages

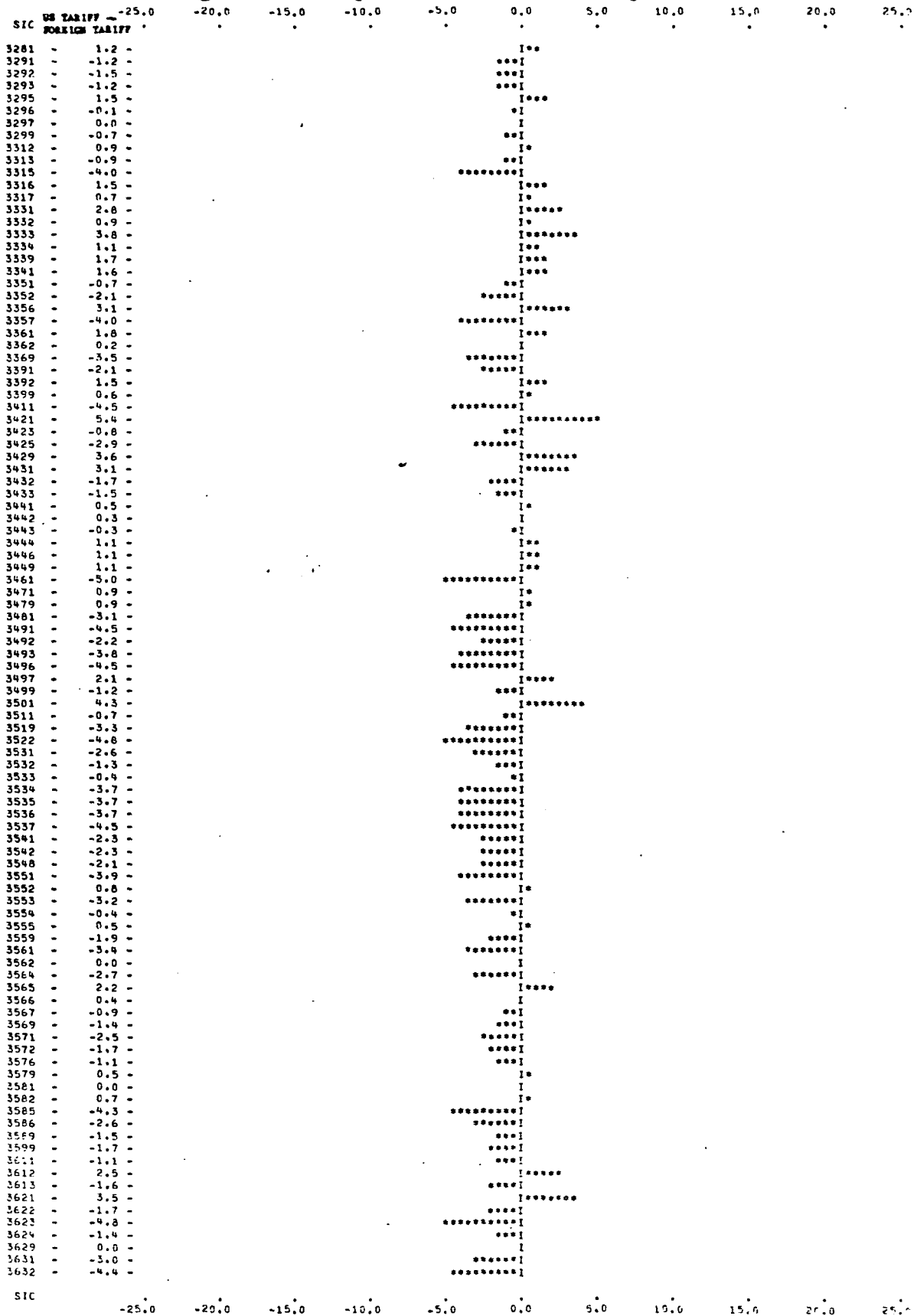
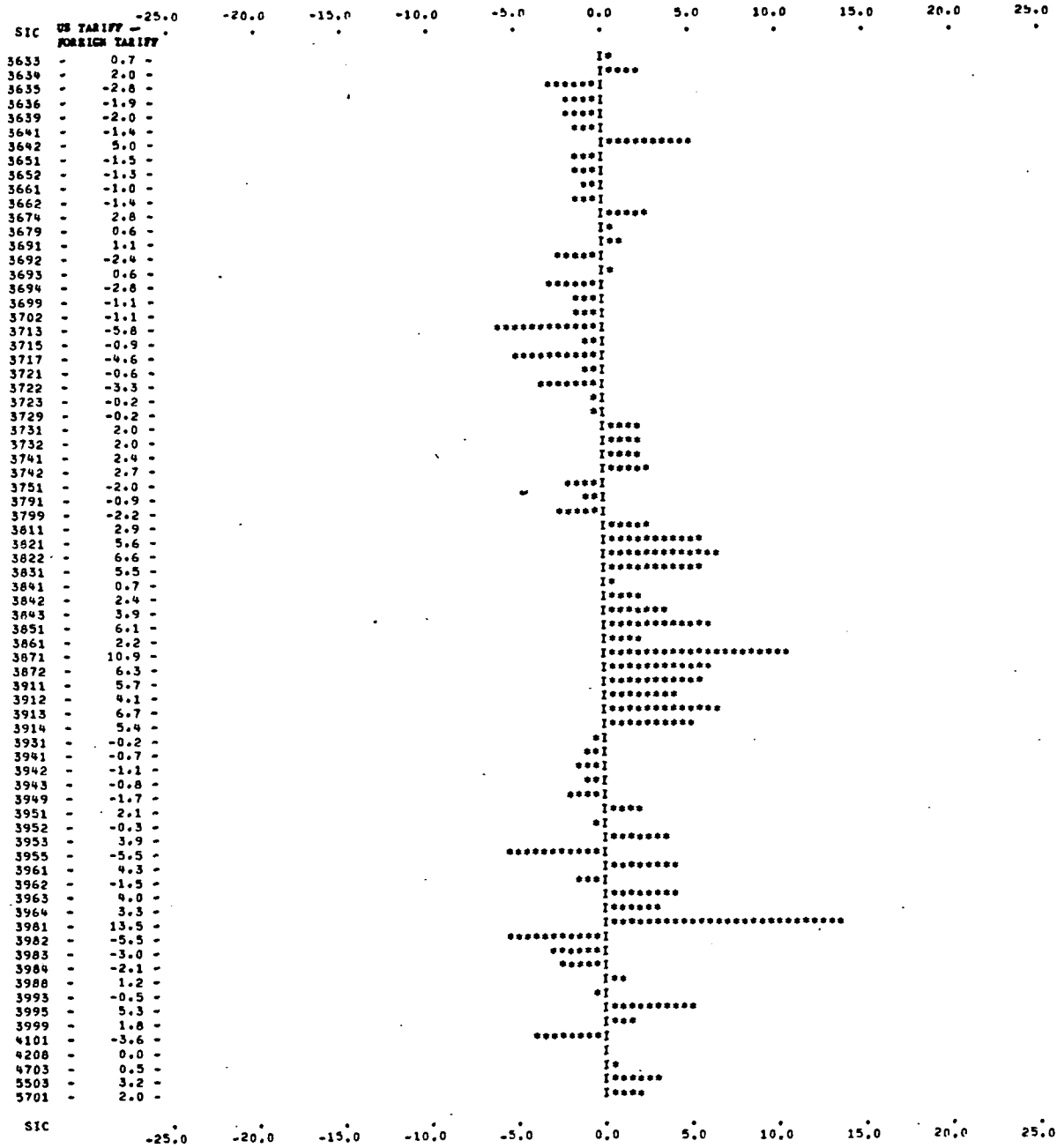


CHART 2--Cont.

Bar graph of differences between U.S. nominal tariff averages and foreign nominal tariff averages



Source: The difference between the U.S. PKR nominal tariff rate and foreign PKR nominal tariff rate is found by subtracting column 10 from column 5 in table 3. Thus the bars represent differences between simply averaged U.S. and foreign tariffs. The reader must keep in mind the weaknesses of the concordance procedures used in arriving at these tariff rates.







Table 6.--Nominal tariff rates and non-tariff barrier indices for major trading areas by TC-SIC--Cont.

Table with columns for TC-SIC, Sector Description, U.S. Tariffs (Percent), and Tariff Averages (Percent) for various countries (US, SIMP, WTL, etc.). It lists numerous industrial sectors like steel wire, machinery, and textiles with their respective tariff and barrier indices.





Table 7.--Rank correlation coefficients, ranks, and summary statistics of the data in table 6

VARIABLE	(NO)	(FOR 295 OBSERVATIONS)									
USISTA65	( 2)										
USISTA70	( 3)										
USLTF70	( 4)										
FPSMPT70	( 5)										
FRLTTF70	( 6)										
USSMPTAR	( 7)										
FPSMPTAR	( 8)										
FRLTGTAR	( 9)										
NTHUS	(10)										
NTHFRN	(11)										
NTHMTO	(12)										

SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)
( 2)	*****	0.491	0.725	0.549	0.541	0.741	0.545	0.544	0.229	0.233	0.222
( 3)	33.492	*****	0.725	0.583	0.574	0.761	0.578	0.577	0.307	0.348	0.327
( 4)	17.961	17.981	*****	0.676	0.665	0.871	0.667	0.647	0.282	0.296	0.260
( 5)	11.193	12.242	15.660	*****	0.973	0.659	0.948	0.942	0.322	0.443	0.412
( 6)	10.976	11.470	14.802	72.108	*****	0.641	0.919	0.954	0.301	0.399	0.370
( 7)	16.890	21.582	31.462	16.354	14.445	*****	0.700	0.662	0.369	0.418	0.390
( 8)	11.099	12.094	15.276	50.732	39.861	16.711	*****	0.975	0.351	0.453	0.407
( 9)	11.065	12.051	14.468	47.911	54.189	15.051	74.607	*****	0.333	0.415	0.380
(10)	4.005	5.400	5.017	5.809	5.391	6.781	6.391	6.018	*****	0.576	0.592
(11)	4.078	6.432	5.248	8.421	7.415	7.847	8.678	7.883	12.026	*****	0.945
(12)	3.875	5.504	4.585	7.720	6.791	7.211	7.609	7.005	12.519	49.505	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE 95% SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 291

RANKS OF THE VARIABLES (FROM LOW TO HIGH VALUES)

SIC	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)
2011	59.0	64.5	46.5	34.5	32.0	69.5	34.5	33.0	251.0	254.0	250.0
2015	92.5	141.0	150.5	178.0	94.0	188.5	136.0	164.5	222.0	222.0	275.0
2021	89.5	14.0	222.0	195.0	98.0	282.0	203.0	108.5	292.5	293.0	292.5
2022	212.0	226.0	230.0	252.5	185.5	238.0	265.0	225.5	292.5	291.5	292.5
2023	73.5	157.5	187.0	229.0	231.5	211.5	255.0	230.5	291.0	279.0	286.0
2026	62.5	219.0	46.5	206.5	199.5	227.0	247.5	249.5	272.0	249.5	288.0
2031	102.0	111.5	37.5	187.0	145.5	77.5	227.0	208.0	104.0	247.0	246.0
2033	190.5	196.0	208.0	246.0	270.5	243.5	272.0	274.5	239.5	287.0	285.0
2034	178.0	192.0	193.0	164.0	177.5	166.0	179.0	181.5	212.0	260.0	259.0
2035	154.5	193.0	220.5	247.5	243.5	185.0	233.0	222.5	104.0	257.0	255.0
2037	274.0	251.0	208.0	241.0	249.5	239.0	238.5	255.5	104.0	283.0	279.0
2041	41.5	70.0	189.0	135.5	119.5	171.0	136.0	130.0	254.5	276.5	281.0
2042	19.5	28.0	11.0	27.5	25.5	14.0	23.5	26.0	245.0	260.0	260.0
2043	25.5	25.5	189.0	204.5	185.5	112.0	203.0	190.5	269.0	276.5	271.0
2044	98.0	171.5	97.0	25.0	28.5	166.0	28.0	29.5	104.0	281.0	232.0
2046	222.0	206.0	22.5	73.0	90.0	59.0	68.5	87.5	231.0	255.0	264.0
2051	7.0	9.0	12.5	148.0	101.5	11.0	189.5	164.5	104.0	259.0	241.5
2061	31.0	51.0	58.0	290.0	290.0	94.0	289.0	274.5	289.0	252.0	278.0
2071	134.5	173.5	129.0	219.0	217.5	171.0	211.5	212.0	266.0	245.0	243.0
2073	126.0	166.5	40.0	189.5	202.5	174.0	161.5	183.5	289.0	253.0	241.5
2082	186.5	162.5	94.0	180.0	166.0	67.5	141.5	187.0	229.0	268.0	265.0
2084	267.0	235.5	110.5	289.0	269.0	286.0	290.0	290.0	272.0	291.5	291.0
2085	287.0	243.0	73.5	278.0	266.0	191.0	275.0	277.0	245.0	245.0	284.0
2086	17.0	10.0	19.0	178.0	119.0	25.0	160.5	180.0	104.0	264.0	251.0
2087	225.0	233.0	204.5	273.0	267.0	230.0	276.5	278.0	272.0	284.0	283.0
2091	38.0	261.0	21.0	21.0	17.0	35.0	25.5	24.0	104.0	234.0	248.5
2093	28.0	65.5	118.0	193.0	129.0	194.0	165.5	172.5	214.0	269.5	276.0
2094	68.0	45.5	63.0	27.5	20.0	65.0	30.5	28.0	217.5	246.0	252.0
2095	1.0	12.5	5.0	83.5	147.0	13.0	216.5	217.0	245.0	240.0	238.0
2098	35.5	34.5	30.0	214.0	217.5	19.0	240.0	245.5	104.0	271.6	253.5
2099	111.5	103.5	40.0	183.0	173.0	126.0	201.0	199.0	239.0	244.0	240.0
2111	23.5	290.0	261.0	292.0	292.0	291.0	292.0	292.0	104.0	278.0	289.0
2121	47.5	126.0	261.0	292.0	292.0	291.0	292.0	292.0	104.0	279.5	290.0
2131	214.0	284.0	261.0	292.0	292.0	291.0	292.0	292.0	104.0	276.0	287.0
2211	227.5	224.0	251.0	259.5	259.5	263.0	264.0	266.0	284.0	267.0	263.0
2221	251.0	246.0	273.0	256.6	257.0	257.0	254.0	253.0	227.0	233.0	258.0
2231	281.0	242.0	284.0	262.0	242.5	278.0	260.0	261.5	252.0	274.0	219.5
2241	249.0	238.0	231.0	192.0	199.5	218.0	211.5	205.5	245.0	212.0	207.0







## PART II

## Effective Tariff Protection in Major Trading Countries

In considering tariff protection, there are many meaningful modes of analysis. One approach is to consider the linkage between product tariffs, imports, domestic prices, and domestic production. The objective is to take account of (and hopefully measure) the effect of a tariff on a tariff inclusive import price. A tariff that "matters" will then allow the producer to charge more for an equivalent domestic product and thus continue its production in the face of import competition. A "probable effects" analysis of a tariff change would then require further information on domestic supply and demand price responses (elasticities) in order to determine the production, employment, and trade effects of the tariff change. Analysis of this type (termed partial-equilibrium) is useful and necessary in considering probable economic effects of tariff changes during a tariff negotiation. This analysis would be even more useful if some overall economic modeling framework were applied to allow measurement of net effects of trade on production and employment. <sup>1/</sup>

The shortcoming of partial equilibrium analysis is its limitation only to the product price effect. If tariffs indeed do matter, then broad changes in the tariff structure should produce broad changes in the domestic price structure. These should significantly influence

---

<sup>1/</sup> Thus, when domestic industry losses are contemplated from a tariff cut, any possible gain due to other countries' tariff cuts should also be calculated.

not only product prices, but also domestic production costs. It is the latter consideration of production cost effect that is the weakest theoretical link in most partial equilibrium analysis. 1/

The Effective Tariff (ET) approach is an attempt to overcome the partial equilibrium approach's neglect of the input cost effects of tariffs. Although it introduces other shortcomings which result basically from the lack of data needed to do complete calculations, 2/ it does provide a more general consideration of tariff protection and its economic effects. The superiority of one approach over the other depends partly upon the questions asked and the overview of protection desired. It also depends partly on the success of the two approaches in empirically exploring the past economic effects of protection and changes in protection. The ET concept tries to measure the net effects of all tariffs in the economy on each sector. It gives the net effect as percentages of what value-added would be without any protection (i.e., free-trade value-added).

In this study, value-added is defined as total sales value minus purchased material inputs and services. This definition makes value-added

---

1/ It is true that the industry price response measures may be influenced by the industry's material input cost structure and thus would be partially accounted for. Profits in an industry that had many purchased inputs would probably be more sensitive to product price changes than for one that had few input costs to consider.

2/ A complete study of the effect of protection on production costs would need a thorough knowledge of input requirements, of possible substitutions that might occur with relative input price changes, of supply price responses, and other information. Much of the economic literature devoted to effective tariff protection deals with models which try to take account of the shortcomings that are embedded in the calculations of effective rates. See Effective Tariff Protection, edited by H. Grubel and H. Johnson, General Agreement on Tariffs and Trade, Geneva, Switzerland, 1971.

the net earnings from production which are paid to investors as profits and to workers as wages. 1/ The ET concept is an attempt to measure how tariffs (affecting both product prices and input costs) influence profits and wages in an industry. The base of measurement is what the profits and wages fund would be if there were no protection at all.

#### The Calculating Formulae

##### Define

$t_i$  nominal tariff on the product of the  $i$ 'th industry.

$P_i, P_i'$  free trade and protection product prices, respectively.

Practicality dictates the assumption that  $P_i' = P_i(1 + t_i)$  (i.e. tariffs matter 100 percent).

$V_i, V_i'$  free trade and protected value added per unit output.

Then:  $V_i \equiv P_i - \sum_j a_{ij} P_j$  where  $a_{ij}$  is the physical amounts of industry  $j$ 's output used as an input to industry  $i$ . (Note that  $\equiv$  means a definition). 2/

---

1/ This definition was chosen in order to use the 1963 Input-Output (IO) table to estimate sector input costs. The definition also allows the use of the model described in Part III.

2/ One of the limitations in calculating the ET rate is that input coefficients are assumed to be constant irrespective of relative input price changes. This is unrealistic. Also, no assumptions are made on how capital and labor might respond to protection-caused changes in the value-added fund. However, even though the measurement assumes linear production relations (no substitution, no scale economies) and is static (no supply or demand responses over time), it can be strongly argued that the measurement problems of the variables in even the most simple ET formulas are large enough to make more complicated formulas empirically useless.



$$ET_i = \frac{V'_i}{\frac{P'_i}{1+t_i} - \sum_j a_{ij} \frac{P'_j}{1+t_j}} - 1$$

$$(1) \quad ET_i = \frac{V'_i}{V_i} - 1$$

$$\frac{1}{1+t_i} - \sum_j \left( \frac{a_{ij} P'_j}{P'_i} \right) \frac{1}{1+t_j}$$

Formula (1) is the calculating formula used in the calculation of ET rates in this study. <sup>1/</sup>

One can also start with the definition and derive formula (2) which is useful for expository purposes.

$$T_i = \frac{V'_i - V_i}{V_i}$$

$$= \frac{P_i (1+t_i) - \sum_j a_{ij} P_j (1+t_j) - [P_i + \sum_j a_{ij} P_j]}{V_i}$$

$$= \frac{P_i t_i - \sum_j a_{ij} P_j t_j}{V_i}$$

$$(2) \quad ET_i = \frac{t_i - \sum_j \left( \frac{a_{ij} P_j}{P_i} \right) t_j}{V_i/P_i}$$

Formula (2) shows that  $ET_i$  is larger (a) the larger the tariff on output, (b) the smaller the weighted sum of the tariff on inputs to production, and (c) the smaller the value-added share of total output.

---

<sup>1/</sup> In formula (1), input weights  $\left[ \frac{(a_{ij} P'_j)}{P'_i} \right]$  are observed values.

The  $\left[ \frac{(a_{ij} P'_j)}{P'_i} \right]$ 's as well as the  $V_i$  coefficient are taken directly from an adjusted version of the 1963 input-output table.

On the average, ET rates tend to be higher than NT rates, because the denominator in formula (2) is less than one. This will not be true, however, if the weighted sum of the tariffs raising input costs is large enough. It is even possible for the weighted sum of input tariffs to exceed the output tariff. This leads to a negative ET rate. Such a rate means that when the entire tariff structure is considered, the net effect harms rather than helps wage and profits in the industry. It is also possible that a particular ET rate will be infinitely large. <sup>1/</sup>

#### Calculations of Effective Tariff Rates

The ET rates were calculated using the 1963 U.S. input-output table and the nominal tariff averages for IO-SIC sectors shown in Part I. All of the concordance and averaging problems involved in obtaining the nominal rates in Part I are therefore included in the ET calculations. In addition, there are some problems in using an input-output table as a source of weights for input tariffs.

Calculations were done using U.S. tariffs from U.S. sources plus United States and foreign tariffs from GATT sources. The ET rates derived from U.S. tariff sources are considered better for U.S. ET rate comparisons among industries. However, for comparisons of U.S. and foreign ET rates, the GATT tariff sources were the only realistic alternatives

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<sup>1/</sup> If protection is large enough on a very noncompetitive industry, it can survive. An industry which would not be able to cover its input costs under free trade (meaning negative free trade value-added) would survive with high enough protection. Calculation of ET rates for these industries would approach infinity from the plus or minus side. For a detailed explanation see: Effective Tariff Protection and Comparative Advantage in Southern Africa, Vernon Roningen, Unpublished Ph.D. dissertation, Columbia University, New York, N.Y., 1972, pp. 42-49.

available. The use of the U.S. IO table for foreign ET calculation assumes that foreign countries' inter-industry production structures are identical to those of the United States. The lack of foreign input-output tables of comparable size and sector definition led to the use of the U.S. table for all ET calculations. 1/

Even though the tables in Part I show one tariff average for each sector, the products included in many sectors' output are both of an intermediate and final nature. For example, the average tariff rate covering the final output products of the textile sectors (sold to consumers and other industries) may not be the same as the rate covering the output products of the textile sector sold only to other industries as manufacturing inputs. In order to allow for different tariff averages for an industry's output and the industry's input into other industries, two vectors of tariff averages were calculated. The output average is the one covering all products shown in the tables in Part I. The input vector omits AVE's of TSUSA numbers which are designated as final manufactured products on the Trade Commission tapes. 2/

Even though this procedure tried to provide different tariff averages for input and output tariffs, the averages turned out to be similar for most IO-SIC industries. 3/

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1/ The use of one I-O table for various countries' ET calculations precludes ET differences due to IO table definitional differences or structural differences.

2/ See Appendix C for the details on how this input tariff sector was prepared.

3/ Tables of both NT and ET averages in the study contain only the overall NT average for I-O SIC sectors. Thus, when comparisons are made of NT and ET rates, the single vector of NT rates shown and used is not exactly the same as the input actually used in the ET calculations. However because there was so little difference between the input and output sector and because of space limitations, only the average NT sector was presented in the text. Appendix D contains the actual tariff vectors used along with alternative ET calculations using only the one NT (output) vector

One expected result is that the overall variation in ET rates is much greater than that of nominal rates. This is shown in the summary statistics in Tables 9 and 11 where the coefficient of variation for ET rates is well over twice that of nominal rates. 1/

Table 13 presents overall weighted tariff averages for 1965, 1970, and PKR nominal and effective tariff rates. These are more meaningful for assessing overall effective tariff protection than the simple averages appearing in Tables 9 and 11. It is known that free trade value-added weights are appropriate for the aggregate of ET rates. 2/ It can also be argued that a value-added weighted average effective tariff rate covering all sectors of the economy roughly represents the total cost of protection. This is a static cost measure in the sense that if resources were reallocated on a costless basis to industries and products with zero ET rates, the value-added weighted average rate would represent the loss in real income incurred by operating protected and therefore inefficient industries. This cost estimate is an upper range estimate since, if protection were removed, exchange rate changes and price changes of nontraded goods and services would produce a lower cost estimate. 3/

On the basis of Table 13 it would appear that the cost of present protection in the United States is a loss in real income of about

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1/ This statistic varies greatly if one or more ET rates becomes very large.

2/ See: The Structure of Protection in Developing Countries, Bela Belassa and associates, Johns Hopkins Press, Baltimore, 1971; and Effective Tariff Protection and Comparative Advantage. . . , p. 296, op. cit.

3/ See: Effective Tariff Protection . . . , op. cit., Ch. VIII. The argument assumes an equilibrium in the factor markets.

five percent. This is down from an 8 or 9 percent cost in 1965 but is still more than half the 1965 cost. Considering that these costs do not include those of non-tariff barriers, further tariff negotiations can indeed play a role in increasing national welfare. It is also evident that if tariffs were eliminated, the adjustment costs (in term of factor returns diminishing in certain sectors) would probably be as great as those occurring during the Kennedy Round tariff reductions.

Even though the weights used are not quite appropriate, the overall nominal tariff averages in Table 13 indicate that elimination of tariffs would probably not have a very large overall price effect. Thus, tariff reductions probably could not be counted upon as the chief weapon in a major anti-inflation effort.

As in any statistical evaluation, what is true for the average is not by definition true for all observations. Hence references to individual sector data will require careful examination of the relative behavior of nominal and effective rates for each sector.



















Table 9.--Rank correlations, ranks, and summary statistics of the variables in table 8--Cont.

RANKS OF THE VARIABLES (FROM LOW TO HIGH VALUES)

Table with 13 columns (SIC, (2), (3), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13)) and 50 rows of numerical data representing rank correlations and summary statistics.







Table 10.--Effective tariff rates for major trading areas  
using unweighted nominal tariff averages

10- SIC	SECTOR DESCRIPTION (PURE SIC)	U.S. TARIFFS (PERCENT) (N=NOMINAL, E=EFFECTIVE) NOMINAL RATES DIRECTLY FROM TSUSA)						EFFECTIVE TARIFF RATES DERIVED FROM GATT NOMINAL TARIFF AVERAGES (PERCENT)					
		1965		1970		PKR		US	EEC	CAN- ADA	JAP- AN	FEC CAN JAP UK	FOR- FIG WTD.
		N	E	N	E	N	E						
	1	2	3	4	5	6	7	8	9	10	11	12	13
101	DAIRY FARM PRODUCTS----- (101)----	1.7	-6.4	1.2	-5.6	1.6	-2.5	70.6	68.8	77.7	-11.3	52.9	40.0
102	POULTRY & EGGS----- (102)----	7.8	24.2	11.0	73.5	7.8	25.1	58.2	2.8	27.9	21.6	18.1	17.5
103	MEAT, ANIMALS, & MISCELLANEOUS LIVESTOCK PRODUCTS----- (103)----	6.1	6.3	6.3	10.2	7.1	8.4	7.3	1.3	1.1	2.4	2.1	1.6
201	COTTON----- (201)----	4.3	7.4	4.7	8.7	4.8	9.3	15.2	-2.0	-0.7	1.1	1.4	0.3
202	FOOD FEED GRAINS & GRASS SEEDS----- (202)----	7.1	11.8	5.5	8.9	4.6	7.4	13.1	3.6	4.3	11.9	6.6	5.8
203	TOBACCO----- (203)----	35.5	67.4	26.3	46.8	25.3	45.0	148.6	32.2	34.2			
204	FRUITS & TREE NUTS----- (204)----	8.0	11.0	5.9	8.0	7.7	8.0	13.8	15.4	4.1	20.6	11.9	11.5
205	VEGETABLES, SUGAR & MISC. CROPS----- (205)----	10.8	16.1	8.6	12.8	7.9	11.9	7.5	5.9	2.2	9.2	5.8	5.2
206	OIL BEARING CROPS----- (206)----	4.8	6.7	4.1	5.6	2.6	3.1	19.2	-0.2	5.6	7.6	5.6	4.4
207	FOREST, GREENHOUSE & NURSERY PRODUCTS----- (207)----	4.4	5.0	3.0	3.3	2.5	2.7	6.6	9.6	7.2	7.0	8.4	8.2
300	FORESTRY & FISHERY PRODUCTS----- (300)----	2.9	1.2	1.8	0.0	1.3	-0.3	13.2	13.2	7.5	13.2	11.2	10.3
500	IRON & FERROALLOY ORES MINING----- (500)----	3.7	4.4	1.3	0.8	2.4	2.5	1.2	-1.6	5.1	-1.6	-0.1	0.7
601	COPPER ORE MINING----- (601)----	1.6	-0.3	0.0	-2.1	6.5	8.4	1.7	-2.1	3.4	1.9	1.1	0.9
602	NONFERROUS METAL ORES MINING, EXCEPT COPPER----- (602)----	2.8	2.2	1.6	0.6	1.5	0.7	2.4	-1.1	4.4	-0.2	1.0	1.1
700	COAL MINING----- (700)----	0.0	-2.0	0.0	-1.5	0.0	-1.5	-1.4	0.5	-1.6	-0.8	-0.9	-0.8
800	CRUDE PETROLEUM & NATURAL GAS----- (800)----	2.1	2.5	2.1	2.7	2.1	2.8	3.4	0.7	3.9	15.3	5.5	4.6
900	STONE & CLAY MINING & QUARRYING----- (900)----	4.6	4.4	2.0	1.0	1.5	0.3	5.9	2.2	6.6	3.1	4.2	3.9
1000	CHEMICAL & FERTILIZER MINERAL MINING----- (1000)----	6.4	8.0	4.0	4.6	3.2	3.1	2.5	1.8	3.4	2.1	2.3	2.3
1419	CANE SUGAR, EXCLUDING REFINING----- (2061)++ CANE SUGAR REFINING----- (2062)++ BEET SUGAR----- (2063)++	4.9	2.0	4.3	2.6	4.6	4.0	9.9	-4.6	34.3	388.3	51.6	42.0
1701	WOVEN CARPETS & RUGS----- (2271)++ TUFTED CARPETS & RUGS----- (2272)++ CARPETS & RUGS, N.E.C.----- (2279)++	20.5	50.0	15.3	27.2	11.8	14.9	11.1	57.0	96.7	48.1	64.2	65.5
1804	MEN'S & BOYS' SUITS, COATS & OVERCOATS----- (2311)++ MEN'S & BOYS' SHIRTS, COLLARS & NIGHTWEAR----- (2321)++ MEN'S & BOYS' UNDERWEAR----- (2322)++ MEN'S & BOYS' NECKWEAR----- (2323)++ MEN'S & BOYS' SEPARATE TROUSERS----- (2327)++ MEN'S & BOYS' WORK CLOTHING----- (2328)++ MEN'S & BOYS' CLOTHING, N.E.C.----- (2329)++ WOMEN'S & JUNIORS' BLOUSES, WAISTS, & SHIRTS----- (2331)++ WOMEN'S & JUNIORS' DRESSES----- (2335)++ WOMEN'S & JUNIORS' SUITS, SKIRTS, & COATS----- (2337)++ WOMEN'S & JUNIORS' OUTERWEAR, N.E.C.----- (2339)++ WOMEN'S, CHILDREN'S & INFANTS' UNDERWEAR & NIGHTWEAR----- (2341)++ CORSETS & ALLIED GARMENTS----- (2342)++ MILLINERY----- (2351)++ HATS & CAPS, EXCEPT MILLINERY----- (2352)++ GIRLS' & INFANTS' DRESSES, BLOUSES, WAISTS & SHIRTS----- (2361)++ GIRLS' & INFANTS' COATS & SUITS----- (2363)++ GIRLS' & INFANTS' OUTERWEAR, N.E.C.----- (2369)++ FUR GOODS----- (2371)++ DRESS & WORK GLOVES, EXCEPT KNIT & ALL-LEATHER----- (2381)++ ROBES & DRESSING GOWNS----- (2384)++ RAINCOATS & OTHER WATERPROOF OUTER GARMENTS----- (2385)++ LEATHER & SHEEP LINED CLOTHING----- (2386)++ APPAREL BELTS----- (2387)++ APPAREL & ACCESSORIES, N.E.C.----- (2389)++ FURS, DRESSED & DYED (INCLUDED IN SIC 3999 IN 1967)----- (3992)++	26.4	41.5	25.7	42.6	24.6	43.1	23.5	12.0	23.6	24.8	20.5	19.1
1925	COMPLETE GUIDED MISSILES----- (1925)----	1.4	0.2	1.7	0.6	8.3	11.7	17.7	1.9	22.7	28.5	16.2	14.5
1929	AMMUNITION, EXCEPT FOR SMALL ARMS, N.E.C.----- (1929)----	1.4	-3.8	1.7	-1.7	8.3	11.1	17.5	1.2	23.3	51.7	16.8	14.8
1931	TANKS & TANK COMPONENTS----- (1931)----	2.9	-15.1	6.6	4.2	5.0	1.1	-0.8	-7.1	27.8	37.1	11.9	11.4
1941	SIGHTING & FIPE CONTROL EQUIP.----- (1941)----	1.4	-6.0	1.7	-3.5	8.3	9.8	-5.8	-4.8	-4.1	-5.4	-5.3	-4.8
1951	SMALL ARMS----- (1951)----	24.7	47.2	17.1	30.9	12.0	20.3	24.0	8.3	4.9	34.2	15.7	12.8
1961	SMALL ARMS AMMUNITION----- (1961)----	14.7	22.3	11.5	17.1	9.5	11.8	14.3	8.2	20.6	26.1	17.0	15.6
1990	GUNS, HOWITZERS, MORTARS & RELATED EQUIPMENT----- (1911)++ ORDNANCE & ACCESSORIES, N.E.C.----- (1999)++	1.4	-1.7	1.7	-0.2	8.3	11.6	18.0	2.4	22.4	41.9	17.1	15.1
2011	MEAT PACKING PLANTS----- (2011)----	7.0	12.4	5.7	4.9	4.4	2.4	7.8	42.1	21.6	65.1	33.1	32.3
2013	SAUSAGES & OTHER PREPARED MEATS----- (2013)----	7.4	8.7	6.2	7.6	5.3	7.8	5.1	53.6	17.3	78.7	40.4	38.0
2015	POULTRY DRESSING PLANTS----- (2015)----	7.6	8.0	9.0	2.4	6.1	6.3	26.5	51.7	12.7	70.8	35.6	33.8
2021	CREAMERY BUTTER----- (2021)----	7.5	87.1	1.5	-13.4	12.6	271.7	117.3	-24.9	-25.0		15.1	2.4
2022	CHEESE, NATURAL & PROCESSED----- (2022)----	17.7	107.5	16.4	84.3	14.3	65.0	17.0	-24.8	3.0		37.8	18.9
2023	CONDENSED & EVAPORATED MILK----- (2023)----	7.3	20.1	8.2	22.1	8.0	21.4	2.7	-21.7	12.4	143.6	9.5	6.8
2024	ICE CREAM & FROZEN DESSERTS----- (2024)----	18.8	59.0	18.8	57.3	18.8	58.1	5.6	43.2	23.5	79.3	35.4	35.5
2026	FLUID MILK----- (2026)----	1.4	-2.0	5.5	12.0	5.7	12.6	11.5	26.4	17.7	78.2	28.9	26.9
2031	CANNED & CURED SEA FOODS----- (2031)----	9.5	21.3	7.4	17.8	6.0	14.8	7.5	58.5	11.2	47.0	31.6	30.8
2032	CANNED SPECIALTIES----- (2032)----	12.8	22.4	8.8	11.2	6.5	6.5	14.3	53.6	31.1	83.8	42.4	43.2
2033	CANNED FRUITS & VEGETABLES----- (2033)----	15.0	40.4	12.5	35.5	11.8	35.9	37.6	37.8	11.5	41.6	23.8	24.2
2034	DEHYDRATED FRUITS & VEGETABLES----- (2034)----	13.3	19.2	10.8	15.7	9.6	13.0	19.2	22.1	4.6	35.9	19.0	18.0
2035	PICKLES, SAUCES, & SALAD DRESSINGS----- (2035)----	10.7	16.0	7.6	2.0	5.7	-1.3	15.6	26.4	46.9		67.6	61.2











Table 11.--Rank correlations, ranks, and summary statistics for the variables in table 10

VARIABLE	(NO)	(FROM 378 OBSERVATIONS)
USUT65	( 2)	
EP65U	( 3)	
USUT70	( 4)	
EP70U	( 5)	
USUTPK	( 6)	
EPPKU	( 7)	
GUEPUS	( 8)	
GUEPEEC	( 9)	
GUEPCAN	(10)	
GUEPJAP	(11)	
GUEPECJU	(12)	
GUEPACTY	(13)	

SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)
( 2)	*****	0.931	0.925	0.855	0.864	0.799	0.655	0.418	0.424	0.264	0.432	0.447
( 3)	49.544	*****	0.855	0.870	0.817	0.843	0.684	0.395	0.403	0.304	0.444	0.440
( 4)	47.100	31.929	*****	0.937	0.905	0.838	0.668	0.423	0.430	0.305	0.459	0.467
( 5)	31.953	34.183	52.213	*****	0.849	0.881	0.689	0.403	0.415	0.322	0.462	0.463
( 6)	33.251	27.494	41.307	31.155	*****	0.935	0.710	0.381	0.382	0.342	0.450	0.435
( 7)	25.330	30.397	29.774	36.030	51.329	*****	0.744	0.368	0.354	0.353	0.447	0.425
( 8)	16.829	18.205	17.405	13.451	19.533	21.578	*****	0.513	0.465	0.451	0.590	0.567
( 9)	8.921	8.349	9.059	5.549	7.999	7.668	11.593	*****	0.453	0.468	0.750	0.755
(10)	9.076	8.528	9.244	8.836	8.012	7.346	10.190	9.851	*****	0.436	0.767	0.841
(11)	5.304	6.193	6.219	6.584	7.056	7.308	9.809	10.851	9.402	*****	0.752	0.687
(12)	9.292	9.606	10.031	10.091	9.764	9.682	14.171	21.957	23.199	22.128	*****	0.978
(13)	9.697	9.509	10.233	10.133	9.367	9.106	13.354	22.314	30.125	18.351	91.536	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 376

RANKS OF THE VARIABLES (FROM LOW TO HIGH VALUES)

SIC	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)
101	21.0	8.5	17.5	8.0	28.5	15.0	373.0	370.0	372.0	4.0	345.0	356.0
102	107.0	249.0	256.5	368.0	160.5	319.5	351.0	53.0	310.0	286.0	265.0	234.5
103	77.0	75.0	119.0	161.0	129.5	176.5	116.0	40.0	29.5	30.0	24.0	23.0
201	49.0	83.0	88.5	135.0	110.5	193.0	252.5	26.0	22.0	26.0	22.0	19.0
202	93.0	135.0	95.5	138.5	104.5	153.0	222.0	62.0	56.5	153.5	50.5	50.5
203	367.0	357.0	358.0	352.0	371.0	361.0	378.0	351.0	335.0			
204	110.0	120.5	107.0	121.0	152.5	168.5	237.5	277.5	52.5	277.0	145.5	153.0
205	173.0	173.0	200.0	202.0	243.5	235.0	124.5	80.0	32.0	112.5	44.0	46.0
206	56.5	78.5	72.5	99.0	45.5	78.5	285.5	35.0	72.0	70.0	43.0	38.5
207	50.0	64.5	92.0	75.0	43.5	73.5	100.0	177.0	90.0	59.0	68.0	80.0
300	35.0	41.0	30.0	37.0	23.5	34.5	224.5	256.0	95.0	188.0	130.0	128.0
500	40.0	60.5	19.5	44.5	41.5	67.5	39.0	27.0	67.0	18.0	17.0	20.0
601	20.0	32.0	6.0	20.0	195.5	176.5	41.0	25.0	43.0	28.0	20.0	21.0
602	32.0	46.0	24.5	42.5	26.5	43.5	46.5	29.0	58.5	23.0	19.0	22.0
700	5.0	24.5	6.0	24.0	7.5	23.0	20.0	36.5	14.5	22.0	15.0	16.0
800	24.5	47.0	36.0	69.0	37.5	75.0	60.0	38.0	49.5	212.0	41.5	41.5
900	52.0	60.5	35.0	49.0	26.5	39.0	87.0	48.5	86.0	34.0	36.0	34.0
1000	82.0	89.0	69.5	87.0	65.0	78.5	48.5	44.5	43.0	29.0	25.0	25.0
1419	58.5	43.0	77.5	68.0	104.5	88.0	168.0	17.0	334.0	371.0	367.0	357.0
1701	314.5	331.0	307.0	299.0	307.0	267.0	192.5	367.0	375.0	348.0	371.0	372.0
1804	342.0	316.0	357.0	348.0	369.0	356.0	313.0	234.5	275.5	308.0	293.0	279.0
1925	16.5	34.0	27.5	42.5	257.0	229.5	278.0	46.0	270.0	320.0	233.5	220.0
1929	16.5	19.0	27.5	22.0	257.0	223.0	275.5	39.0	272.5	324.0	242.5	224.0
1931	35.0	3.0	129.0	84.5	124.0	52.5	25.0	11.0	301.0	338.0	145.5	151.0
1941	16.5	11.5	27.5	15.0	257.0	202.0	8.0	15.5	9.0	11.0	7.0	6.0
1951	335.0	324.0	321.0	312.0	310.5	300.5	316.0	150.0	111.5	329.0	227.0	182.0
1961	256.0	232.5	267.5	245.0	278.0	232.5	245.0	144.5	240.5	312.0	246.5	237.0
1990	16.5	26.0	27.5	36.0	257.0	227.5	280.5	51.0	267.0	325.0	250.0	228.5
2011	91.0	141.5	102.5	92.0	95.0	65.5	126.0	359.0	259.0	352.0	346.0	344.0
2013	99.5	98.0	116.0	115.5	133.5	166.0	76.0	365.5	213.0	356.0	355.0	354.0
2015	103.5	89.0	212.5	65.0	175.0	127.5	324.0	364.0	168.0	353.0	349.0	348.0
2021	101.5	366.0	23.0	2.0	313.5	376.0	376.0	1.0	1.0		218.5	26.0
2022	294.0	371.0	315.0	372.0	332.0	370.0	269.0	2.0	35.5		351.0	276.0
2023	97.0	214.0	189.5	279.0	247.5	304.0	51.5	3.0	161.5	366.0	86.0	59.5
2024	307.5	349.0	338.0	360.0	354.0	369.0	61.0	361.0	274.0	357.0	348.0	350.0
2026	16.5	24.5	95.5	191.5	152.5	244.0	199.5	337.5	216.0	355.0	334.0	332.0
2031	143.0	222.0	155.0	247.0	170.0	264.5	129.5	368.0	144.0	347.0	340.0	342.0
2032	216.0	234.0	207.0	182.0	195.5	129.5	245.0	365.5	321.0	359.5	357.0	361.0
2033	264.0	310.0	278.5	330.0	307.0	349.0	350.0	356.0	149.0	344.0	314.5	321.5
2034	230.5	207.5	233.5	235.0	280.0	247.5	285.5	321.0	126.5	331.0	276.0	265.0
2035	168.0	172.0	164.5	59.0	152.5	25.0	233.0	337.5	356.0		372.0	369.0
2036	42.5	39.0	37.0	33.0	28.5	29.0	35.5	369.0	54.5	272.0	323.0	319.0









Table 11.--Rank correlations, ranks, and summary statistics for the variables in table 10--Cont.

RANKS OF THE VARIABLES (FROM LOW TO HIGH VALUES)

SIC	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )	( 7 )	( 8 )	( 9 )	( 10 )	( 11 )	( 12 )	( 13 )
3732	141.0	127.0	155.0	154.0	138.5	132.0	66.0	23.0	10.5	39.0	13.5	12.0
3741	336.5	342.0	333.0	336.0	317.5	314.0	249.0	125.5	43.0	254.5	95.5	80.0
3742	230.5	254.0	263.5	275.5	284.5	286.0	280.5	65.5	199.5	53.5	102.0	115.5
3751	324.0	352.0	301.0	331.5	291.0	311.0	315.0	323.5	343.0	264.5	341.0	338.0
3791	72.0	28.0	179.0	178.0	247.5	270.5	121.0	166.5	104.5	37.5	125.0	83.0
3799	37.0	18.0	53.0	40.0	49.5	41.0	169.5	306.0	109.5	259.0	283.0	238.5
3811	279.0	237.0	247.0	219.0	282.0	258.5	127.5	61.0	34.0	27.0	30.0	28.5
3821	351.0	341.0	337.0	323.0	324.0	310.0	318.5	243.5	180.5	90.5	190.5	175.0
3822	358.0	348.0	347.0	339.0	339.5	326.0	322.0	262.0	155.0	79.5	156.5	162.0
3831	349.0	325.5	353.0	333.5	346.5	328.5	305.5	277.5	98.5	165.5	236.5	182.0
3841	321.0	308.0	309.5	305.0	302.0	300.5	269.0	213.5	235.5	230.0	246.5	240.5
3842	238.5	180.0	194.5	138.5	207.5	156.5	174.0	71.5	70.0	128.0	49.0	50.5
3843	290.0	263.0	278.5	259.0	269.0	252.5	271.0	195.0	119.5	168.0	141.5	132.5
3851	327.0	300.5	322.5	304.0	333.0	313.0	323.0	267.5	175.0	251.5	258.5	224.0
3861	254.5	197.0	251.0	213.0	243.5	206.0	257.5	266.0	114.5	216.5	179.0	165.0
3871	357.0	336.0	342.5	316.5	348.0	332.0	358.0	238.5	242.0	244.0	265.0	248.0
3872	369.0	370.0	360.0	364.0	356.0	354.0	357.0	130.5	350.5	323.0	329.0	325.5
3911	364.0	368.0	356.0	358.5	350.5	351.0	337.0	277.5	216.0	330.0	294.0	277.5
3912	371.0	375.0	365.0	371.0	359.0	362.0	341.0	296.0	261.5	328.0	305.5	302.0
3913	182.5	315.0	168.5	292.0	138.5	274.5	342.0	59.0	19.0	99.0	48.0	32.0
3914	353.5	367.0	315.0	342.0	315.0	340.5	360.0	301.0	245.5	332.5	327.0	317.0
3931	275.5	232.5	255.0	224.0	252.5	218.0	210.0	205.0	203.5	133.5	198.0	185.5
3941	346.0	360.0	330.0	345.0	317.5	334.0	301.0	302.0	317.0	261.5	300.0	310.5
3942	352.0	338.0	345.5	331.5	344.5	328.5	233.0	280.5	245.5	250.0	254.0	257.0
3943	210.5	242.0	200.0	230.0	190.5	212.0	289.0	330.0	303.5	60.5	279.5	295.5
3949	264.0	247.0	256.5	246.0	264.0	252.5	240.5	209.0	292.0	226.5	272.0	264.0
3951	365.0	353.0	344.0	319.0	343.0	322.0	279.0	168.0	218.0	216.5	215.5	201.5
3952	230.5	227.0	270.0	272.5	228.0	232.5	269.0	200.0	308.0	245.5	252.5	261.5
3953	301.5	261.0	334.5	310.5	353.0	346.5	307.0	150.0	268.0	291.0	229.5	230.5
3955	89.5	73.0	77.5	66.5	65.0	61.0	88.5	328.0	191.0	65.5	256.5	253.0
3961	350.0	340.0	350.5	343.0	349.0	346.5	305.5	250.0	139.0	270.0	207.5	194.0
3962	297.5	307.0	294.0	290.0	300.0	305.0	309.0	340.5	347.0	297.0	335.0	340.0
3963	289.0	238.0	305.0	272.5	309.0	278.5	330.0	291.5	322.5	161.5	273.0	289.5
3964	356.0	339.0	341.0	320.5	337.5	319.5	297.0	118.5	225.5	204.5	202.0	191.5
3981	329.0	329.0	369.0	373.0	325.0	339.0	372.0	289.5	188.0	123.0	241.0	227.0
3982	246.5	217.0	164.5	130.5	143.5	83.0	153.0	285.0	328.0	106.5	246.5	285.0
3983	135.5	154.5	121.5	151.0	228.0	245.0	157.5	222.0	245.5	203.0	202.0	217.0
3984	301.5	318.0	286.0	302.0	274.0	287.0	257.5	222.0	355.0	88.0	287.0	305.0
3987	5.0	5.0	306.0	303.0	322.5	324.5	4.0	6.0	4.0	7.0	2.0	2.0
3988	278.0	256.5	263.5	243.5	257.0	229.5	202.5	180.0	86.0	251.5	130.0	123.0
3993	291.5	281.0	112.5	106.0	100.0	95.0	245.0	187.0	272.5	202.0	223.5	234.5
3995	326.0	376.0	339.0	374.0	350.5	375.0	375.0	362.0	303.5	354.0	364.0	358.0
3999	323.0	299.0	308.0	293.5	302.0	292.5	196.0	99.0	126.5	109.5	72.0	77.5
4101	213.5	197.0	207.0	191.5	207.5	178.5	104.5	134.0	252.5	175.0	190.5	204.5
4208	206.0	190.0	150.0	143.0	185.5	166.0	178.0	234.5	96.0	168.0	138.5	128.0
4703	273.5	230.5	290.5	253.5	292.0	262.0	216.0	109.5	219.0	115.5	156.5	156.5
5503	355.0	356.0	334.5	333.5	322.5	316.0	313.0	187.0	287.0	125.5	211.0	234.5
5701	206.0	159.5	251.0	216.0	250.0	216.0	230.0	260.0	54.5	247.0	171.5	143.5

SUMMARY STATISTICS FOR 378 OBSERVATIONS

VARIABLE	SUM	AVERAGE	STAND. DEV.	MINIMUM	MAXIMUM	COEF. OF VARIATION
USUT65	4963.01	13.1297	8.96294	.0	55.3000	.682649
EP65U	9944.86	26.3092	53.1077	-20.0000	912.300	2.01860
USUT70	3774.77	9.98615	7.50616	.0	63.6000	.751657
EP70U	16975.2	44.9080	514.246	-16.7000	9999.80	11.4511
USUTPK	2997.07	7.92875	6.11401	.0	48.5000	.771119
EPPKU	6027.52	15.9458	38.4360	-16.0000	557.600	2.41041
GUEPUS	5658.49	14.9695	17.2714	-13.8000	148.600	1.15377
GUEPEEC	5145.52	13.6125	17.8956	-24.9000	154.900	1.31464
GUEPCAN	7216.06	19.0901	22.0905	-25.0000	288.600	1.15717
GUEPJAP	41087.9	108.698	890.308	-16.1000	9999.90	8.19064
GUEPECJU	6782.26	17.9425	24.7032	-11.8000	377.600	1.37680
GUEPACTY	6352.69	16.8060	18.4519	-11.5000	214.000	1.09793

Source: Calculated from a data bank at the U.S. International Trade Commission.

Table 12.--Rank correlation coefficients of the nominal and effective tariff rates from table 8 and 10

VARIABLE	(NO)	(FOR 378 OBSERVATIONS)
USTT6570	( 2)	
EP65K	( 3)	
USTT7070	( 4)	
EP70W	( 5)	
USTTPK70	( 6)	
EPPKk	( 7)	
USUT65	( 8)	
EP65U	( 9)	
USUT70	(10)	
EP70U	(11)	
USUTFK	(12)	
EPPKU	(13)	

## SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)
( 2)	*****	0.926	0.922	0.838	0.839	0.781	0.877	0.806	0.810	0.731	0.764	0.699
( 3)	47.511	*****	0.844	0.878	0.768	0.815	0.779	0.811	0.713	0.715	0.674	0.689
( 4)	46.310	30.551	*****	0.923	0.938	0.877	0.829	0.747	0.856	0.771	0.813	0.745
( 5)	29.745	35.619	46.393	*****	0.865	0.934	0.732	0.736	0.761	0.783	0.722	0.749
( 6)	29.934	23.23A	52.639	33.425	*****	0.925	0.745	0.671	0.790	0.713	0.843	0.774
( 7)	24.279	27.261	35.364	50.824	47.080	*****	0.671	0.678	0.711	0.715	0.753	0.787
( 8)	35.462	24.08K	28.781	20.860	21.681	17.556	*****	0.931	0.925	0.855	0.664	0.794
( 9)	26.447	26.865	21.766	21.109	17.530	17.868	49.544	*****	0.855	0.870	0.817	0.843
(10)	26.785	19.721	32.046	22.742	25.008	19.594	47.100	31.929	*****	0.937	0.905	0.838
(11)	20.746	19.856	23.483	24.409	19.710	19.819	31.953	34.183	52.213	*****	0.849	0.881
(12)	22.964	17.667	27.054	20.240	30.376	22.209	33.251	27.494	41.307	31.155	*****	0.935
(13)	18.958	18.416	21.671	21.891	23.717	24.723	25.330	30.397	29.774	36.030	51.329	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 376

VARIABLE	(NO)	(FOR 378 OBSERVATIONS)
GWEPUS	( 2)	
GWPEEC	( 3)	
GWPCAN	( 4)	
GWEPJAP	( 5)	
GWPECCJU	( 6)	
GWPEACTY	( 7)	
GUEPUS	( 8)	
GUEPEEC	( 9)	
GUEPCAN	(10)	
GUEPJAP	(11)	
GUEPECCJU	(12)	
GUEPEACTY	(13)	

## SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)	(13)
( 2)	*****	0.415	0.496	0.427	0.548	0.539	0.832	0.423	0.485	0.378	0.542	0.531
( 3)	8.848	*****	0.414	0.475	0.720	0.722	0.503	0.967	0.425	0.502	0.720	0.724
( 4)	11.074	8.816	*****	0.405	0.747	0.823	0.456	0.435	0.909	0.394	0.702	0.768
( 5)	9.161	10.464	8.602	*****	0.750	0.689	0.455	0.454	0.464	0.900	0.726	0.678
( 6)	12.692	20.136	21.805	21.981	*****	0.980	0.579	0.721	0.762	0.719	0.956	0.944
( 7)	12.420	20.243	28.067	18.452	95.072	*****	0.562	0.724	0.816	0.662	0.937	0.956
( 8)	29.085	11.293	9.938	9.905	13.785	13.169	*****	0.513	0.465	0.451	0.590	0.567
( 9)	9.042	73.710	9.371	9.891	20.184	20.365	11.593	*****	0.453	0.488	0.750	0.755
(10)	10.747	9.100	42.187	10.144	22.806	27.383	10.190	9.851	*****	0.436	0.767	0.841
(11)	7.907	11.253	8.311	40.060	20.055	17.142	9.809	10.851	9.402	*****	0.752	0.687
(12)	12.508	20.095	19.117	20.489	63.479	51.940	14.171	21.951	23.199	22.128	*****	0.978
(13)	12.147	20.381	23.277	17.879	55.684	63.171	13.354	22.314	30.125	18.351	91.536	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 376

Source: Compiled at the U.S. International Trade Commission.

Note.--The upper rank correlation coefficients are between U.S. tariff using weighted and unweighted nominal tariff averages, variables 2-7 are from columns 2-7 of Table 8. Variables 8-13 are from columns 2-7 of Table 10.

The lower rank correlation coefficients are between the effective tariff rates derived from GATT imports weighted and non-weighted nominal tariff sources. Variables 2-7 are from columns 8-13 of Table 8, while variables 8-13 are from column 8-13 of Table 10.

CHART 3

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

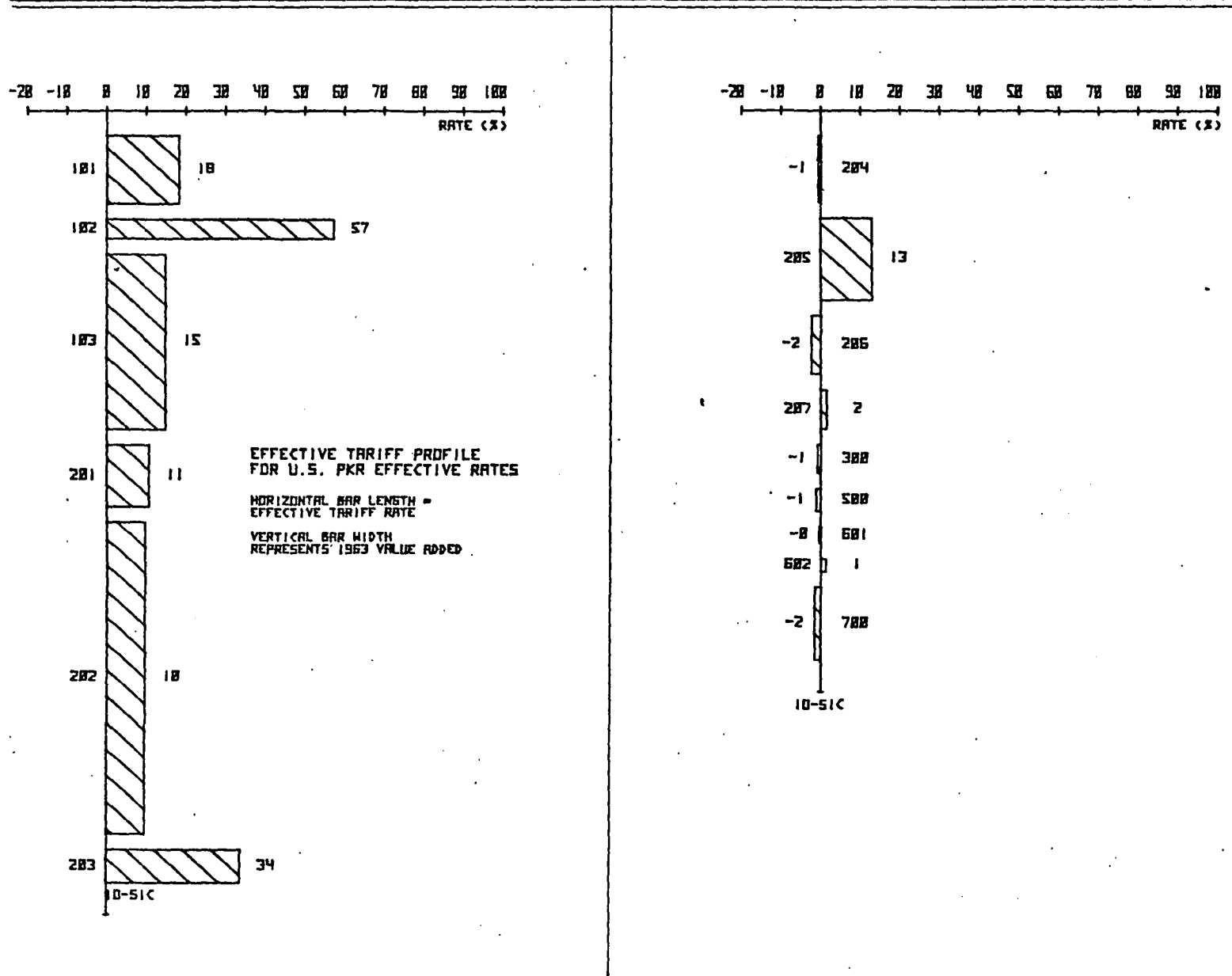


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

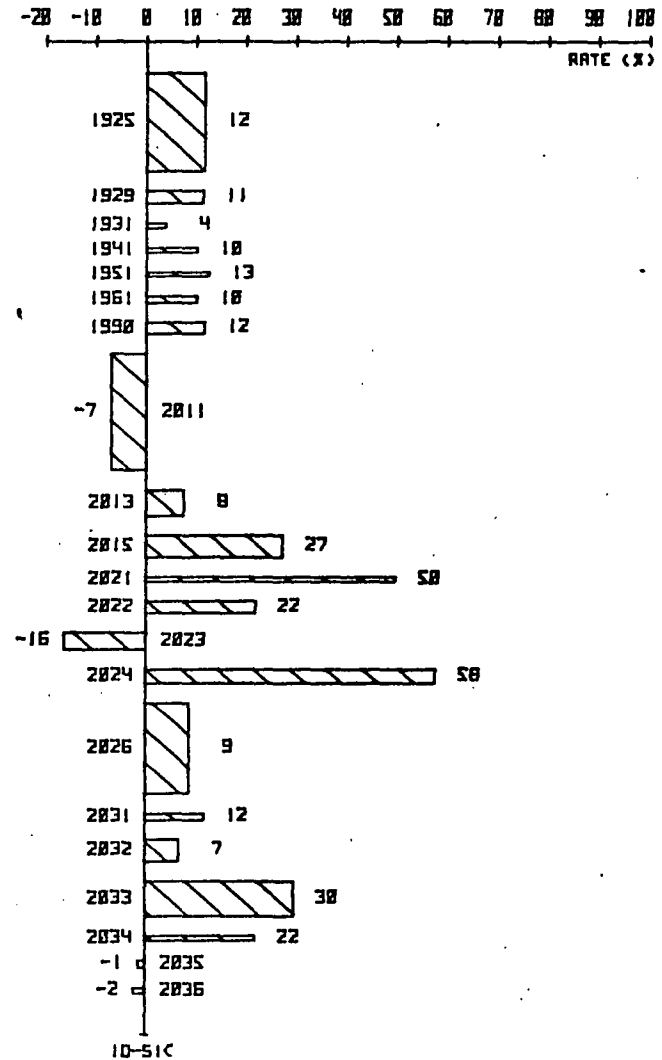
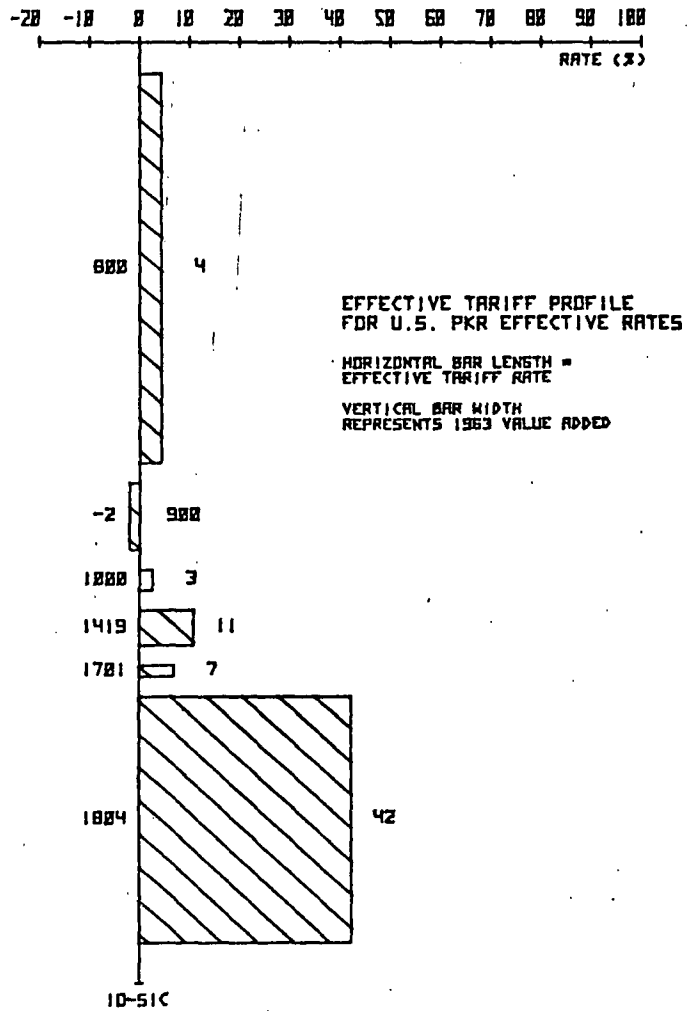


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

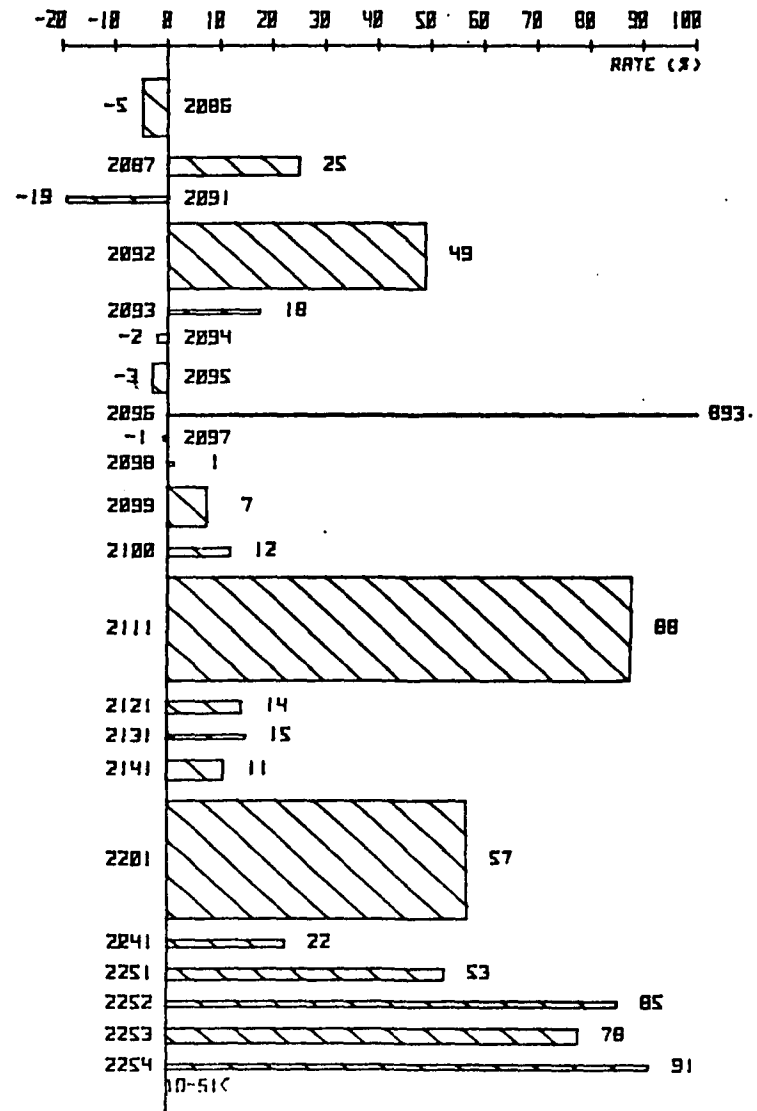
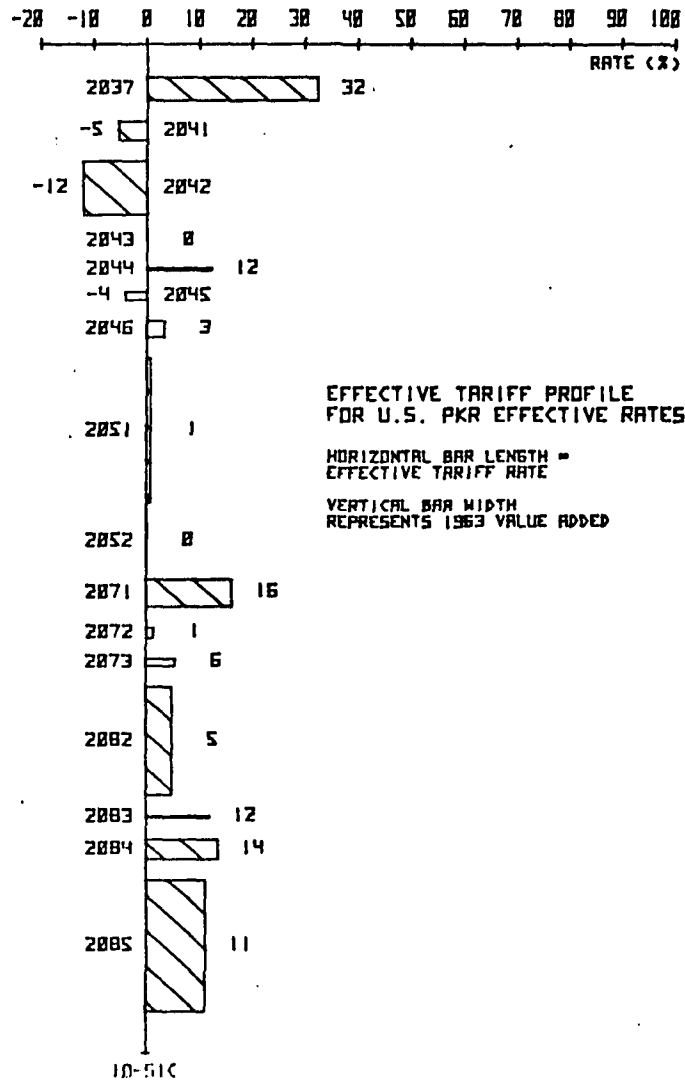




CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

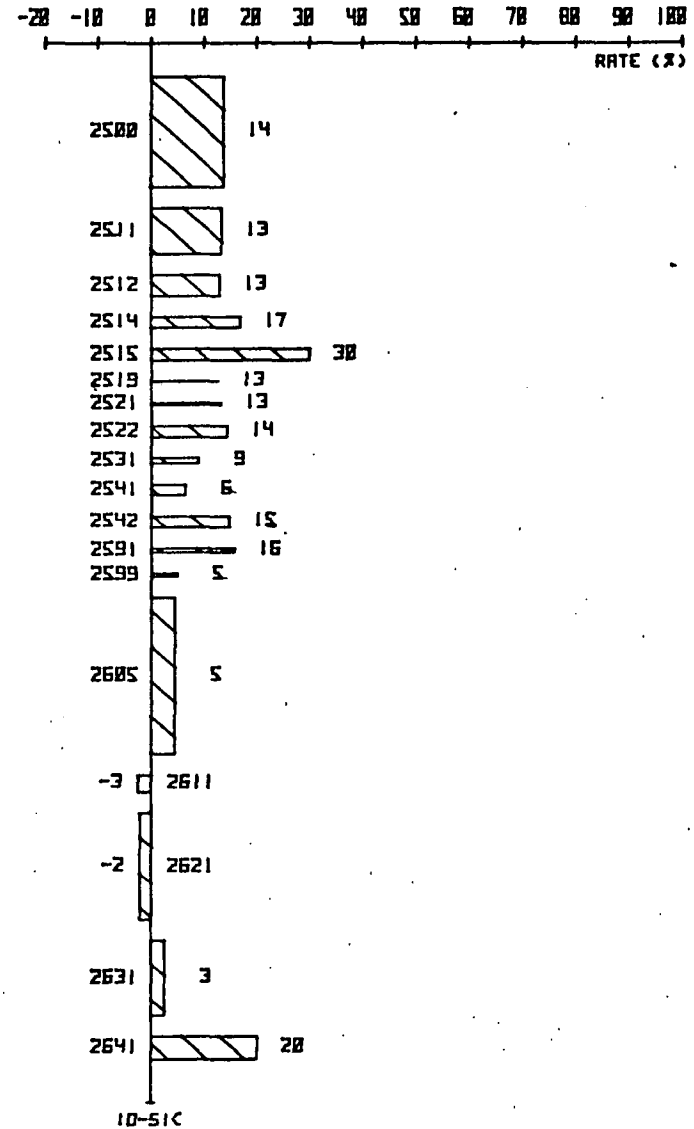
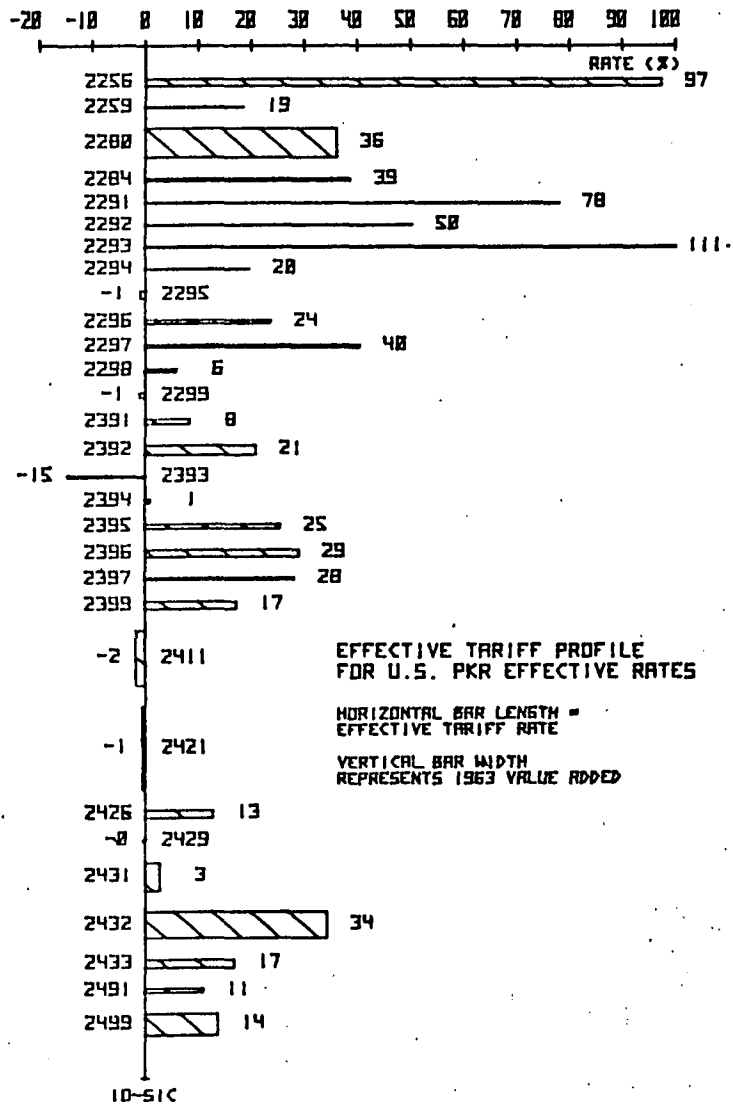


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

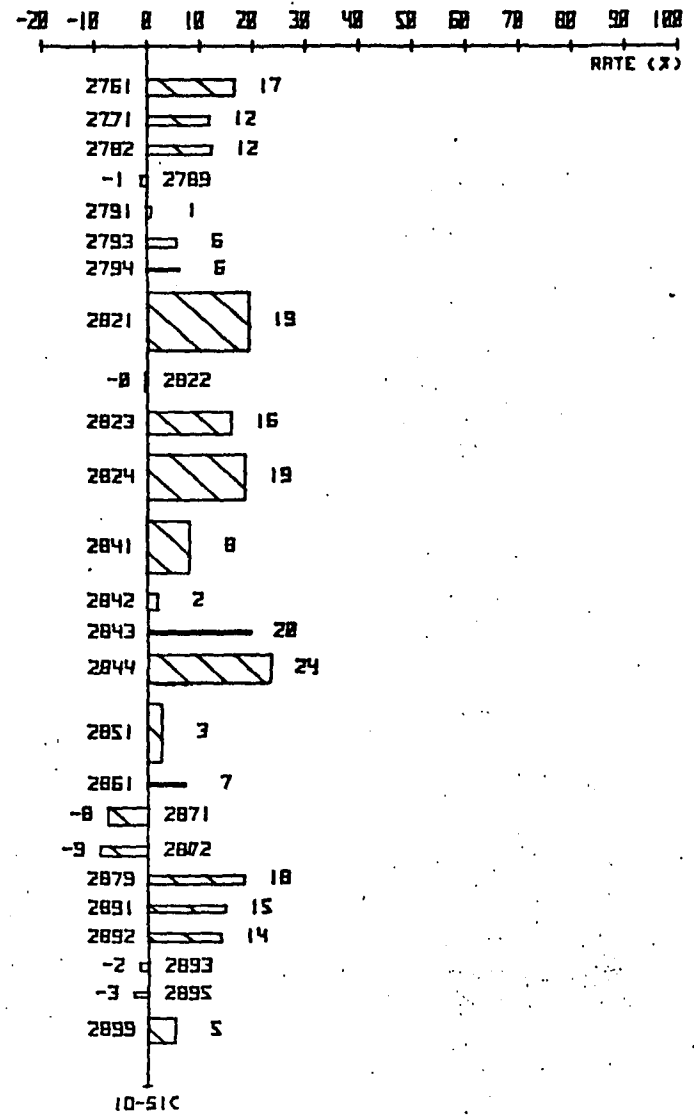
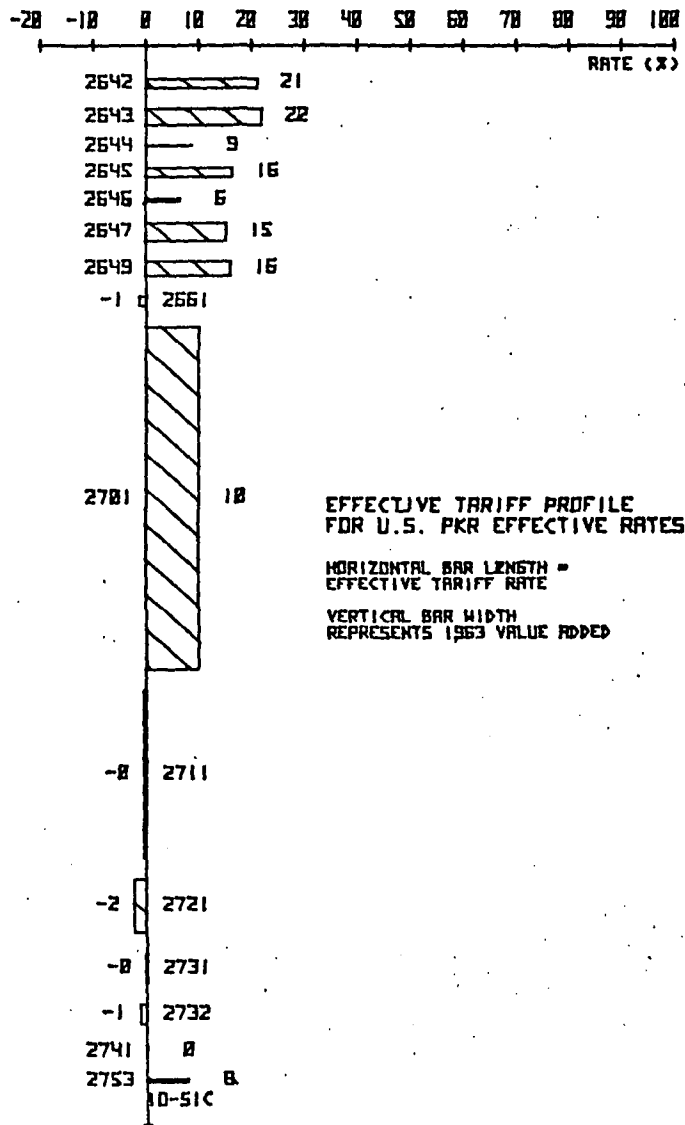


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

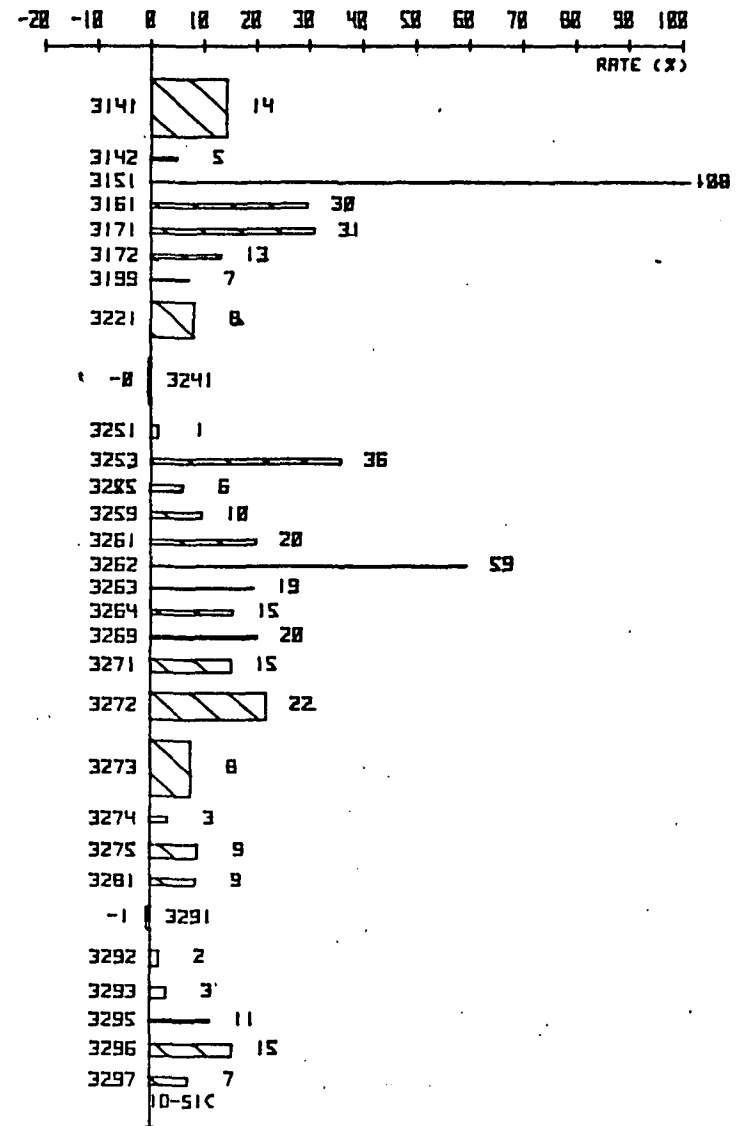
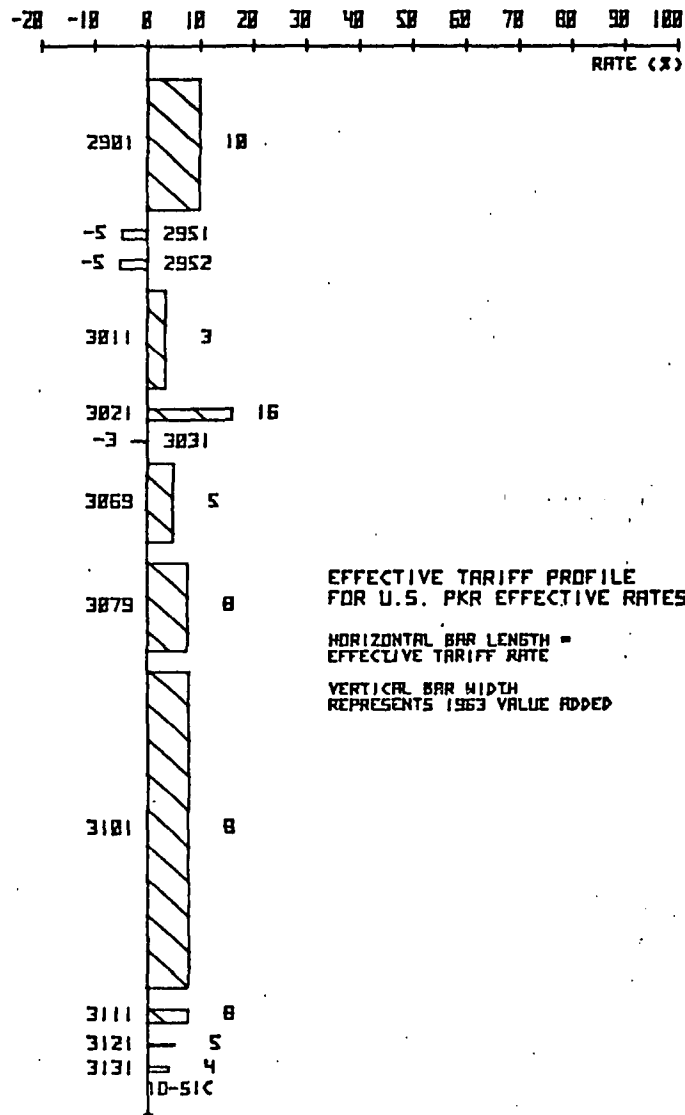


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

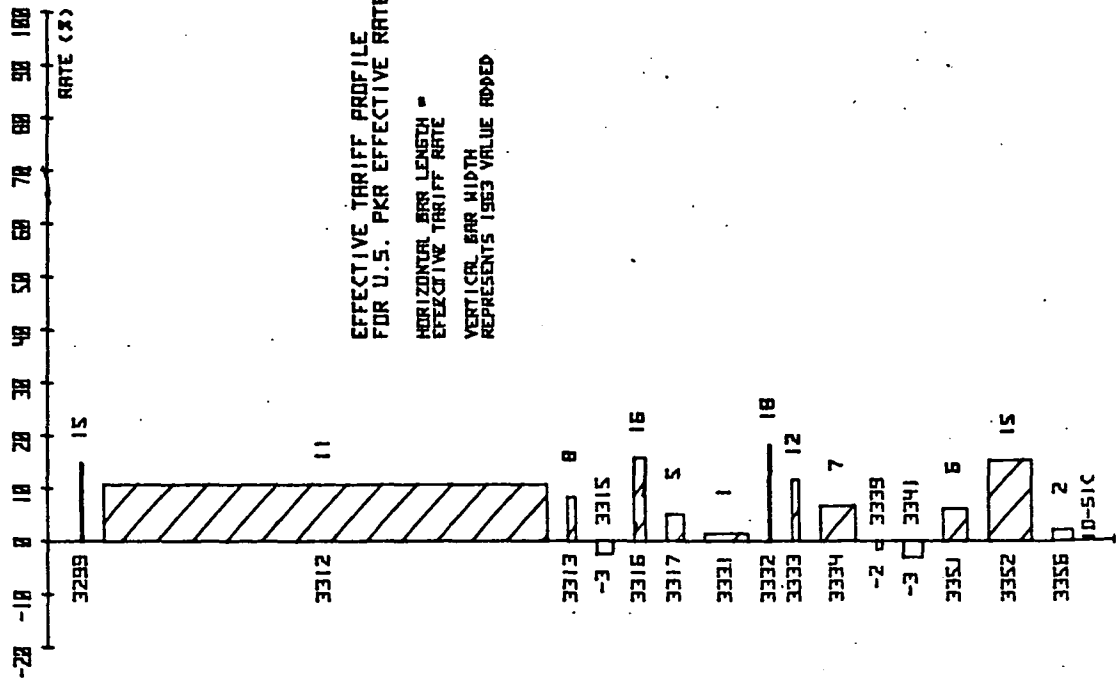


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

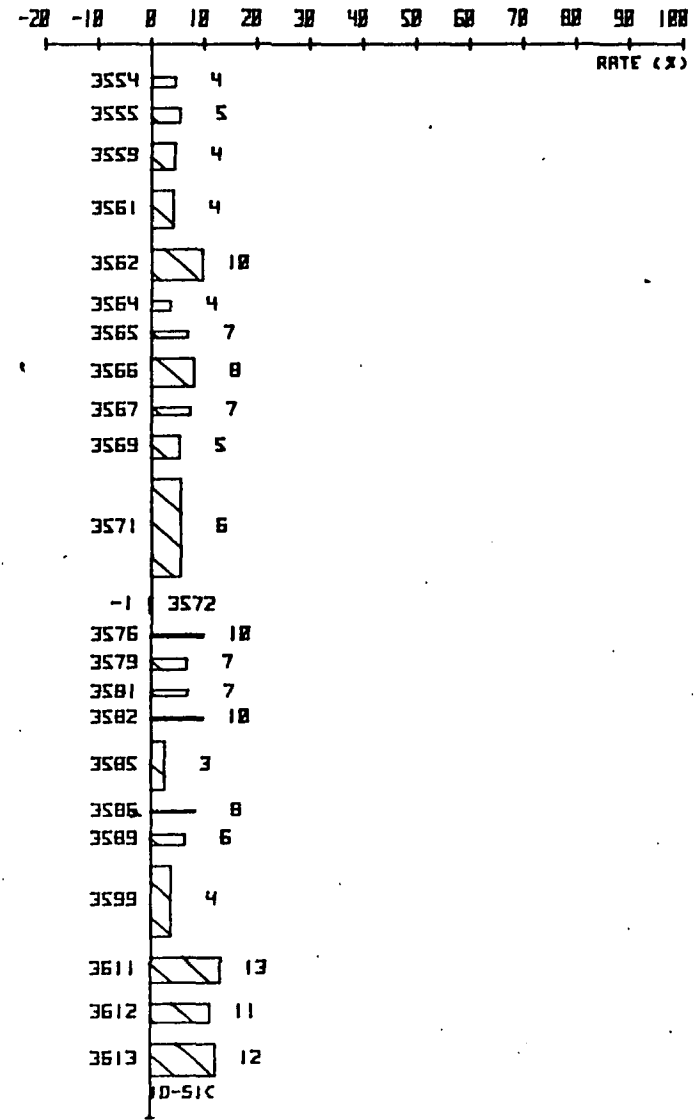
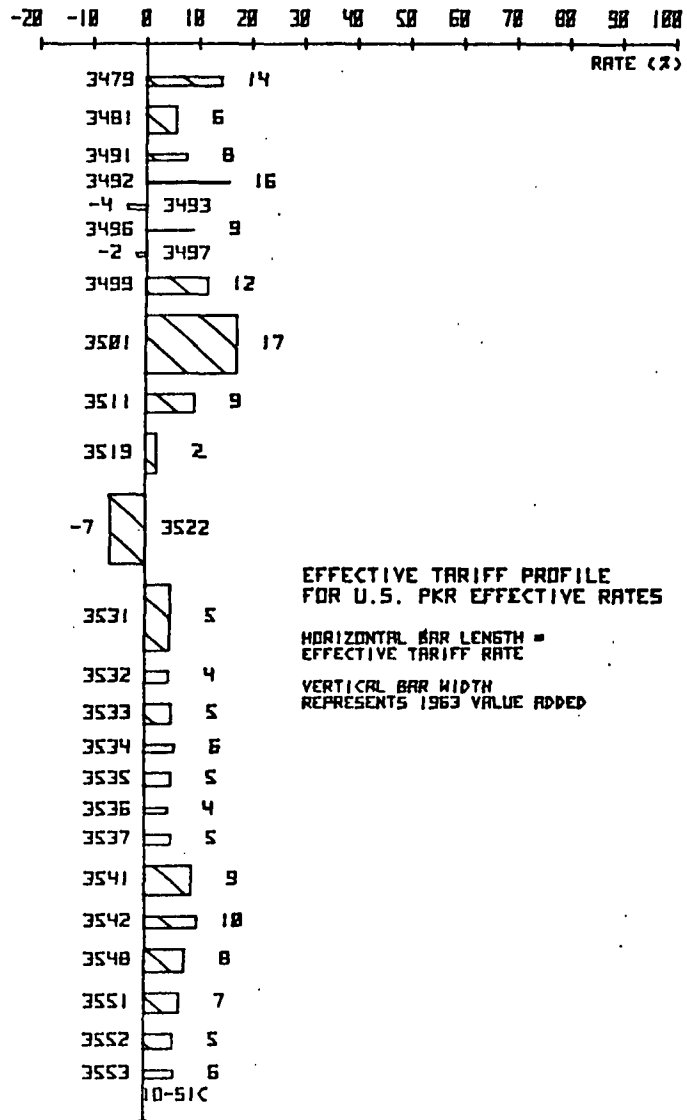
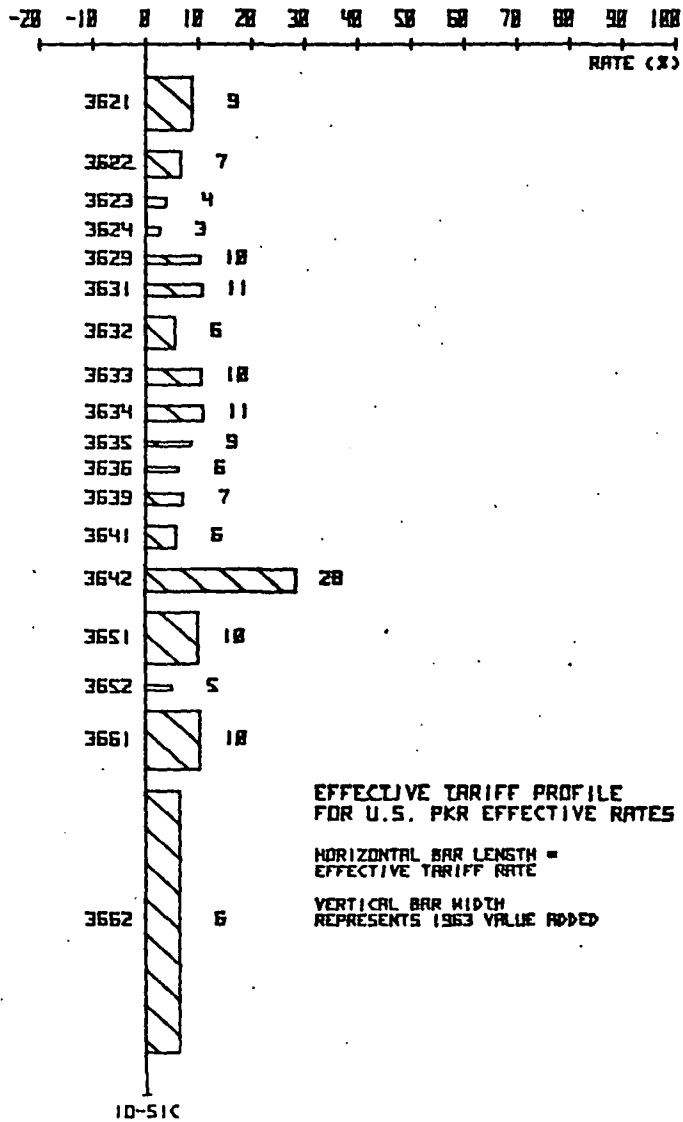


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States



EFFECTIVE TARIFF PROFILE  
FOR U.S. PKR EFFECTIVE RATES

HORIZONTAL BAR LENGTH =  
EFFECTIVE TARIFF RATE

VERTICAL BAR WIDTH  
REPRESENTS 1963 VALUE ADDED

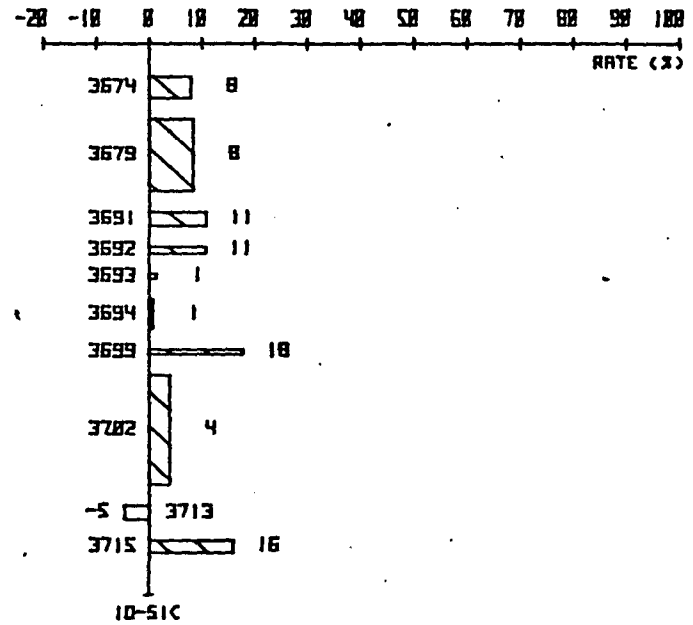


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States

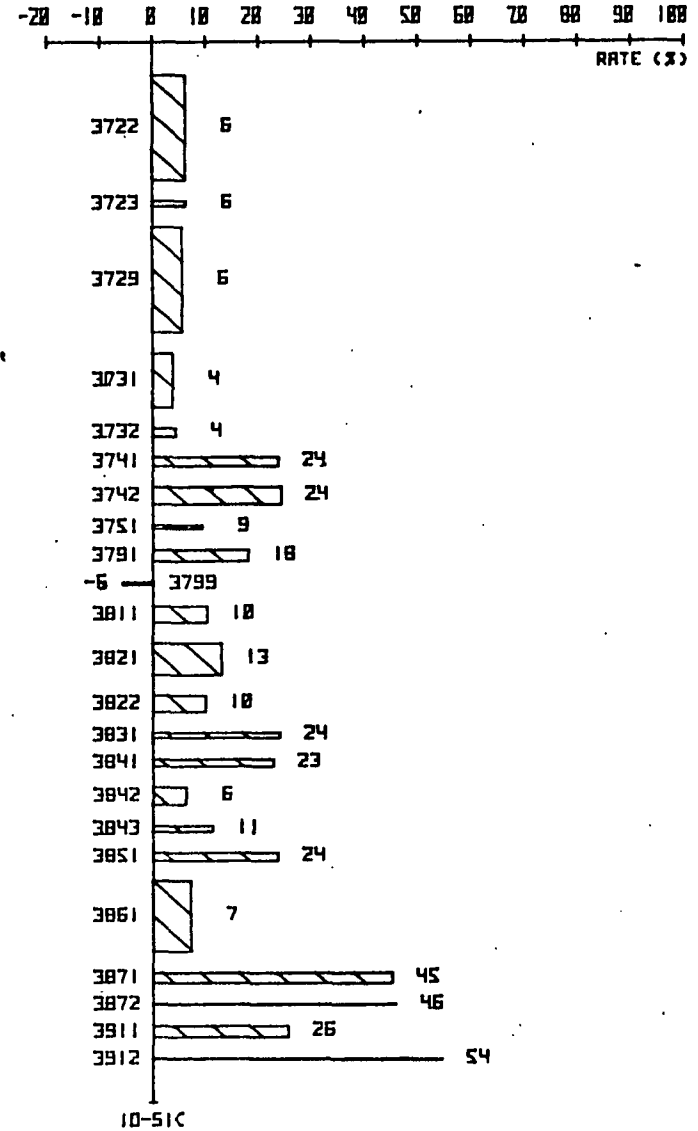
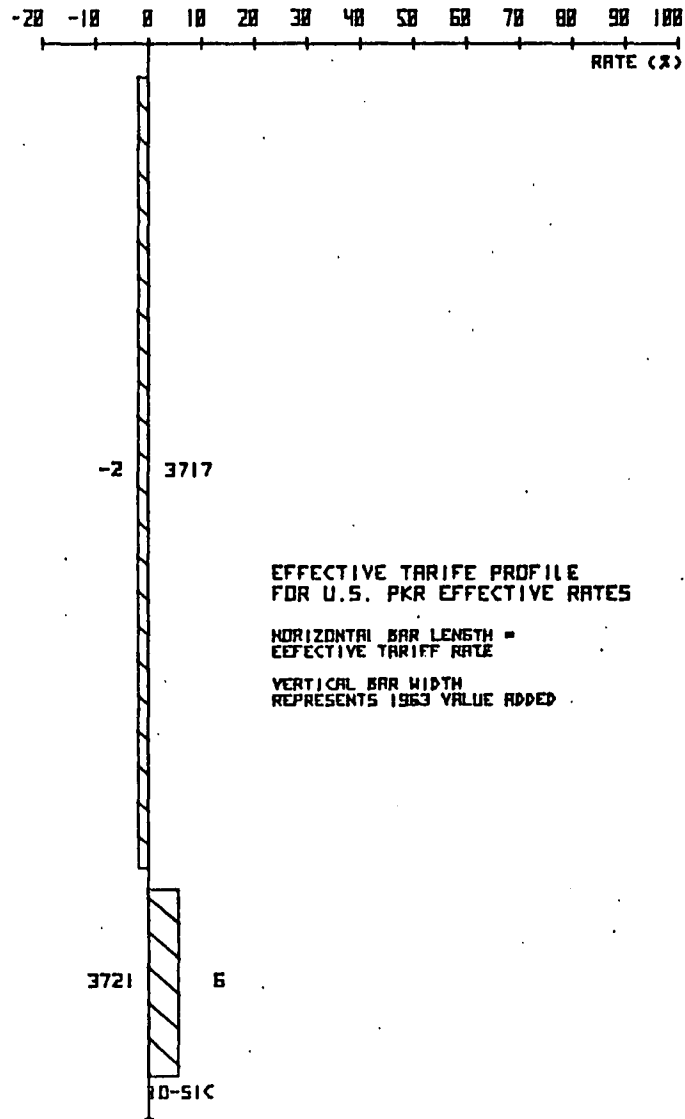
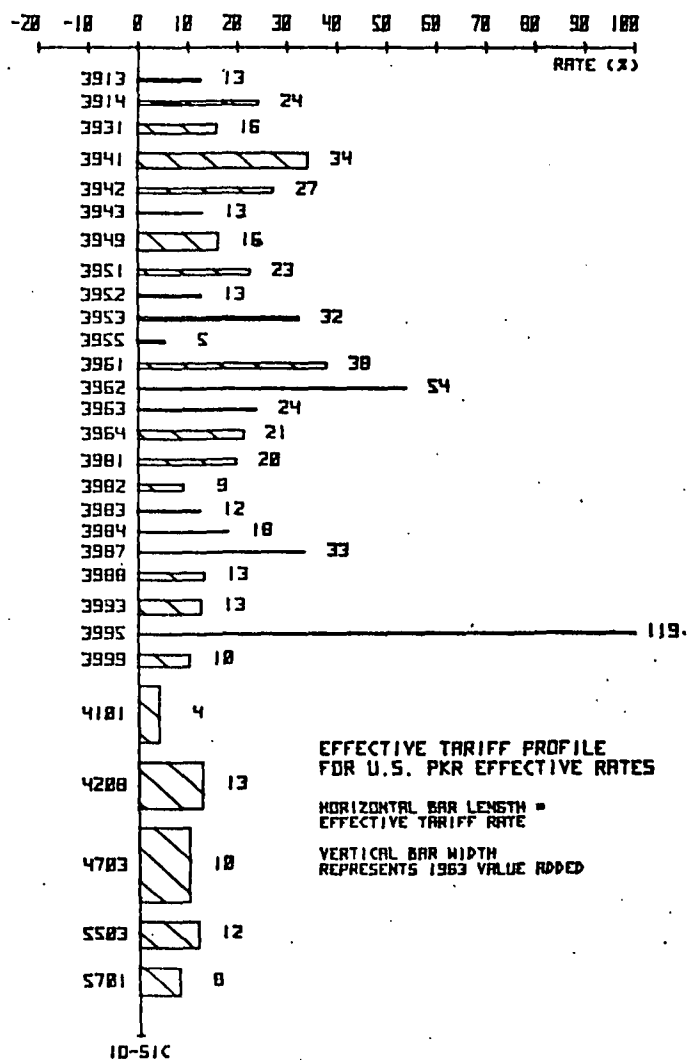


CHART 3--Cont.

Effective tariff profiles for Post Kennedy Round (PKR) effective tariff rates for the United States





Source: The U.S. PKR effective tariff rates are from table 8, column 7. The 1963 value-added weights representing the bar width are from the 478 sector input-output table for the United States.

Note: To the extent that value-added has grown roughly proportionally in all sectors of the economy, the 1963 value-added weights are rough approximations for sector sizes in later years.

A bar to the left of the origin indicates a negative average effective tariff rate for the sector. The sectors shown are those producing traded goods. It should be noted that sectors which do not produce traded goods also have effective tariff rates.

A crude interpretation of the shaded area of a bar would be that it represents the amount of subsidy received by the factors of production in a sector because of the tariff structure. The area of a bar to the left of the origin represents the net loss incurred by factors of production in that sector because of the tariff structure.

CHART 4

Bar graphs of the differences between U.S. and foreign average effective tariff rates

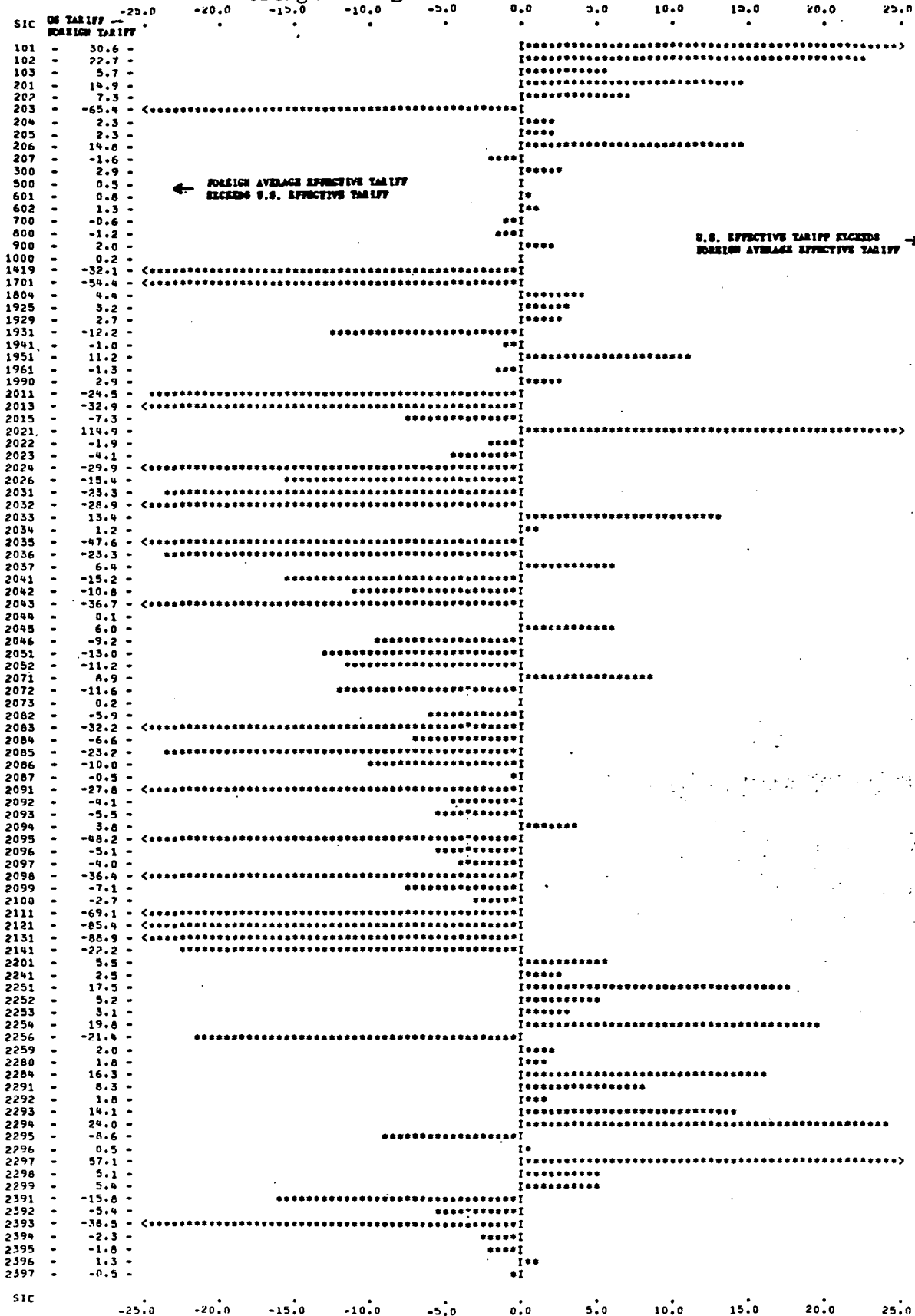
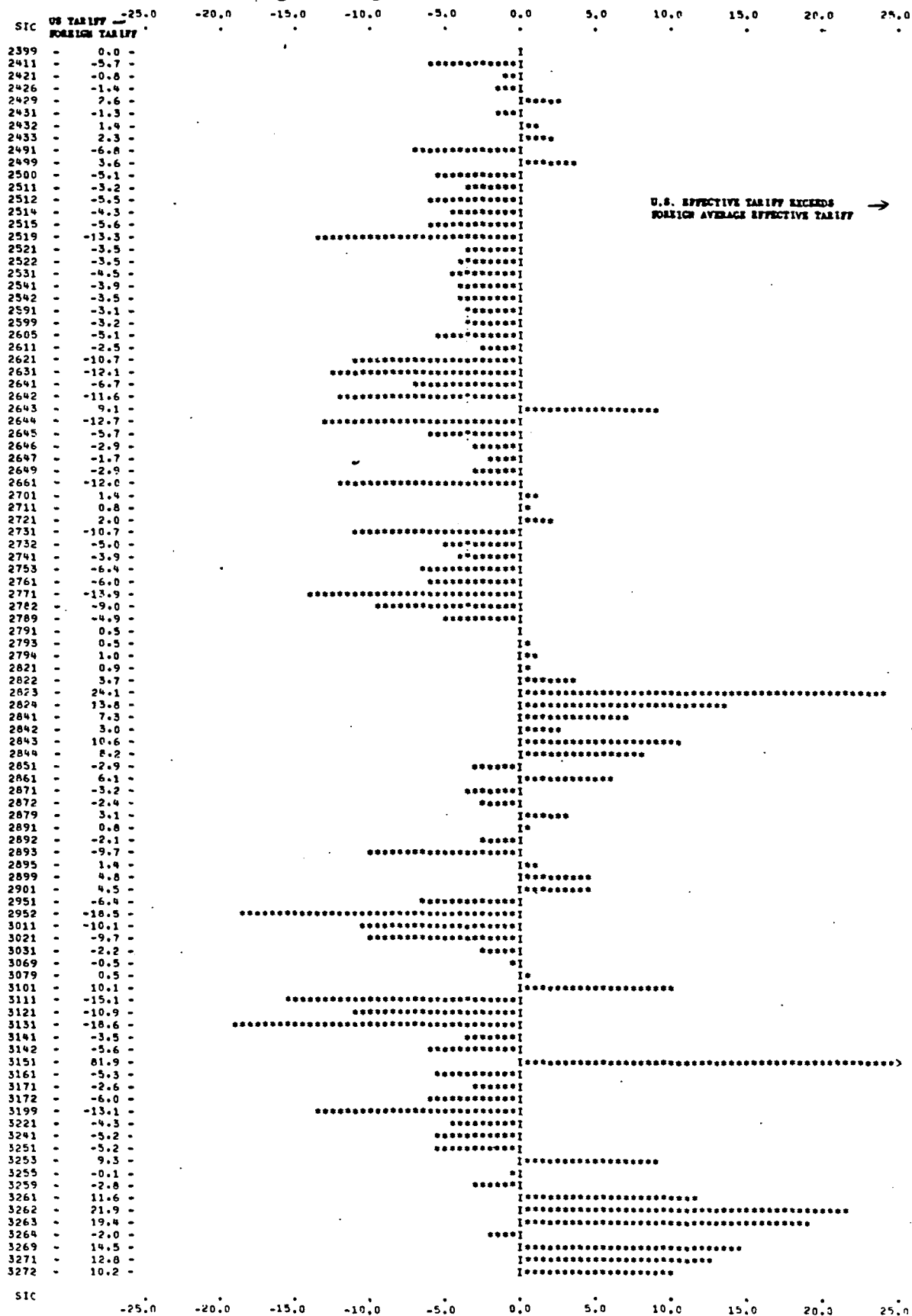


CHART 4--Cont.  
 Bar graphs of the differences between U.S. and  
 foreign average effective tariff rates



U.S. EFFECTIVE TARIFF EXCEEDS FOREIGN AVERAGE EFFECTIVE TARIFF →

CHART 4--Cont.  
 Bar graphs of the differences between U.S. and  
 foreign average effective tariff rates

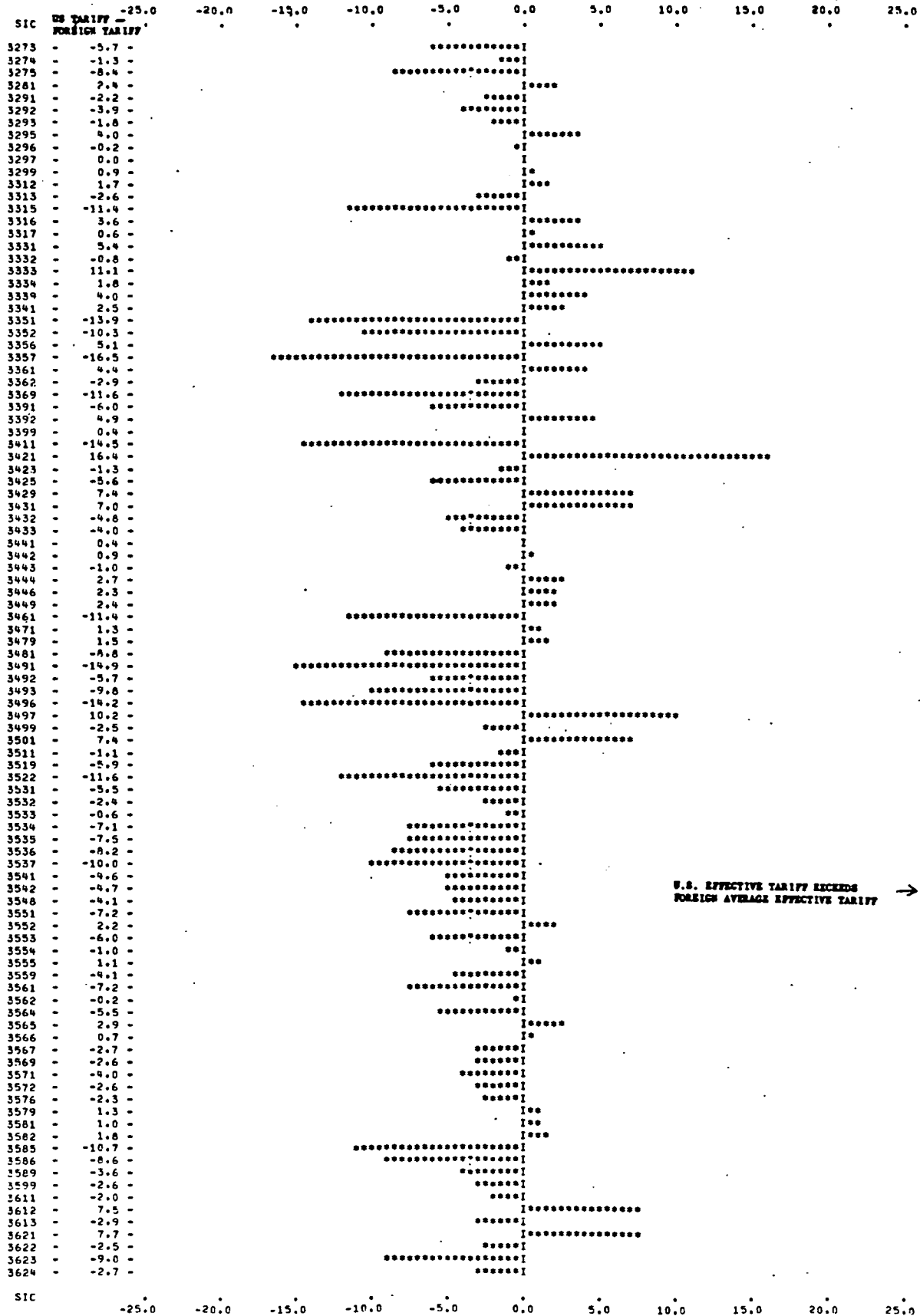
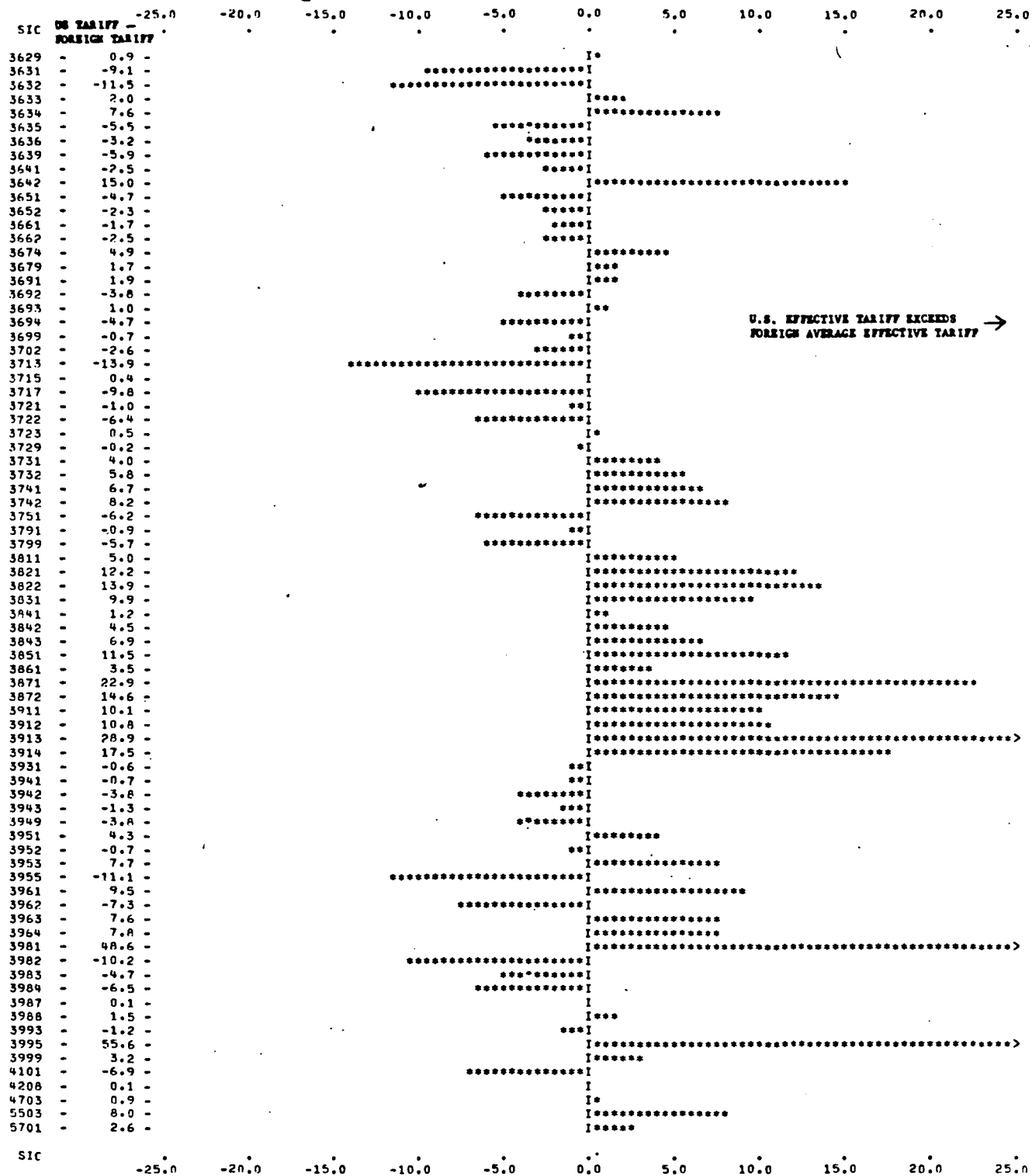


CHART 4--Cont.  
 Bar graphs of the differences between U.S. and  
 foreign average effective tariff rates



Source: The U.S. and foreign average effective tariff rates from which the difference was derived come from columns 8 and 13 respectively, of table 10.

Table 13.--Overall averages of nominal and effective tariff rates for the United States

Year	: Using import weights		: Using unweighted nominal	
	: on nominal tariffs		: tariffs	
	Nominal	Effective	Nominal	Effective
	Percent	Percent	Percent	Percent
1965-----	6.9	8.1	7.8	9.2
1970-----	5.7	7.6	6.1	6.7
PKR-----	5.1	5.4	5.2	5.6

Source: Compiled at the U.S. International Trade Commission from data in tables 8 and 10.

Note.--Nominal rates were aggregated over 470 sectors using 1963 total shipment values from the input-output table. Effective tariff rates were aggregated by using versions of 1963 free-trade value added from the tables. The use of a single 1963 free-trade value added figure for aggregation was not the best procedure from a theoretical point of view, but after eliminating several anomalies from the input data, satisfactory averages were derived.

## PART III

## TOWARDS MEASUREMENT OF COMPARATIVE ADVANTAGE

An interesting question for trade negotiations is "wherein lies U.S. comparative advantage (CA) in international trade?" A theoretically and empirically sound ranking of all sectors of the U.S. economy by their comparative advantage would greatly aid policymakers in rational choices of negotiating strategy. The ultimate goal should be an operable model which would predict the costs of and the benefits from proposed changes in the protection structure of both the United States and its trading partners. 1/

This section presents a model (based on the effective tariff concept) which points to some crude comparative advantage measures that would add to the usefulness of effective tariff rates. 2/ The model is a step towards the construction of something more general; it forces researchers to face up to the data and methodology problems that would come with a more useful predictive model.

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1/ An example of such a model of a linear programming type is presented by Evans for Australia in Effective Tariff Protection, op. cit.

2/ The model is found specifically in the following three sources:

1. Findlay, R. "Comparative Advantage, Effective Protection, and the Domestic Resource Cost of Foreign Exchange," Journal of International Economics, I (May 1971), pp. 189-204.

2. Kemp, M., The Pure Theory of International Trade, Prentice-Hall, Englewood Cliffs, N.J., 1964.

3. Roningen, Effective Tariff Protection, op. cit.

The more complicated models, such as the Evans one mentioned previously, add complexity and a dynamic formulation.

The Findlay article (ref. above) and others have shown that effective tariff rates come close to measuring comparative advantage in a static sense under certain conditions.

The chief benefits of the model are that it forces an operational definition of comparative advantage and that it combines data from various sources in a logically sound framework. The variables in the model are defined below:

Let:

$V_i$ =value-added per unit output per year in the  $i$ 'th industry  
 $W_i$ =wage per employee per year in the  $i$ 'th industry  
 $r_i$ =rate of return (%) to capital in the  $i$ 'th industry  
 $L_i$ =employees per unit output per year in the  $i$ 'th industry  
 $K_i$ =physical capital per unit output in the  $i$ 'th industry

If  $V_i$  is defined as it is in Part II, then  $V_i = r_i K_i + w_i L_i$

A useful set of variables is the ratios  $K_i/V_i$  and  $L_i/V_i$ . They give the amount of capital (in \$) and the number of employees required to produce a dollar of value-added in the  $i$ 'th industry in a year. These two numbers measure a year's resource requirements for a dollar's value added at observed prices (which are embedded in  $V_i$ ,  $V_i = P_i - \sum_j a_{ij} P_j$  from Part II). <sup>1/</sup>

The capital and labor requirements can be plotted on a graph for comparison between sectors. If employees were all receiving the same wage and capital were earning the same return in most industries, then  $r_i = r$  and  $w_i = w$  and  $V_i = rK_i + wL_i$  for most industries. This would mean that most points would lie on the straight line shown in Figure 1.

A point such as the one for the  $i$ 'th industry would lie on the line AB if its factors were earning  $w$  and  $r$ . If a point were at  $s$ ,

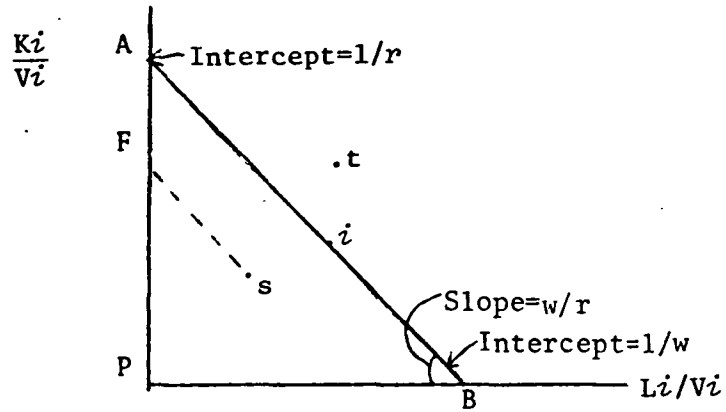
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<sup>1/</sup> Practically, prices and value-added in these calculations are averages of the actual prices and amounts of value added accompanying the many products produced in a sector.



Figure 1

Capital and Labor Requirements Per Unit  
Value-Added



such an industry would be using less factors (capital and labor) to produce a dollar of value added. It would therefore be more efficient and its factors would earn  $w_i > w$  or  $r_i > r$  or both.

An industry at point t would take more factors to produce a dollar of value-added and hence would be less efficient than a point on the line AB. Either its employees would receive a lower wage or its investors would receive less profits or both. To the extent that resources are mobile over time, they would want to transfer from such industries to those such as i or s where they would earn more.

If some industries (such as s) were not on line AB, the use of the ratio  $w/r$  could be used to convert labor into capital units and sum them to FP, a measure of total factors used per dollar of value-added at average or "overall" relative factor prices. Thus, the distance FP would be a total factor cost measure, and its reciprocal could be defined as a measure of Comparative Efficiency (CE) for the sector "s" ( $1/FP \equiv CE$ ). It would be the amount of value-added generated per unit factor (in capital units) in an industry at the average relative rate of factor return. It could be compared with CE measures in other sectors. Such a measurement assumes that capital values and numbers of employees move more slowly in time than prices and that capital and labor do move from sector to sector in response to prices as they affect their earnings. These are reasonable economic assumptions which are embedded in most economic analysis in one form or another. The model is static and therefore does not specify how fast resources will

move in response to price incentives (such information is the core of operation of a dynamic model).

The CE measure is not only one of relative efficiency between domestic industries, but it is also the only one of relative comparative efficiency in traded goods. If all output is tradeable, then a dollar earned (from adding value to any product) can be spent on any import at the given exchange rate. 1/ It is obvious that factors in industries such as  $s$ , because they use less of themselves to earn a dollar and thus a dollar's worth of foreign exchange, can buy more imports than the factors in industry  $t$ . Conversely, less factors are used to earn a dollar or a dollar's worth of foreign exchange via exports in industry  $s$  than in other industries. Hence the CE measure covers true comparative efficiency in the economic sense both in comparison of relative economic efficiency among domestic sectors and in relative efficiency in producing goods for foreign markets.

Part II showed that protected unit value-added ( $V$ ) and free trade unit value-added ( $V^F$ ) are related by the effective tariff rate, i.e.,  $V_i = V_i^F (1 + ET_i)$ .

Assuming that points on the line AB in figure 1 represent an equilibrium in a protected price structure, application of the ET rate to  $V_i$  will give the free trade amount of factors needed to produce a dollar of value-added assuming protection is removed. 2/

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1/ If some sector's output is not traded, the same efficiency arguments apply.

2/ This statement also involves an assumption of no relative factor price changes or non-traded goods price changes or exchange rate changes occurring when protection is removed. These assumptions must be paid some attention in terms of a more realistic model. (See Evans and Roningen, op. cit); but as a first approximation and considering measurement problems for even the simple model, these assumptions are not too restrictive.

Thus an ET rate of 100 percent would mean that  $V_i^F = V_i / (1 + 100/100) = V_i/2$ . Then twice as many resources would be needed to produce a dollar of free trade value-added. The free trade resource requirements of such a sector would be represented by a point twice as far from the origin as the protected point.

Conversion of points in Figure 1 to their free trade equivalents can be done by multiplying the protected point by one plus the ET rate. A definition of comparative advantage would then be the above comparative efficiency measure adjusted to the free trade level stated by the effective tariff rate.

Such a model gives a logical definition of comparative advantage in terms of total resource productivity and protection-caused divergencies between domestic and foreign prices. Comparative advantage so defined sounds reasonable and simple, although the measurement problems are difficult.

#### The Data

Various data sources were used to derive measures for the model described above and to use regression analysis in testing various hypotheses. Data variables will be simply defined in the text where necessary and will be referenced by their computerbank names. Appendix F contains sources for the variables.

The problems involved in applying data to the model described in Figure 1 are readily apparent when one looks at the scattered data points in Charts 5 and 6. Here, for most IO-SIC manufacturing sectors,

are plots of capital per unit value-added versus labor per unit value-added. Chart 5 uses data for 1967 while Chart 6 gives 1970 data. A hypothetical equilibrium line has been drawn in each graph. The intercepts were calculated using the average wage (total wage bill/total employment) and the average rate of return to capital (total value-added minus (taxes plus depreciation) minus wage bill/total capital stock). For 1967 this represented a rate of return to capital slightly over 20 percent and an average wage of about \$7,000. <sup>1/</sup> It is evident from the charts that the observed measures are not in equilibrium. Since the data used are from standard sources and are used in most studies of trade and industrial performance, why is the scatter of points so far from the theoretical equilibrium situation?

There are two possibilities. First, the data may be incorrect; second, the model might be inadequate because it does not account for the true equilibrium (or dis-equilibrium as the case may be). Something can be said about each of these aspects.

The possibilities for data error are considerable. Capital stock estimates are not known for their reliability; indeed, the method of valuation is questionable if asset values are a strong function of returns earned. Capital here includes total values of fixed assets, estimates of rented assets, and average inventory stocks held. These data items do not originate from the same source as the labor data (number of total employees); hence there might be a category matching

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<sup>1/</sup> Only a uniform depreciation figure has been subtracted. Ten percent of fixed assets was subtracted from value-added. The intercept rates of return to capital and labor were in effect sector size weighted averages for the manufacturing sector.

CHART 5: Observed 1967 capital and labor requirements per dollar of value-added.

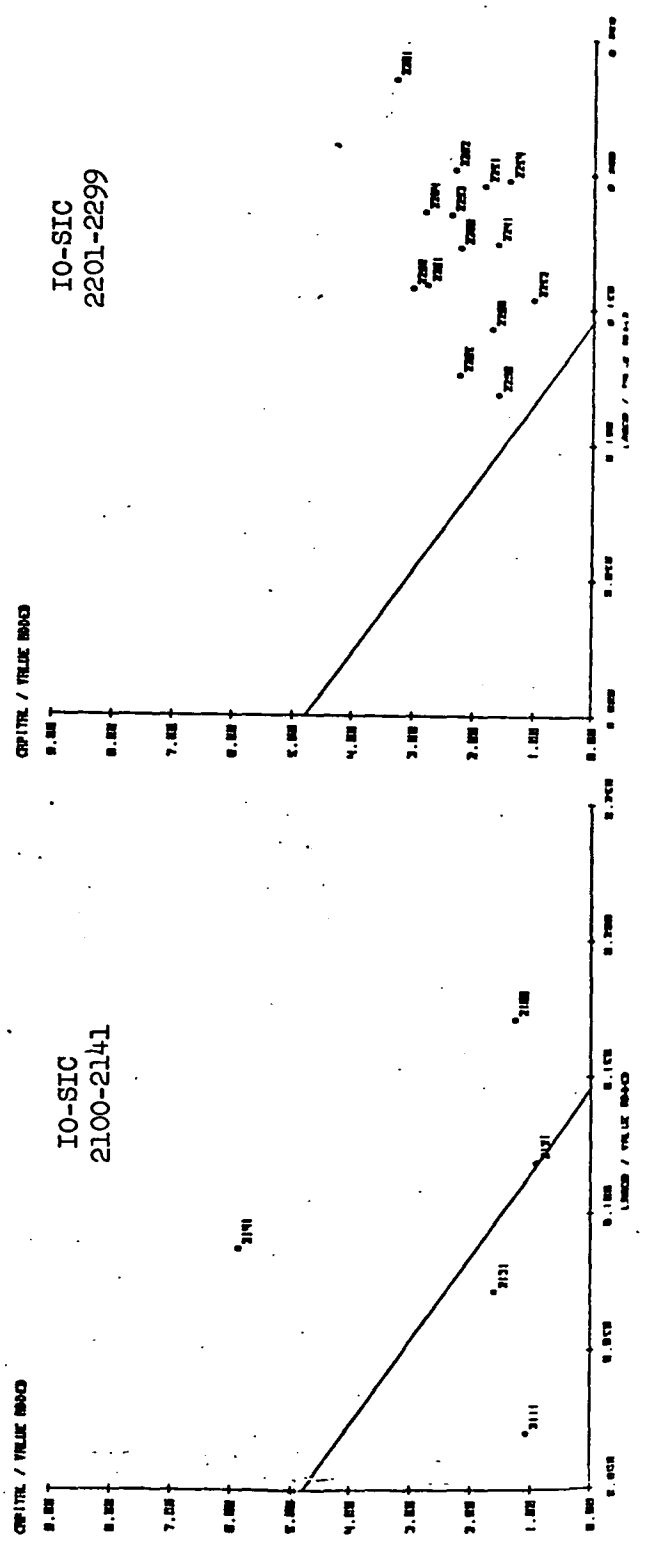
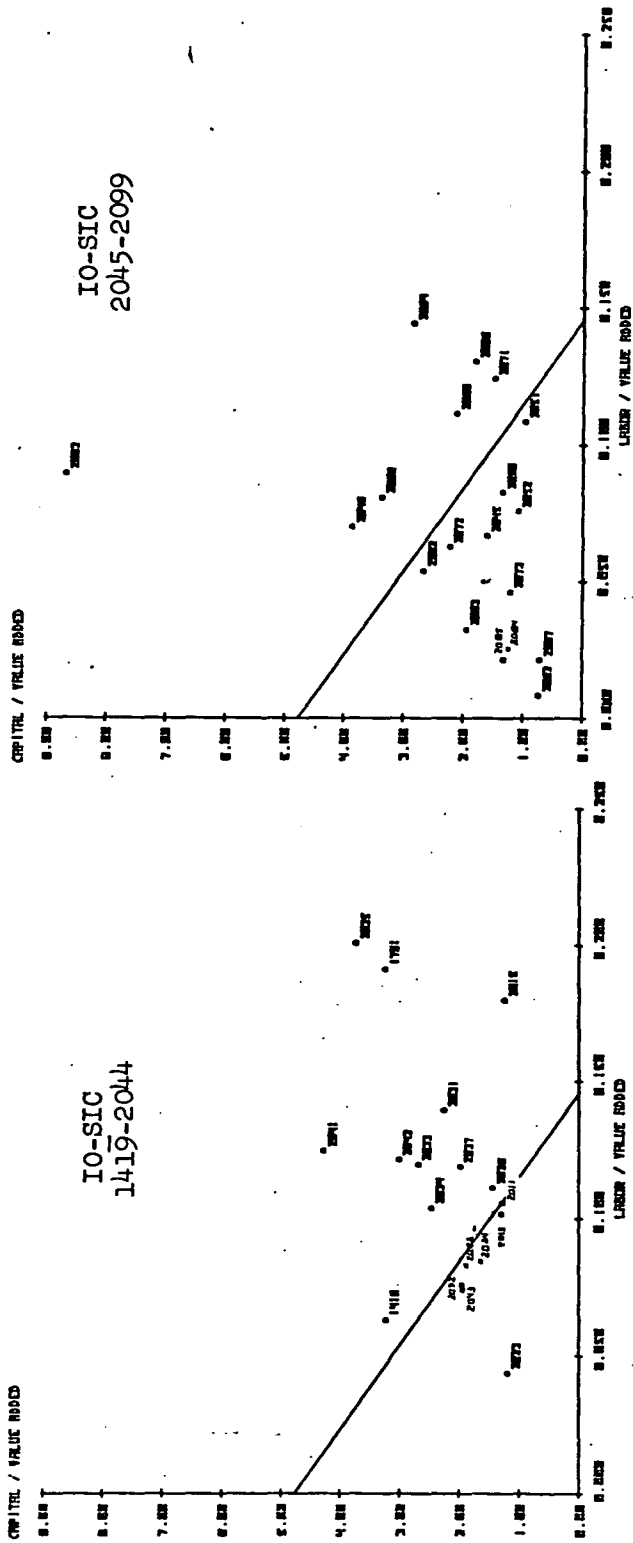


CHART 5: Observed 1967 capital and labor requirements per dollar of value-added--Continued

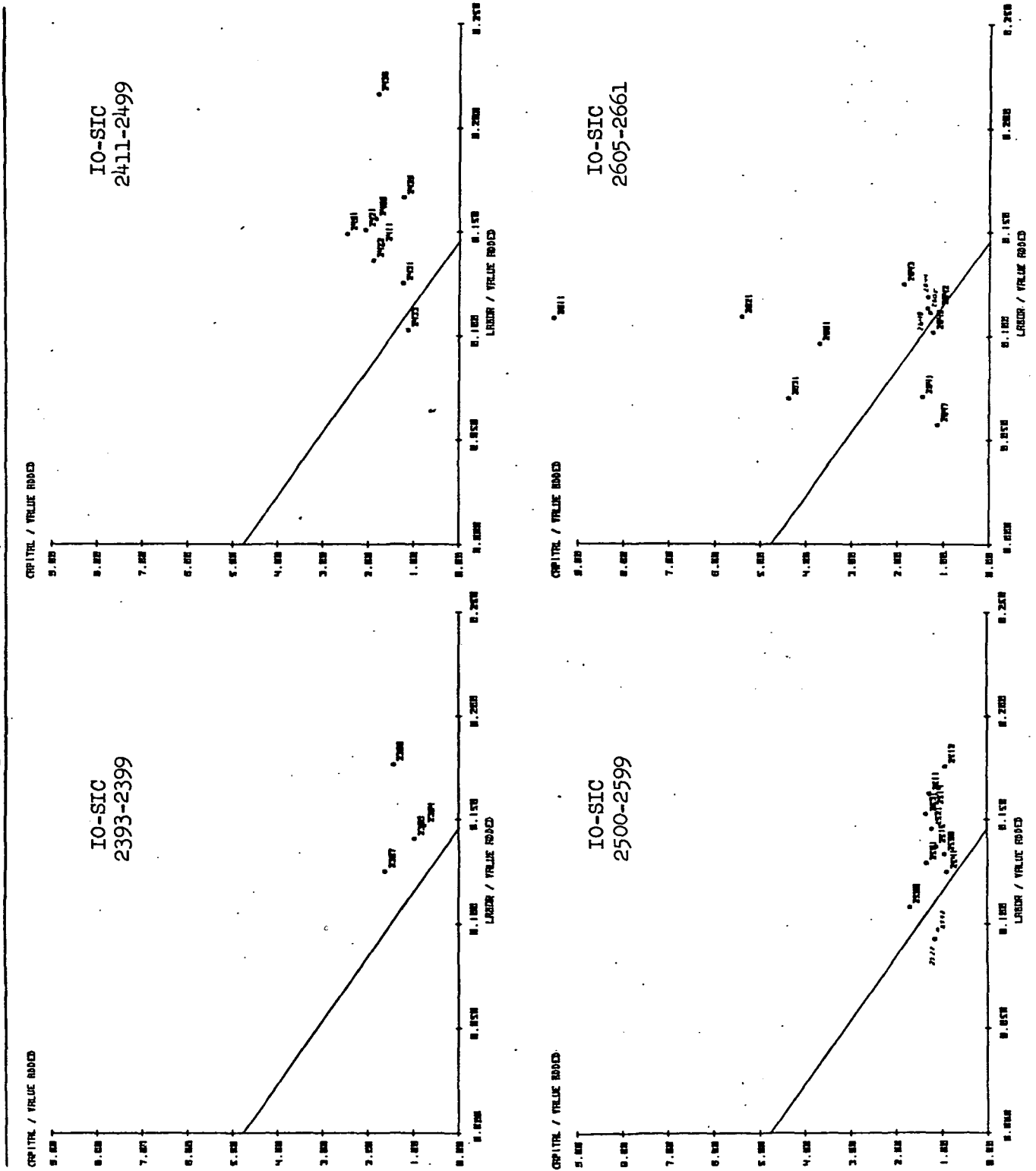


CHART 5: Observed 1967 capital and labor requirements per dollar of valued-added--Continued

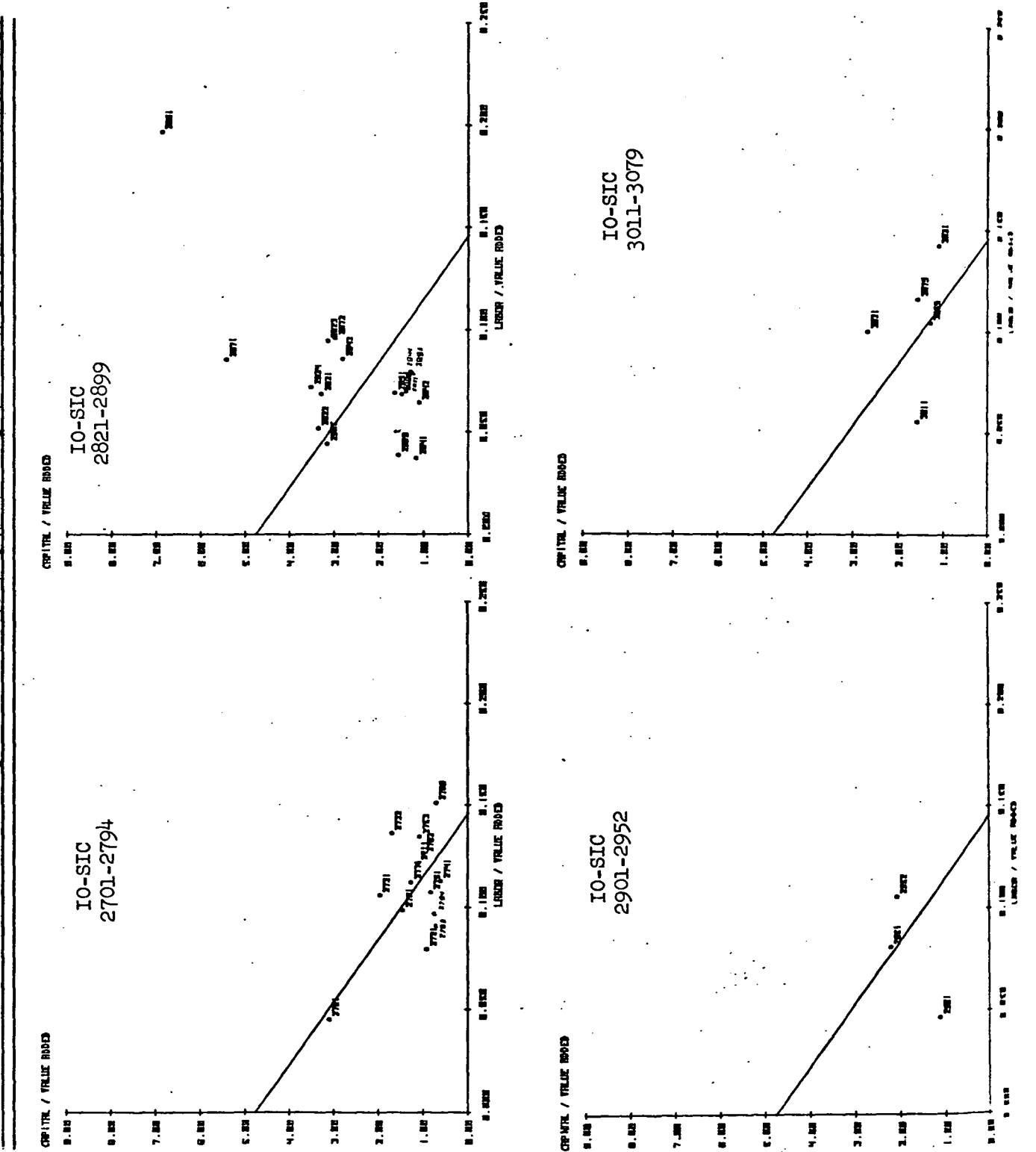




CHART 5: Observed 1967 capital and labor requirements per dollar of value-added--Continued

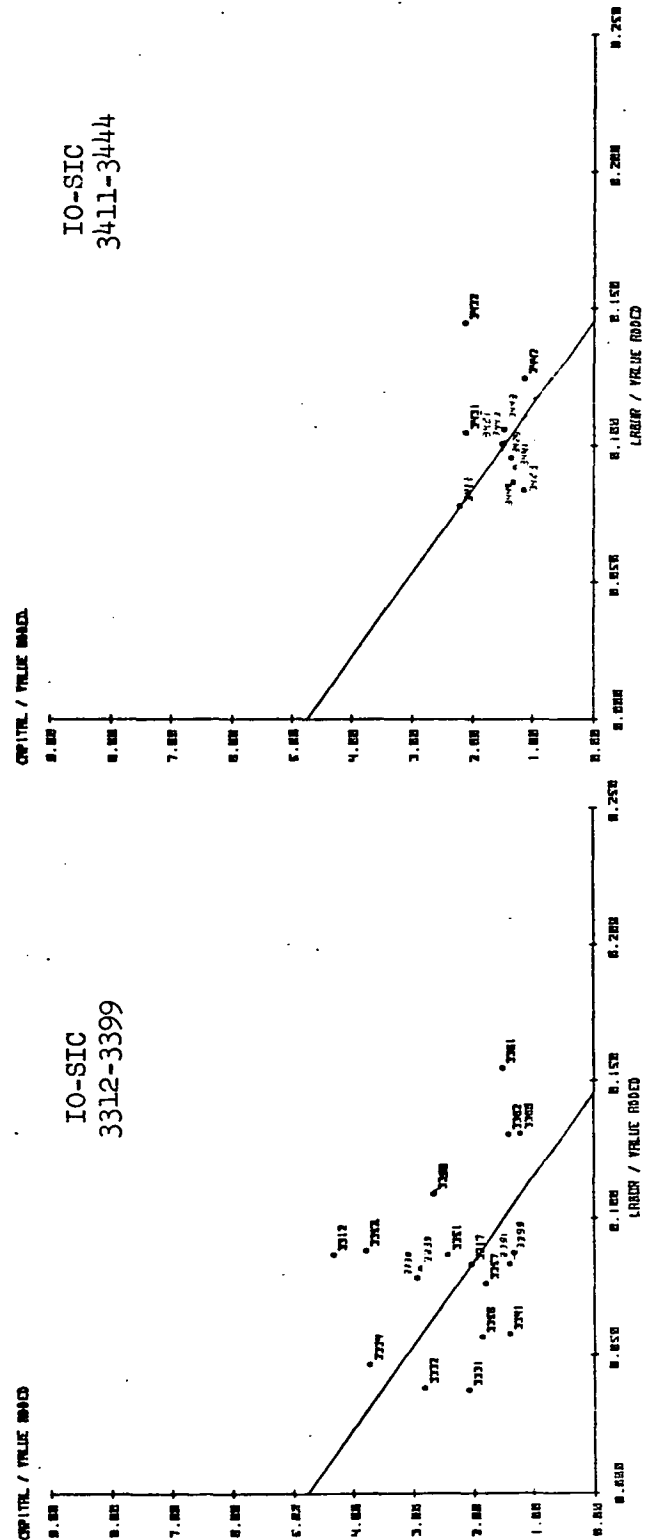
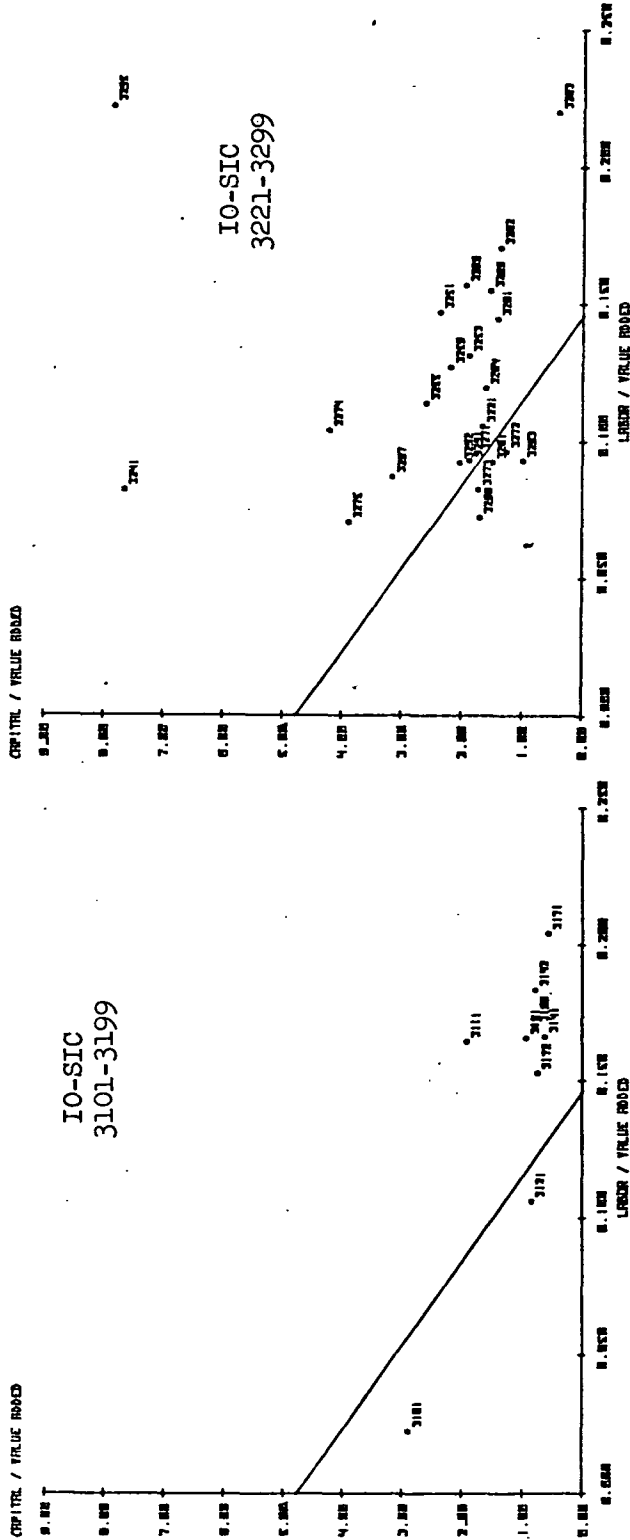


CHART 5: Observed 1967 capital and labor requirements per dollar of value-added--Continued

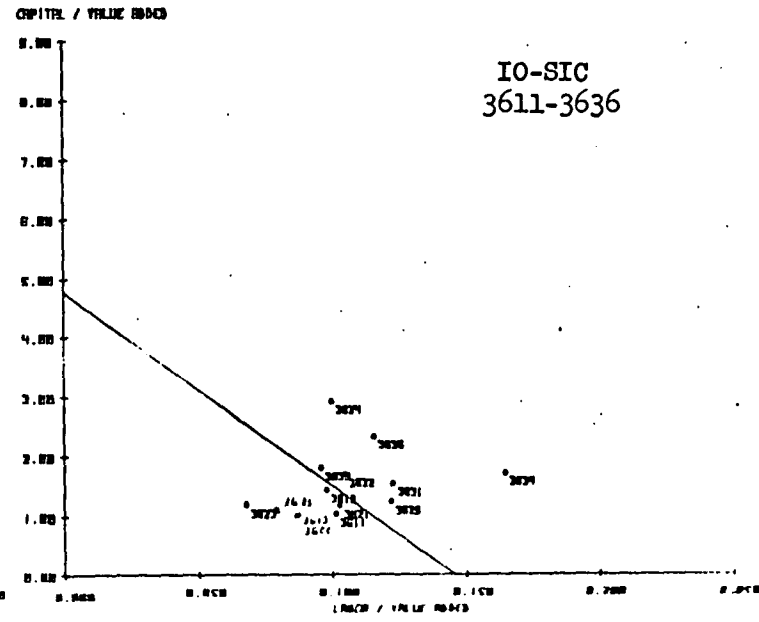
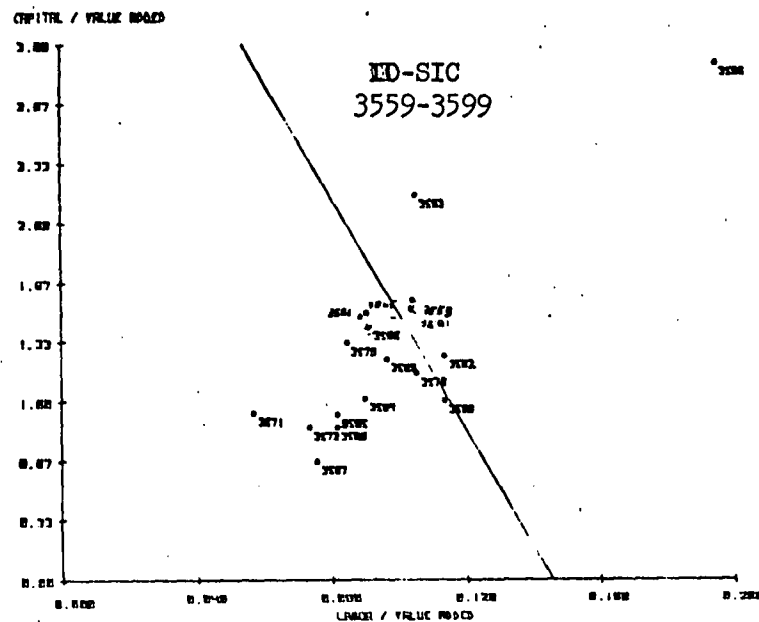
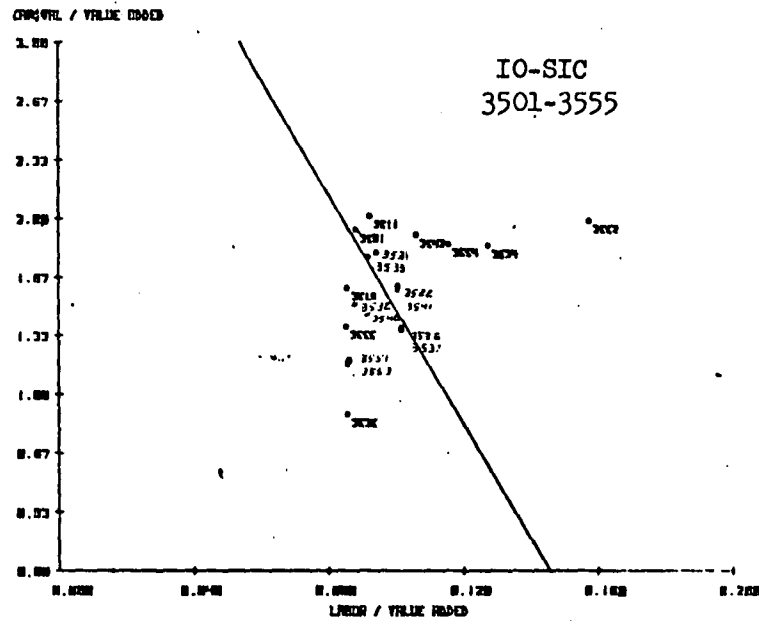
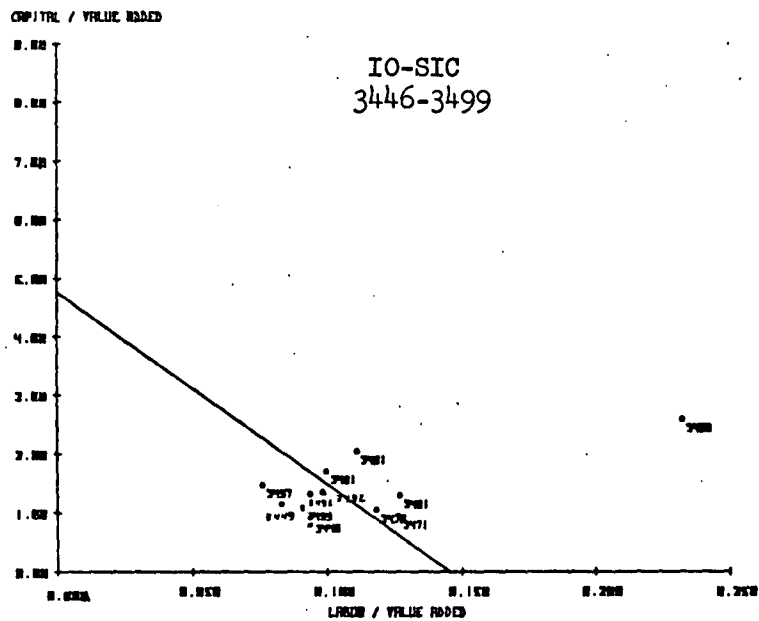


CHART 5: Observed 1967 capital and labor requirements per dollar of value-added--Continued

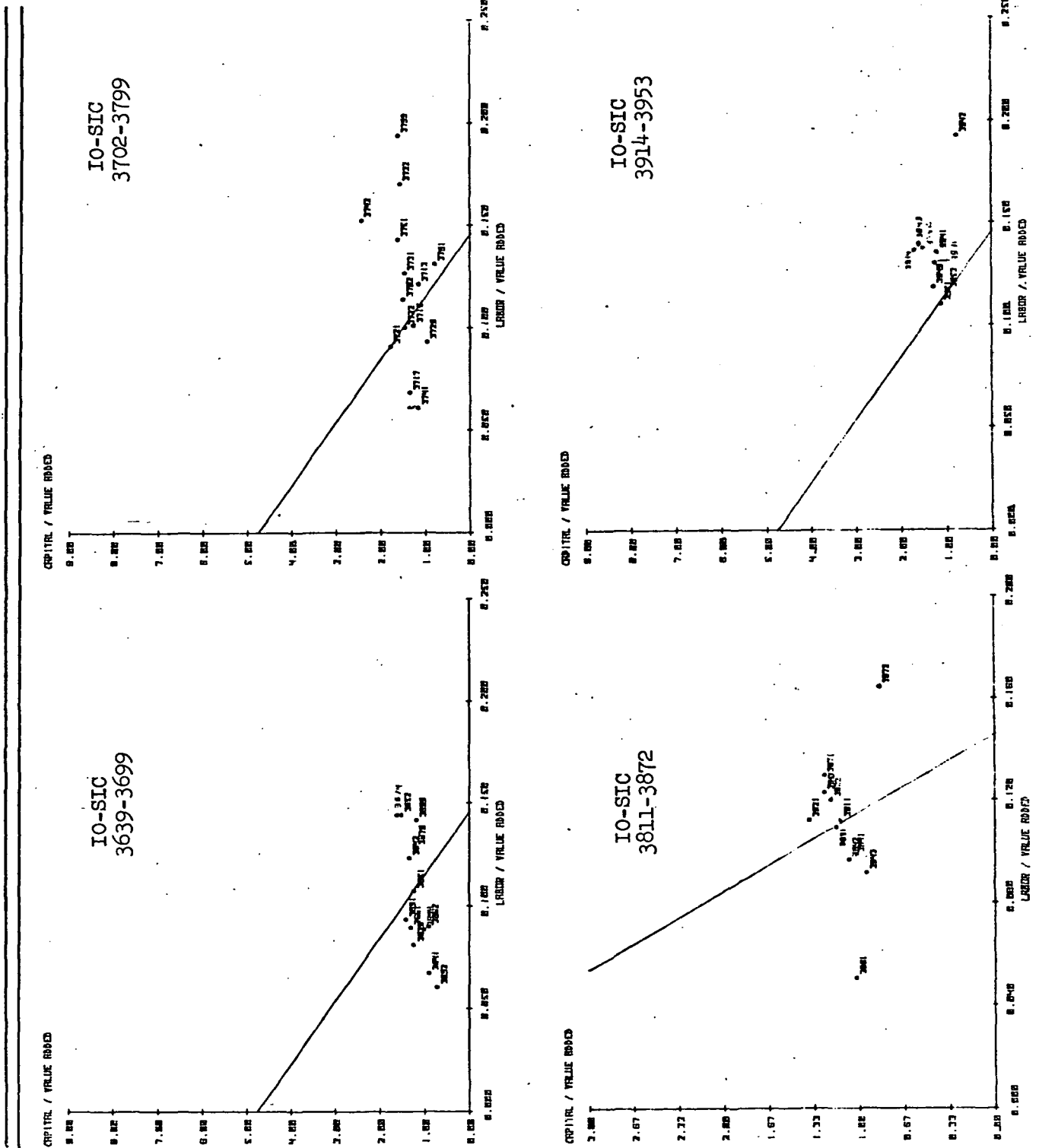


CHART 5: Observed 1967 capital and labor requirements per dollar of value-added--Cont.

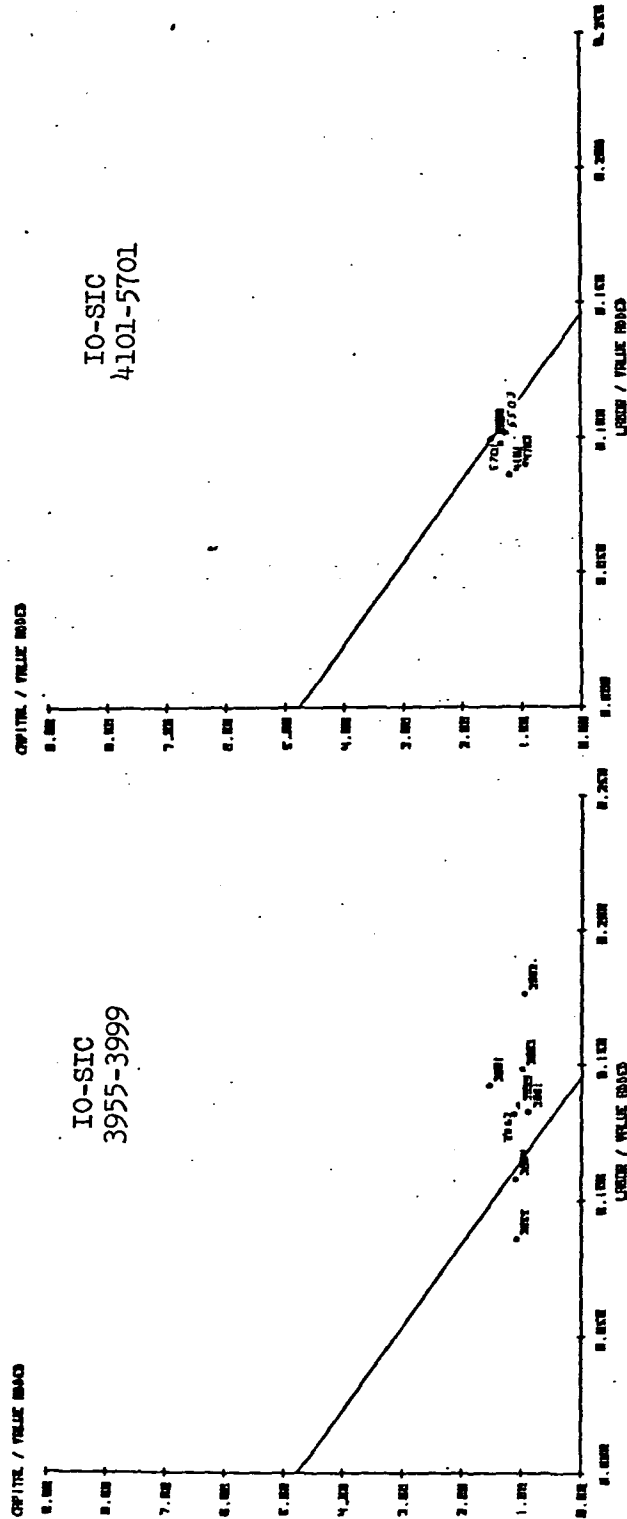


CHART 6: Observed 1970 capital and labor requirements per dollar of value-added.

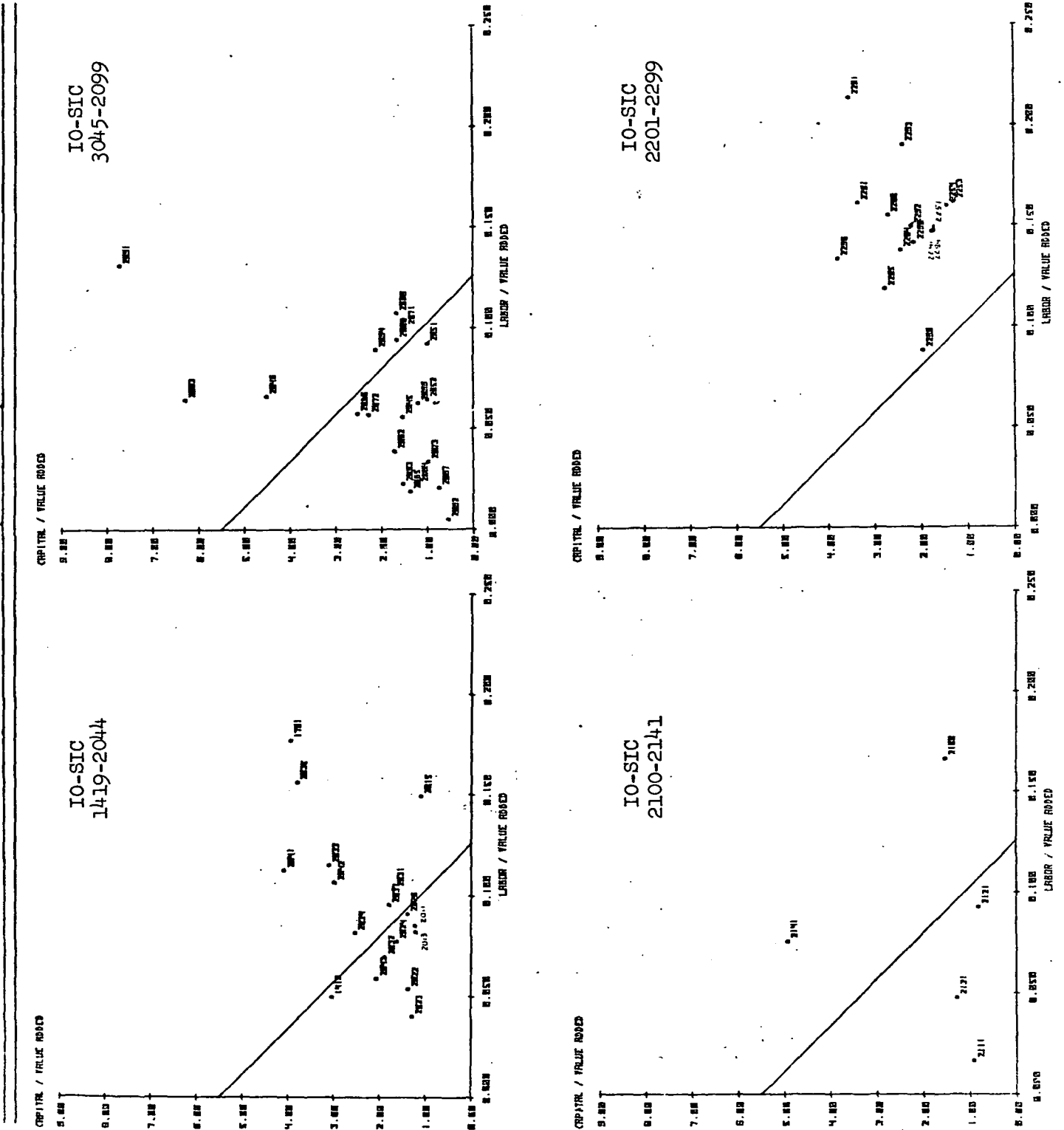


CHART 6: Observed 1970 capital and labor requirements per dollar of value-added--  
Continued

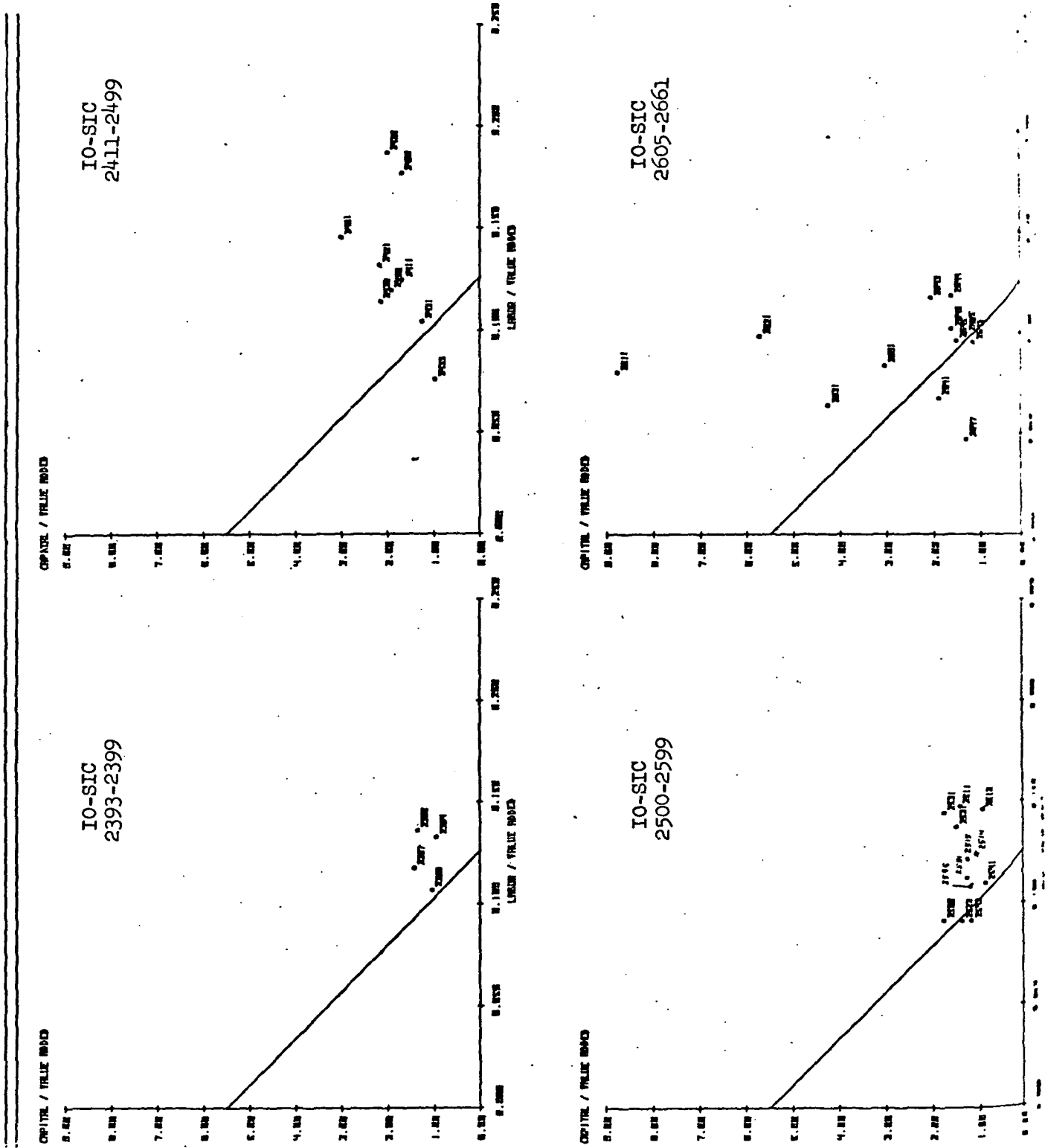


CHART 6: Observed 1970 capital and labor requirements per dollar of value-added--Continued

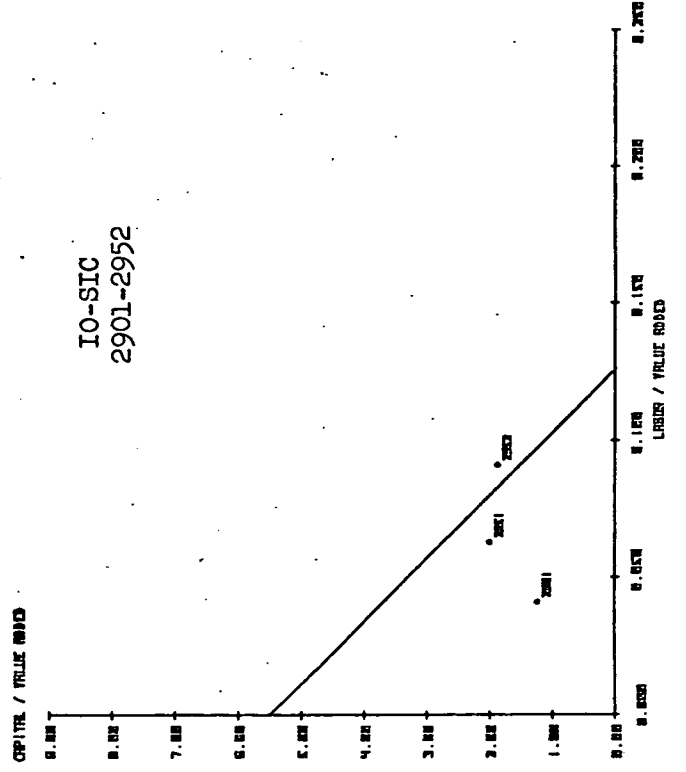
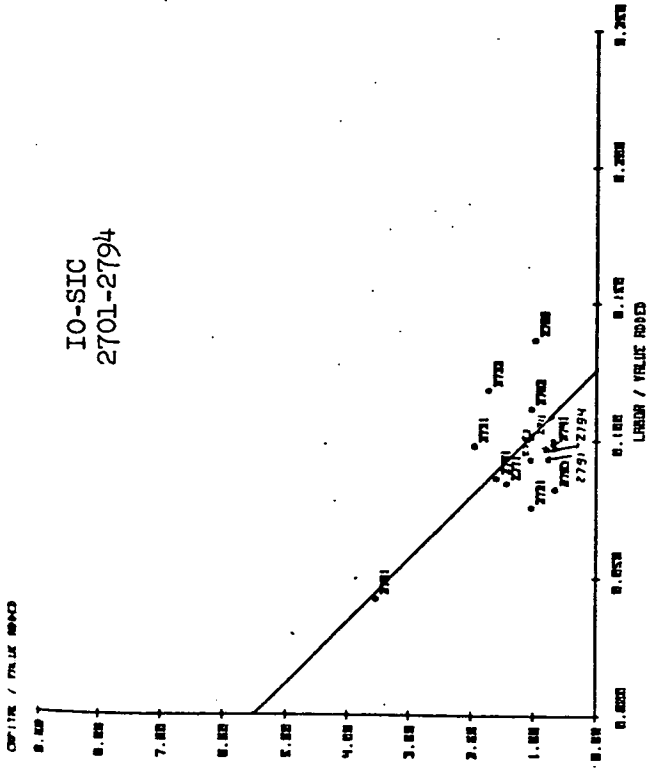
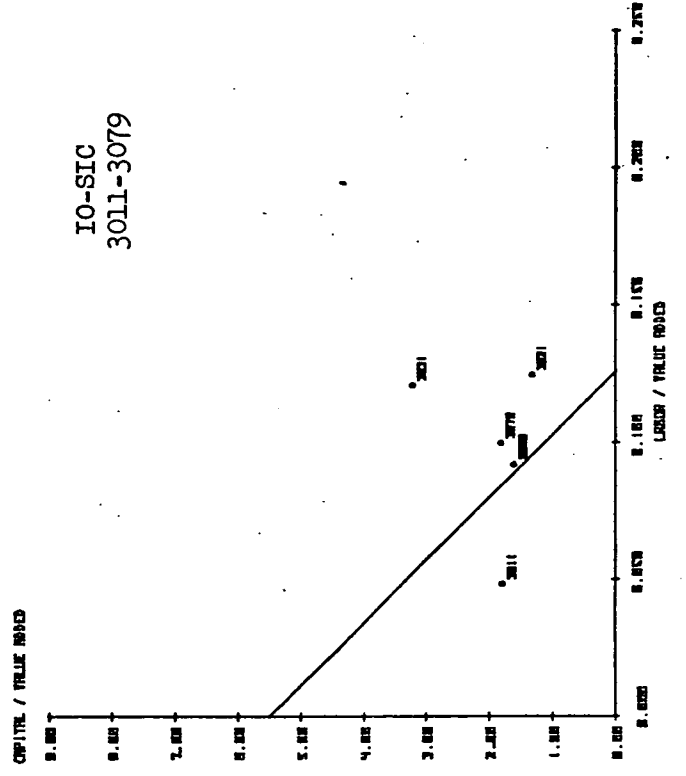
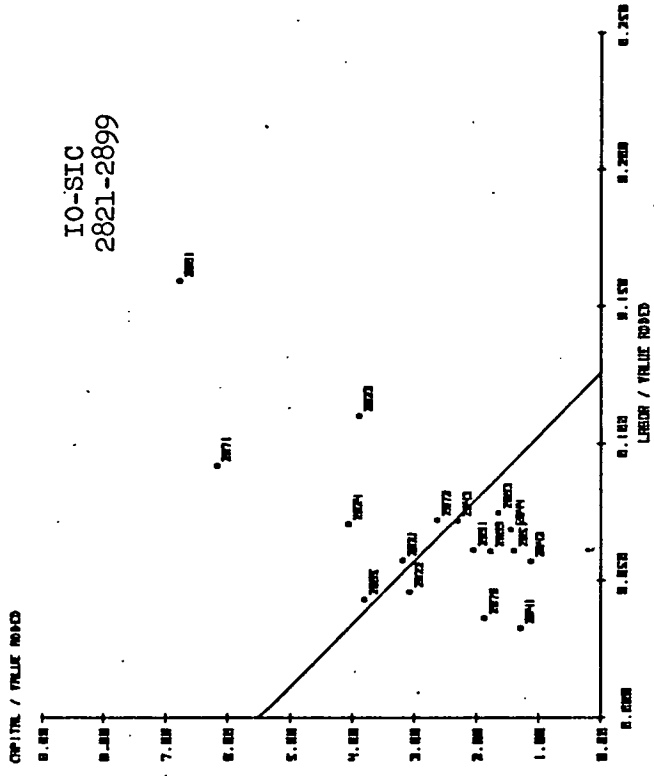


CHART 6: Observed 1970 capital and labor requirements per dollar of value-added--Continued

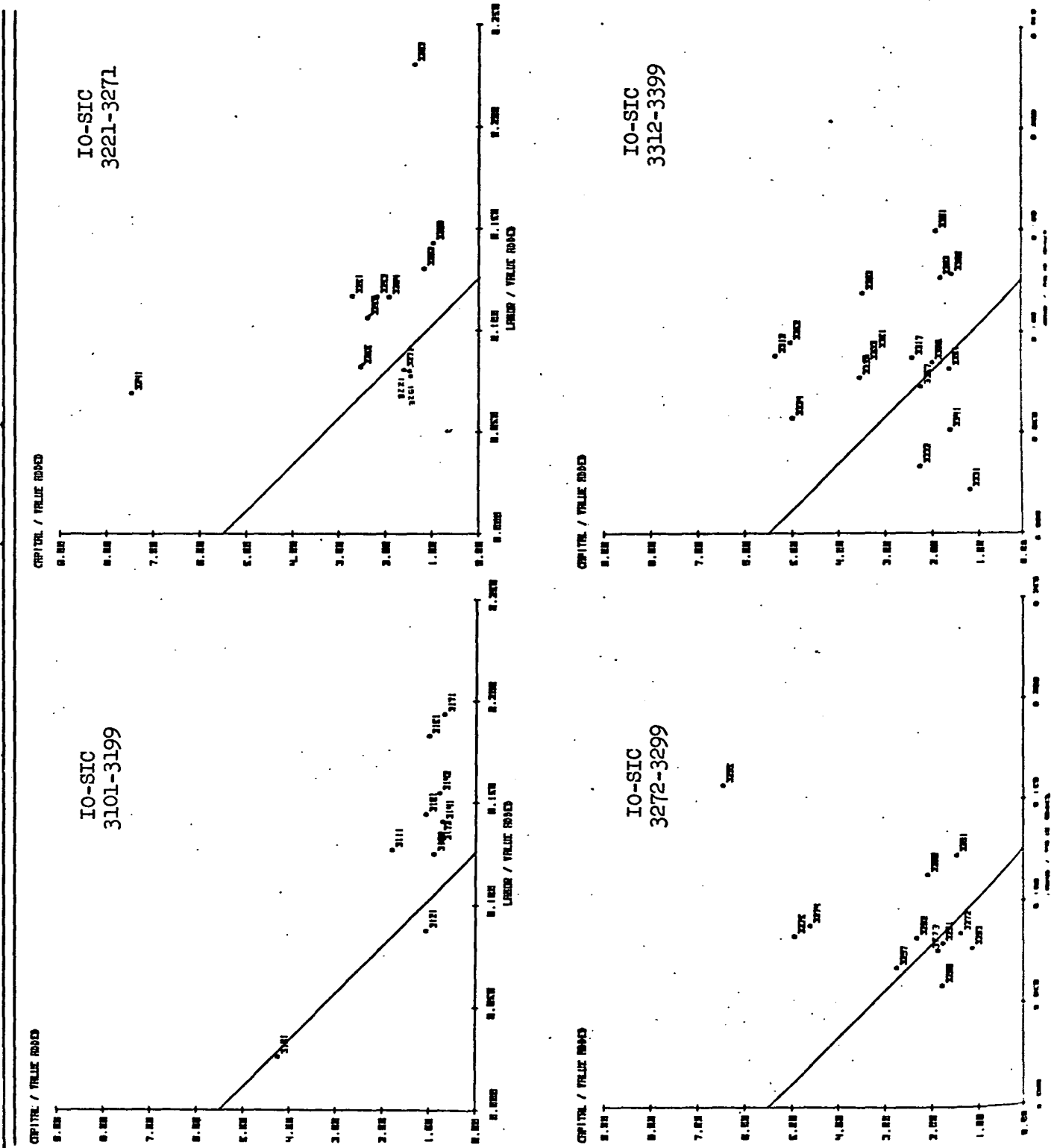




CHART 6: Observed 1970 capital and labor requirements per dollar of value-added--Continued

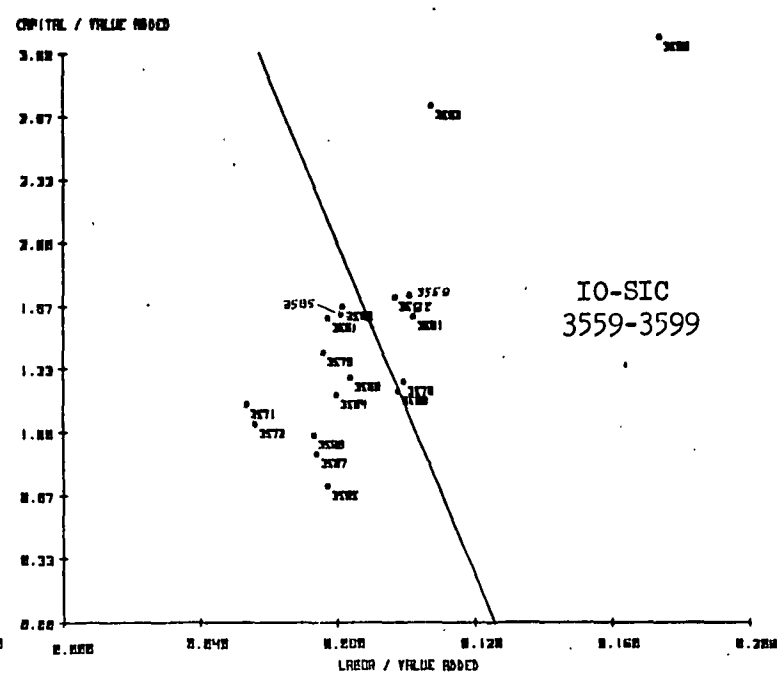
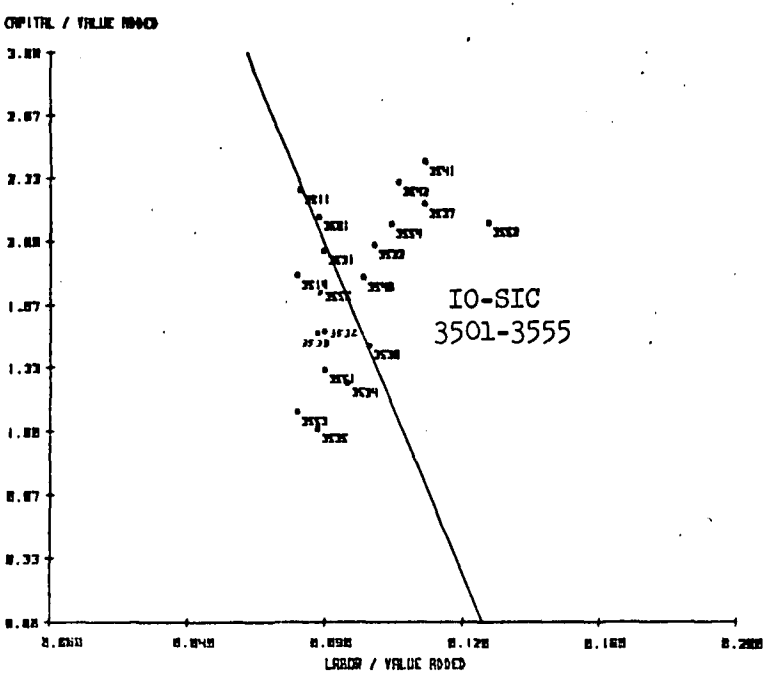
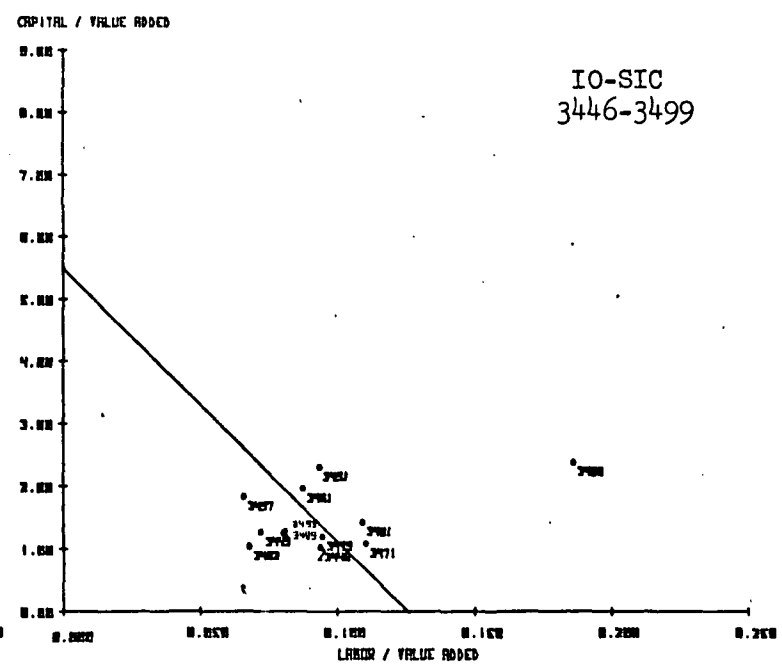
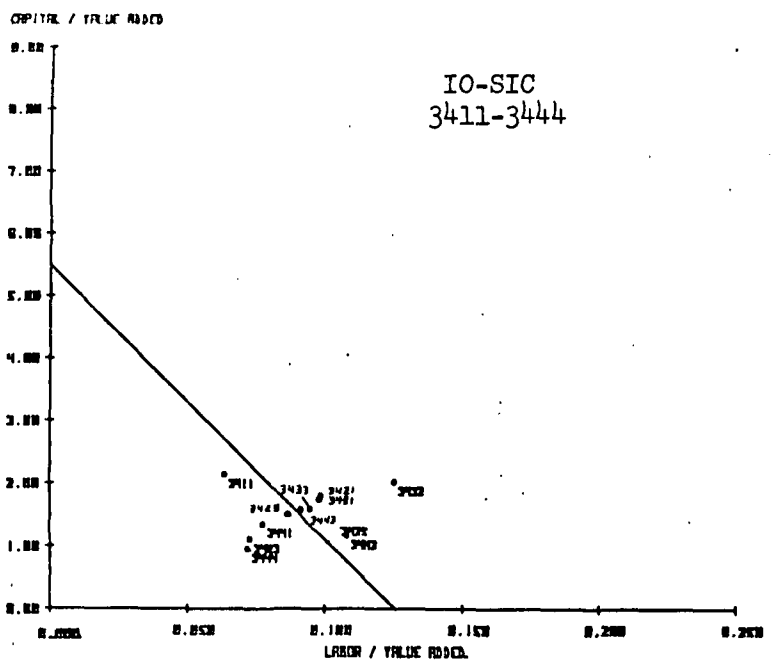
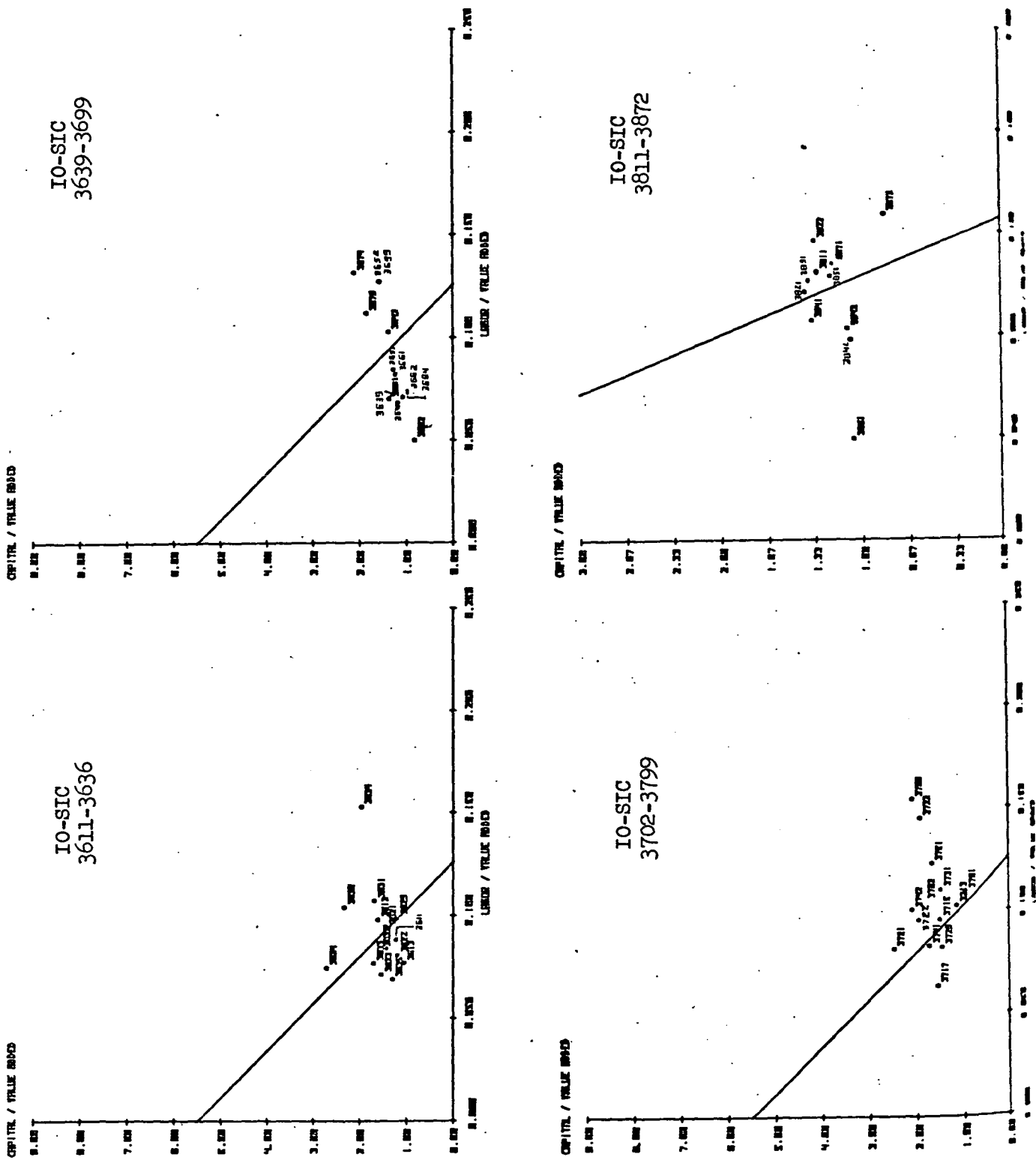
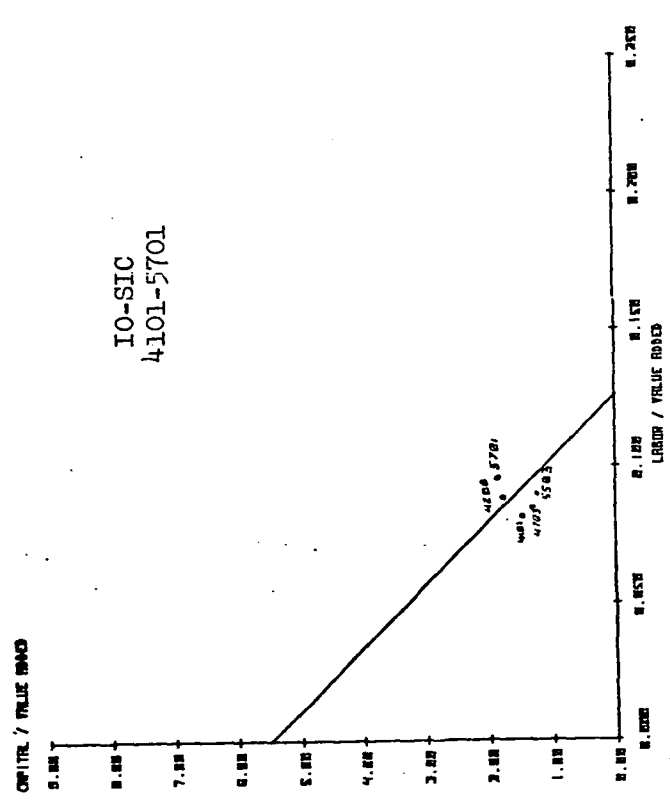
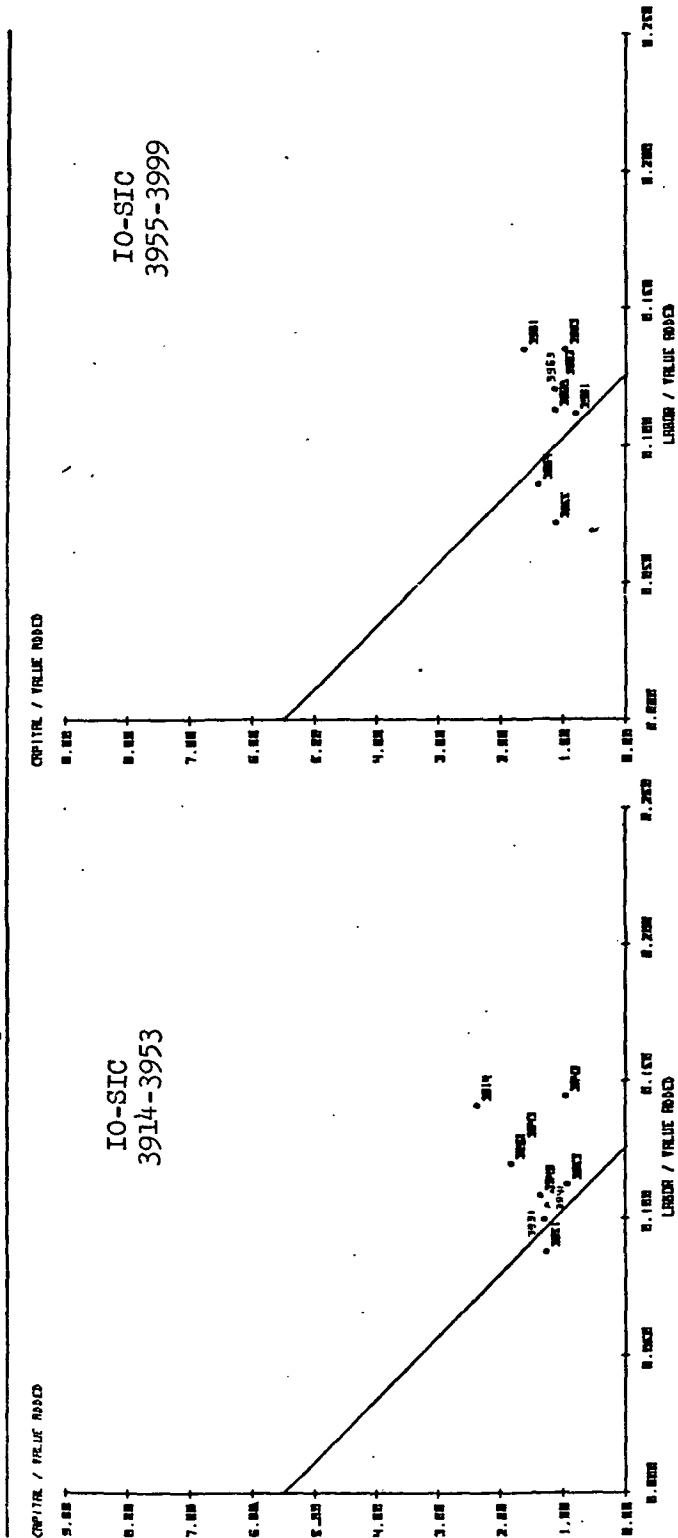


CHART 6: Observed 1970 capital and labor requirements per dollar of value-added--Continued



CARFT 6: Observed 1970 capital and labor requirements per dollar of value-added--Continued



problem. Value-added was calculated using an adjusted input-output definition and may therefore contain errors found in the input-output table values. Value-added, as calculated for the input-output table, is a residual and it carries and accumulates errors entering elsewhere. 1/ Tax data were used to remove direct taxes from value-added, but this originally was more aggregated than the IO-SIC level. For all of these reasons, it may be incorrect to apply such data to the type of static model used here. These data are normally used for time series analysis where changes in values over time are used and absolute value errors are not important.

On the other hand, the model might be inadequate. It may not be sufficiently detailed to reveal a correct portrayal of the existing equilibrium. For example, labor could be divided to show different labor markets. A seemingly inefficient industry by the criteria in Charts 5 and 6 might be earning a sufficient rate of return to capital if the industry is located in a low wage region. Conversely, an industry which seems to be doing much better than average may be only earning an average return on its capital because union power may bring higher than average wages. Thus, the model as specified makes no assumptions about industrial structure or labor markets that might account for part of the scatter.

Next, there is the question of equilibrium itself. Some industries are growing due to an expanding demand, others are declining,

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1/ See Walderhough, op. cit.

perhaps because of declining demand or because they cannot compete with imports. Furthermore, profits fluctuate considerably and with different patterns in various industries during the business cycle.

Finally, there is the question of the relative movements of comparative efficiency measures, given price movements. A simple illustration will show that a given price change can cause a much larger CE change. Suppose a particular industry experiences a 20 percent price increase in its output products. Applying a 20 percent price increase to a value-added calculation can typically lead to a 50 percent increase in value-added. This in turn causes the capital per unit value-added and labor per unit value-added figures to decrease by one-third. Hence, in Figure 1, a point on the equilibrium line in an industry experiencing a 20 percent price increase would move inward by a full third of the distance to the origin. <sup>1/</sup>

The effective tariff rate theoretically is a measure of static comparative advantage if an equilibrium exists in the factor markets (all industries would lie in the straight line in Figure 1 in the protected situation). However, if some industries are doing much better relative to others, then similar effective rates would have to be given different considerations for different industries. For example, if an industry such as "s" in Figure 1 had a 20 percent ET rate, removal of all protection might simply move its CE measure out near the average efficiency line. On the other hand, the removal of a 20 percent ET rate from industry "t" would probably deal a severe blow, since that industry is not very competitive with existing protection. This

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<sup>1/</sup> It can be shown that if the base price structure for a sector changes, the effective rate will also change because value added may have changed.

implies that industries' general competitive health must be strongly considered when using effective tariff rate changes to measure the possible price import effects of tariff cuts.

The comparative efficiency measures, theoretically and empirically, do not serve well as total explanations of sector trade performance. The prices included in value-added are determined both by domestic and foreign demand and domestic and foreign supply. For most U.S. industries in the past, the domestic aspect has outweighed the foreign. Every U.S. industry, to survive in the long run, must compete relatively well with all other sectors for capital and labor resources, and its relative value-added price must roughly reflect that fact. A particular industry may, for example, have substantial exports because of products characterized by high technology; however, on a comparative efficiency basis it may be no better off than another U.S. industry which produces low-technology products. In other words, product or industry characteristics reflecting trade patterns may not be fully reflected in comparative (static) efficiency measures because many other factors also influence the latter. Therefore, even if comparative efficiency measures were to be considered in conjunction with effective tariff rates in judging adverse effects of tariff reductions, these efficiency measures should not be fully relied on as explanations of trade performance.

#### Empirical Work

Various types of regressions were run to examine aspects of the model described above as well as general aspects of sectors' trade

performance. The most difficult problem in this type of cross-section analysis seems to be multicollinearity, i.e., the situation where many of the explanatory variables are related to each other. This situation means that regression analysis cannot distinguish which of the related variables is the true explanatory one. There are essentially two methods around this problem. One is the use of factor analysis, principal components analysis, or some theoretical device to combine many related variables into a single variable. <sup>1/</sup> The other way out of multicollinearity is simply to select a set of roughly orthogonal variables for regression. Where one variable used is related to others that are discarded, one can assume that the chosen variable adequately represents the phenomena described by all of the related variables. The shortcoming in this or any other technique (such as factor analysis) is that some explanatory variables may be related even though there is no known theoretical reason for the relationship and in that event one may discard a variable which has some explanatory power.

Table 14 presents some evidence on the scatter pattern in Charts 5 and 6. The elasticity equivalents summarize the results. Some of the scatter is explained by differing wages in industries and some by differing total demand growth rates. While the percent of total variance explained is very small for the entire sample (7-8 percent), if 40 of the 246 observations are deleted, the  $R^2$  rises to 23-27 percent.

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<sup>1/</sup> See An Industry Characteristics Analysis of the Competitiveness of U.S. Industries, U.S. International Trade Commission, a study that uses factor analysis to combine various industry characteristics into an orthogonal set of explanatory variables. These new "combined" variables then can be used in regression analysis.

Table 14.--Regression equations or factor comparative efficiency measures

REGRESSION OF EP267 FOR OBSERVATIONS 1 TO 246.

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 243 )	P-VALUE	PARTIAL-R
WPH67	0.39667E-01	0.1144E-01	3.468	0.000619	0.21714
GRYC	0.79457E-03	0.2356E-03	3.373	0.000864	0.21128

INTERCEPT= 0.6454E-01 STD.-ERROR= 0.337E-01 T-RATIO= 2.835

DEGREES OF FREEDOM= 243  
 SUM OF SQUARES OF RESIDUALS= 2.103  
 VARIANCE OF ESTIMATE= 0.0653E-02  
 STANDARD ERROR OF ESTIMATE= 0.2502E-01  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.0496  
 F( 2, 243)= 11.954 P-VALUE= 0.000011  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.2993  
 CORRECTED R-SQ=0.0821  
 BARTEN'S R-SQ=0.0825  
 STANDARD ERROR AS PERCENT OF MEAN= 43.65031  
 DURBIN-WATSON STATISTIC= 1.60

VARIABLE	MEAN	STD.-DEVIATION
WPH67	2.0918	0.51864
GRYC	16.186	25.185

CORRELATION MATRIX:

	WPH67	GRYC
WPH67	1.0000	0.0015
GRYC	0.0215	1.0000

REGRESSION OF EP267 FOR OBSERVATIONS 1 TO 246.

THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 206 )	P-VALUE	PARTIAL-R
WPH67	0.39687E-01	0.6801E-02	5.836	0.000000	0.37664
GRYC	0.71930E-03	0.1483E-03	5.018	0.000001	0.33062

INTERCEPT= 0.6934E-01 STD.-ERROR= 0.200E-01 T-RATIO= 3.466

DEGREES OF FREEDOM= 206  
 SUM OF SQUARES OF RESIDUALS= 0.4857  
 VARIANCE OF ESTIMATE= 0.230E-02  
 STANDARD ERROR OF ESTIMATE= 0.4456E-01  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2269  
 F( 2, 206)= 30.574 P-VALUE= 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4774  
 CORRECTED R-SQ=0.2214  
 BARTEN'S R-SQ=0.2220  
 STANDARD ERROR AS PERCENT OF MEAN= 22.57301  
 DURBIN-WATSON STATISTIC= 1.78

REGRESSION OF EP270 FOR OBSERVATIONS 1 TO 246.

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 243 )	P-VALUE	PARTIAL-R
WPH70	0.27021E-01	0.1108E-01	2.439	0.015432	0.15460
GRYC	0.91316E-03	0.2760E-03	3.305	0.001082	0.20759

INTERCEPT= 0.6338E-01 STD.-ERROR= 0.364E-01 T-RATIO= 2.179

DEGREES OF FREEDOM= 243  
 SUM OF SQUARES OF RESIDUALS= 2.885  
 VARIANCE OF ESTIMATE= 0.1187E-01  
 STANDARD ERROR OF ESTIMATE= 0.1090  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.0672  
 F( 2, 243)= 8.752 P-VALUE= 0.000214  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.2592  
 CORRECTED R-SQ=0.0599  
 BARTEN'S R-SQ=0.0599  
 STANDARD ERROR AS PERCENT OF MEAN= 57.37202  
 DURBIN-WATSON STATISTIC= 1.93

VARIABLE	MEAN	STD.-DEVIATION
WPH70	3.3963	0.62759
GRYC	16.186	25.185

CORRELATION MATRIX:

	WPH70	GRYC
WPH70	1.0000	0.0054
GRYC	0.0364	1.0000

REGRESSION OF EP270 FOR OBSERVATIONS 1 TO 246.

THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 203 )	P-VALUE	PARTIAL-R
WPH70	0.26524E-01	0.5030E-02	5.273	0.000000	0.34710
GRYC	0.81240E-03	0.1258E-03	6.460	0.000000	0.41297

INTERCEPT= 0.6534E-01 STD.-ERROR= 0.172E-01 T-RATIO= 3.963

DEGREES OF FREEDOM= 203  
 SUM OF SQUARES OF RESIDUALS= 0.3613  
 VARIANCE OF ESTIMATE= 0.1878E-02  
 STANDARD ERROR OF ESTIMATE= 0.4334E-01  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2717  
 F( 2, 203)= 17.461 P-VALUE= 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.5210  
 CORRECTED R-SQ=0.2643  
 BARTEN'S R-SQ=0.2650  
 STANDARD ERROR AS PERCENT OF MEAN= 23.1311  
 DURBIN-WATSON STATISTIC= 1.87



Table 14.--Regression equations on factor comparative efficiency measures--Continued

Definition of the variables

FP267, FP270	-	1967 and 1970 comparative efficiency measures for each sector. These are value-added per total factor at average (weighted by size) factor price ratios.
WPH67, WPH70	-	1967 and 1970 average hourly wages in each sector.
GRTC	-	percentage growth of real domestic and foreign consumption for each sector from 1965 to 1970. It is calculated as the growth of production and imports minus the growth of the price deflator for each sector.

Source: Calculated from a databank at the International Trade Commission.

Note.--The point elasticity equivalents of the regression coefficients are as follows (calculated at sample means):

	WPH	GRTC
1967	0.54	0.060
1970	0.48	0.078

The equations omitting about forty observations produce a considerably better fit. Multicollinearity is not a problem for the variables shown. These equations are the second and fourth in the Table. (The ones stating observations were weighted by WT.)

Envisioning data problems, this is reasonably satisfactory for a typical cross-section analysis. One concludes that some of the scatter is explained by differing sector growth rates and by differing wage rates. The latter may be regional wage differences and/or union bargaining power differences in industries. There is obviously much left to be explained by other factors and data problems. 1/

The scatter of points did not explain trade performance in any satisfactory manner. However, it might be worthwhile to pursue some theories which would link poor comparative efficiency performance to stiff import competition. The reasoning is that as imports compete more on a price basis with domestic production, domestic prices have to be kept low, value-added is kept low, and therefore comparative efficiency is low. Such industries would either lose resources (resulting in slow or negative growth) or switch out of production of import competing items.

Table 15 includes more variables in an explanation of total comparative factor cost per unit value-added in a two and three factor model (note that these are the reciprocal of the measures in Table 14). Here wages are included as average hourly wage rates. Demand growth is represented by the growth of value-added while the price effect is included as the growth of a value-added price index. The results are quite strong in spite of some small multicollinearity problems.

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1/ Multicollinearity is not a problem for the two variables related, as can be seen from the low correlation coefficient between them.

Table 15.--Regression results for total factor costs for a two- and three-factor model

REGRESSION OF FP267MTA FOR OBSERVATIONS 1 TO 240.

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 233)	P-VALUE	PARTIAL-R
GVA6570	-0.27551E-01	0.4243E-02	-6.493	0.000000	-0.39141
WPH67	-1.1740	0.2544	-4.339	0.000021	-0.27345
RMC	0.36049E-01	0.1204E-01	2.994	0.003048	0.19249
DEP	0.63239E-03	0.1177E-03	5.373	0.000000	0.33203
GVP6570	-0.10147E-01	0.3668E-02	-2.767	0.006118	-0.17834
CONCR467	-0.10779E-01	0.6368E-02	-1.693	0.091841	-0.11022

INTERCEPT= 9.429    STD.-ERROR= 0.734    T-RATIO= 12.985

DEGREES OF FREEDOM= 233  
 SUM OF SQUARES OF RESIDUALS= 617.3  
 VARIANCE OF ESTIMATE= 3.508  
 STANDARD ERROR OF ESTIMATE= 1.873  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.3794  
 F ( 5, 233)= 23.738 P-VALUE= 0.00000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.6159  
 CORRECTED R-SQ=0.3634  
 BARTEN'S R-SQ=0.3641  
 STANDARD ERROR AS PERCENT OF MEAN= 34.24985  
 DURBIN-WATSON STATISTIC= 1.93

VARIABLE	MEAN	STD.-DEVIATION
GVA6570	20.727	29.537
WPH67	2.8734	0.51471
RMC	6.2175	10.445
DEP	87.414	1054.0
GVP6570	15.273	33.901
CONCR467	41.003	20.340

## CORRELATION MATRIX:

	GVA6570	WPH67	RMC	DEP	GVP6570	CONCR467
GVA6570	1.0000					
WPH67	-0.0454	1.0000				
RMC	-0.1103	-0.1017	1.0000			
DEP	-0.1374	-0.1366	-0.0293	1.0000		
GVP6570	0.1086	0.0488	0.1506	-0.0927	1.0000	
CONCR467	-0.1396	0.3074	0.1011	0.0068	-0.0538	1.0000

REGRESSION OF FP367MTA FOR OBSERVATIONS 1 TO 240.

THE METHOD OF ESTIMATION WAS OLS .

VARIABLE	COEFFICIENT	STD.-ERROR	T ( 239)	P-VALUE	PARTIAL-R
GVA6570	-0.26090E-01	0.4147E-02	-6.291	0.000000	-0.38037
WPH67	-1.0619	0.2364	-4.491	0.000011	-0.28171
RMC	0.29665E-01	0.1169E-01	2.539	0.011781	0.16371
DEP	0.63434E-03	0.1153E-03	5.500	0.000000	0.33833
GVP6570	-0.97900E-02	0.3585E-02	-2.731	0.006793	-0.17576

INTERCEPT= 8.925    STD.-ERROR= 0.719    T-RATIO= 12.412

DEGREES OF FREEDOM= 234  
 SUM OF SQUARES OF RESIDUALS= 789.3  
 VARIANCE OF ESTIMATE= 3.373  
 STANDARD ERROR OF ESTIMATE= 1.837  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.3619  
 F ( 5, 239)= 26.542 P-VALUE= 0.0  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.6016  
 CORRECTED R-SQ=0.3483  
 BARTEN'S R-SQ=0.3489  
 STANDARD ERROR AS PERCENT OF MEAN= 33.86356  
 DURBIN-WATSON STATISTIC= 1.85

VARIABLE	MEAN	STD.-DEVIATION
GVA6570	20.727	29.537
WPH67	2.8734	0.51471
RMC	6.2175	10.445
DEP	87.414	1054.0
GVP6570	15.273	33.901

## VARIANCE-COVARIANCE MATRIX OF THE COEFFICIENTS

## CORRELATION MATRIX:

	GVA6570	WPH67	RMC	DEP	GVP6570
GVA6570	1.0000				
WPH67	-0.0954	1.0000			
RMC	-0.1103	-0.1017	1.0000		
DEP	-0.1374	-0.1366	-0.0293	1.0000	
GVP6570	0.1086	0.0488	0.1506	-0.0927	1.0000

Table 15.--Regression results for total factor costs for a two- and three-factor model--Continued

Dependent variables:

FP267MTA - total factor cost per unit value-added (after taxes) in 1967 in a two-factor model. The two factors in this model were capital and labor.

FP367MTA - total factor cost per unit value-added in 1967 for a three-factor model. The three factors were capital, production workers, and white collar or non-production employees.

Independent variables:

GVA6570 - Percentage growth in value-added from 1965 to 1970.

WPH67 - Average hourly wage in 1967.

RMC - 1970 import consumption ratio.

DEP - 1970 effective tariff rate (using unweighted nominal tariff averages).

GVP6570 - Growth of value-added price indices from 1965 to 1970.

CONCR467 - 1967 concentration ratio.

Note.--the elasticity equivalents of the regression coefficients at the sample means are given below:

	FP267MTA	FP367MTA
GVA 6570	-0.104	-0.100
WPH	-0.580	-0.563
RMC	0.041	0.034
DEP	0.010	0.010
GVP 6570	-0.028	-0.028

The means for the effective rate are unusually high because a few effective ratios in a few sectors are very large.

There is some small multicollinearity problem for a few of the variables. The worst is for CONCR467 and WPH 67. However, CONCR467 is not statistically significant in the first equation and is omitted in the second equation. The coefficients seem relatively stable.

Static resource costs to produce a dollar value-added in 1967 seem to be (a) greater in the industries experiencing slower growth in value-added (they can't compete, hence they are not expanding as fast as other industries); (b) greater in industries with lower hourly wages (this may mean low wage areas or poor wage-paying ability due to non-competitiveness); (c) greater in industries experiencing higher import penetration ratios; (d) greater in industries with high effective tariff protection rates; and (e) greater in industries experiencing a slow growth in value-added prices.

The signs of all of the coefficients are reasonable. Other attempts at regression analysis do not show that tariffs or tariff changes are strong determinants of U.S. price changes in general. The analysis so far indicates that while protection is not the moving price force in the U.S. economy, it is associated more with the less competitive industries. The next step is to look at industry characteristics explaining trade performance.

Trade Performance

A rank correlation matrix for various trade performance variables is shown in Table 16. Variables 2-8 are derived from U.S. data sources while variables 9-12 are U.S. trade data from U.N. sources. ET rates for 1965 and 1970 are given as variables 13 and 14. All of the trade variables are for 1970.

The concordance problems crop up again as one inspects the difference between variables when sourced from the U.S. and the U.N. The U.N. data went through the same concordance route as the GATT Tariff while the U.S. sourced data went the direct route to the IO-SIC. This is evidenced by rank correlation of only 0.6 between equivalent types of measures using U.S. and U.N. data (specifically the trade balance and trade ratio measures).

Measurement of trade performance, especially for an economy when trade is a small portion of GNP, is a difficult problem. Part of the problem is that goods in some sectors are generally traded more than goods produced in others. The trade distortions caused by tariffs and NTB's complicate the problems. The concordance problems of matching trade and production data make certain kinds of trade measures very difficult to quantify accurately.

Finally, most sectors show both imports and exports; therefore, one cannot usually characterize a sector as a total exporting or importing competing sector. Note that import/consumption and export/production ratios are weakly but positively correlated.









Table 16.--Rank Correlation matrix of trade performance measures  
by IO-SIC--Continued

Variable definitions: Variables 2-8 use data directly from U.S. sources. Variables 9-12 use U.S. and other data from United Nations sources. All of the data are for 1970.

TBUS	-	$(\text{U.S. exports} - \text{imports}) / (\text{exports} + \text{imports})$
TRUS	-	U.S. exports/U.S. imports
RMC	-	Imports/ (Production + Imports-Exports)
REP	-	U.S. Exports/Production
RMCA, REPA	-	Imports/consumption and export/production ratios adjusted to a product basis. This is done by correcting production data from an establishment to a product basis by multiplying by the specialization ratio and dividing by the coverage ratio as defined in the Industry Profiles data book.
PCHM6570	-	Percentage change in imports from 1965 to 1970.

Note that the U.N. prefixed variables denote U.S. data from United Nations sources.

UNUSTB	-	Same as TBUS
UNUSTBWD	-	$(\text{U.S. exports} - \text{imports}) / \text{world exports}$
UNUSTR	-	Same as TRUS
XUSSXWD	-	U.S. exports/world exports
EP65W, EP70W	-	U.S. 1965 and 1970 effective tariff rates (Nominal tariffs are imports weighted). These rates are the ones given in columns 3 and 5 of Table 8.

Although theories exploring trade performance abound, data to verify or reject them at the product level are not available. Therefore, researchers generally try to explain trade performance using production sector data. Because of the problems noted above, most explanations account for only 20 to 30 percent of the variation in trade measures.

It is notable that the ET rate correlates negatively with trade performance measures such as trade balances and U.S. export shares of world exports (evidence of the validity of the ET rate as a measure of comparative advantage). Effective protection rates tend to be low in those sectors having good trade performance.

One can observe that export performance measures such as export shares do not correlate with import penetration measures. Trade balance measures seem to catch, to some extent, both good export performance and import competition.

One might expect to find different explanations for export performance than for imports. There are many theories calling for several types of explanatory variables. Unfortunately, this study does not have all of the variables, hence it cannot test all the proposed theories. Furthermore, multicollinearity makes a simultaneous test impossible. The study presents only a few variables explaining trade performance. The number was kept low because of the multicollinearity problem.

Table 17 gives several regression equations of trade performance with four explanatory variables. Some trade performance measures are not explained very well by the variable while others offer better results. 1/

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1/ In all cases the number of variables was restricted to a set exhibiting almost no multicollinearity. The  $R^2$  could perhaps have been improved by trial and error addition of more orthogonal variables. It also could be improved significantly by deleting 40-50 of the worst residuals on grounds of data or concordance problems. Size ordered plots of the residuals seemed to indicate that heteroscedasticity was not a problem (though no tests were performed).

Table 17.--Regression results for trade performance measures

REGRESSION OF <u>UOUSTM</u> FOR OBSERVATIONS 1 TO 239.						
THE METHOD OF ESTIMATION WAS OLS.						
VARIABLE	COEFFICIENT	STD.-ERROR	T( 234)	P-VALUE	PARTIAL-R	
ALR	0.16770	0.0925E-01	1.869	0.062915	0.17126	
PROFESS	6.2447	1.248	5.002	0.000001	0.31045	
GUPPUS	-22.350	15.37	-1.472	0.095762	-0.10849	
EPITBUS	-0.54497	2.120	-0.257	0.797376	-0.01623	
INTERCEPT	125.0	STD.-ERROR= 73.0	T-RATIO= 1.712			
DEGREES OF FREEDOM= 234						
SUM OF SQUARES OF RESIDUALS= 163.9						
VARIANCE OF ESTIMATE= 0.7006						
STANDARD ERROR OF ESTIMATE= 0.8370						
COEFFICIENT OF DETERMINATION (R-SQ)=0.1229						
F( 4, 234)= 8.199 P-VALUE= 0.000003						
MULTIPLE CORRELATION COEFFICIENT (R)=0.3506						
CORRECTED R-SQ=0.1079						
BARTEN'S R-SQ=0.1044						
STANDARD ERROR AS PERCENT OF MEAN= 16.53734						
DURBIN-WATSON STATISTIC= 2.16						
REGRESSION OF <u>UUSTM</u> FOR OBSERVATIONS 1 TO 239.						
THE METHOD OF ESTIMATION WAS OLS.						
VARIABLE	COEFFICIENT	STD.-ERROR	T( 234)	P-VALUE	PARTIAL-R	
ALR	0.05620E-01	0.1920E-01	2.376	0.016330	0.15446	
PROFESS	1.5444	0.2686	5.900	0.000000	0.35444	
GUPPUS	-5.9876	2.877	-1.942	0.053296	-0.17046	
EPITBUS	-0.25520	0.4562	-0.559	0.576440	-0.04446	
INTERCEPT	35.34	STD.-ERROR= 15.7	T-RATIO= 2.251			
DEGREES OF FREEDOM= 234						
SUM OF SQUARES OF RESIDUALS= 7.591						
VARIANCE OF ESTIMATE= 0.3244E-01						
STANDARD ERROR OF ESTIMATE= 0.1801						
COEFFICIENT OF DETERMINATION (R-SQ)=0.1667						
F( 4, 234)= 11.702 P-VALUE= 0.000000						
MULTIPLE CORRELATION COEFFICIENT (R)=0.4083						
CORRECTED R-SQ=0.1524						
BARTEN'S R-SQ=0.1531						
STANDARD ERROR AS PERCENT OF MEAN= 5.29062						
DURBIN-WATSON STATISTIC= 2.14						
REGRESSION OF <u>UUSIN</u> FOR OBSERVATIONS 1 TO 239.						
THE METHOD OF ESTIMATION WAS OLS.						
VARIABLE	COEFFICIENT	STD.-ERROR	T( 234)	P-VALUE	PARTIAL-R	
ALR	0.13007	0.0601E-01	1.512	0.131616	0.06634	
PROFESS	5.3445	1.203	4.491	0.000002	0.30445	
GUPPUS	-15.964	12.08	-1.317	0.182257	-0.04575	
EPITBUS	-2.1465	2.043	-1.060	0.290134	-0.04414	
INTERCEPT	101.7	STD.-ERROR= 70.4	T-RATIO= 1.445			
DEGREES OF FREEDOM= 234						
SUM OF SQUARES OF RESIDUALS= 152.3						
VARIANCE OF ESTIMATE= 0.6508						
STANDARD ERROR OF ESTIMATE= 0.8067						
COEFFICIENT OF DETERMINATION (R-SQ)=0.1149						
F( 4, 234)= 7.552 P-VALUE= 0.000009						
MULTIPLE CORRELATION COEFFICIENT (R)=0.3389						
CORRECTED R-SQ=0.0994						
BARTEN'S R-SQ=0.1004						
STANDARD ERROR AS PERCENT OF MEAN= 74.21809						
DURBIN-WATSON STATISTIC= 2.04						
REGRESSION OF <u>UUSAD</u> FOR OBSERVATIONS 1 TO 239.						
THE METHOD OF ESTIMATION WAS OLS.						
VARIABLE	COEFFICIENT	STD.-ERROR	T( 234)	P-VALUE	PARTIAL-R	
KLP	0.27771E-01	0.6537E-01	0.333	0.739359	0.02177	
PROFESS	8.1473	1.166	6.978	0.000000	0.41542	
GUPPUS	-11.944	12.49	-0.957	0.339726	-0.06242	
EPITBUS	-3.9057	1.981	-1.971	0.049912	-0.12779	
INTERCEPT	85.44	STD.-ERROR= 64.2	T-RATIO= 1.258			
DEGREES OF FREEDOM= 234						
SUM OF SQUARES OF RESIDUALS= 143.1						
VARIANCE OF ESTIMATE= 0.6114						
STANDARD ERROR OF ESTIMATE= 0.7814						
COEFFICIENT OF DETERMINATION (R-SQ)=0.1847						
F( 4, 234)= 13.602 P-VALUE= 0.000000						
MULTIPLE CORRELATION COEFFICIENT (R)=0.4344						
CORRECTED R-SQ=0.1746						
BARTEN'S R-SQ=0.1756						
STANDARD ERROR AS PERCENT OF MEAN= 53.82443						
DURBIN-WATSON STATISTIC= 1.91						

Table 17.--Regression results for trade performance measures--Cont.

REGRESSION OF TRUS FOR OBSERVATIONS 1 TO 139.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERROR	T(234)	P-VALUE	PARTIAL-R
RLR	0.19762	0.1151	3.454	0.000655	0.22027
PROFESS	1.9522	1.611	2.452	0.015334	0.18746
GUEPUS	-17.620	17.24	-0.743	0.457927	-0.04819
EPITBUS	2.7115	2.735	0.992	0.322422	0.06449

INTERCEPT = 56.55    STD.-ERROR = 94.2    T-RATIO = 0.598

DEGREES OF FREEDOM = 234  
 SUM OF SQUARES OF RESIDUALS = 272.7  
 VARIANCE OF ESTIMATE = 1.165  
 STANDARD ERROR OF ESTIMATE = 1.080  
 COEFFICIENT OF DETERMINATION (R-SQ) = 0.0829  
 F(4, 234) = 3.725 P-VALUE = 0.000451  
 MULTIPLE CORRELATION COEFFICIENT (R) = 0.2879  
 CORRECTED R-SQ = 0.0672  
 BARTLETT'S M-SQ = 0.078  
 STANDARD ERROR AS PERCENT OF MEAN = 25.36646  
 DURBIN-WATSON STATISTIC = 2.17

CORRELATION MATRIX:

	RLR	PROFESS	GUEPUS	EPITBUS
RLR	1.0000	0.1122	-0.0713	-0.0741
PROFESS	0.1122	1.0000	0.0786	-0.0255
GUEPUS	-0.0713	0.0786	1.0000	-0.1122
EPITBUS	-0.0741	-0.0255	-0.1122	1.0000

REGRESSION OF TRUS FOR OBSERVATIONS 1 TO 139.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERROR	T(234)	P-VALUE	PARTIAL-R
RLR	0.3865	0.1250	3.104	0.002109	0.19417
PROFESS	0.21839	1.744	0.125	0.910476	0.00017
GUEPUS	-3.3076	16.72	-0.177	0.859909	-0.0115
EPITBUS	1.6485	2.964	1.229	0.220335	0.07004

INTERCEPT = -1.471    STD.-ERROR = 192.    T-RATIO = -0.018

DEGREES OF FREEDOM = 234  
 SUM OF SQUARES OF RESIDUALS = 321.4  
 VARIANCE OF ESTIMATE = 1.374  
 STANDARD ERROR OF ESTIMATE = 1.172  
 COEFFICIENT OF DETERMINATION (R-SQ) = 0.0456  
 F(4, 234) = 2.795 P-VALUE = 0.026942  
 MULTIPLE CORRELATION COEFFICIENT (R) = 0.2135  
 CORRECTED R-SQ = 0.0273  
 BARTLETT'S M-SQ = 0.079  
 STANDARD ERROR AS PERCENT OF MEAN = 105.25836  
 DURBIN-WATSON STATISTIC = 1.94

REGRESSION OF MHC FOR OBSERVATIONS 1 TO 239.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERROR	T(234)	P-VALUE	PARTIAL-R
RLR	-0.53019E-01	0.1107	-0.479	0.632321	-0.03150
PROFESS	0.91430	1.346	0.244	0.819205	0.01749
GUEPUS	155.733	16.58	2.035	0.042995	0.13166
EPITBUS	-0.75689	2.629	-0.288	0.773698	-0.01662

INTERCEPT = -171.4    STD.-ERROR = 90.5    T-RATIO = -1.915

DEGREES OF FREEDOM = 234  
 SUM OF SQUARES OF RESIDUALS = 252.1  
 VARIANCE OF ESTIMATE = 1.077  
 STANDARD ERROR OF ESTIMATE = 1.039  
 COEFFICIENT OF DETERMINATION (R-SQ) = 0.0201  
 F(4, 234) = 1.200 P-VALUE = 0.311496  
 MULTIPLE CORRELATION COEFFICIENT (R) = 0.1418  
 CORRECTED R-SQ = 0.0034  
 BARTLETT'S M-SQ = 0.0034  
 STANDARD ERROR AS PERCENT OF MEAN = 77.09963  
 DURBIN-WATSON STATISTIC = 1.96

REGRESSION OF MLP FOR OBSERVATIONS 1 TO 239.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERROR	T(234)	P-VALUE	PARTIAL-R
RLR	0.52659	0.7868E-01	6.490	0.000000	0.47069
PROFESS	4.7744	1.101	4.338	0.000021	0.27244
GUEPUS	15.491	11.79	1.351	0.184417	0.04670
EPITBUS	1.1888	1.869	0.636	0.525931	0.04154

INTERCEPT = -90.22    STD.-ERROR = 64.4    T-RATIO = -1.402

DEGREES OF FREEDOM = 234  
 SUM OF SQUARES OF RESIDUALS = 127.4  
 VARIANCE OF ESTIMATE = 0.5446  
 STANDARD ERROR OF ESTIMATE = 0.7380  
 COEFFICIENT OF DETERMINATION (R-SQ) = 0.2395  
 F(4, 234) = 16.498 P-VALUE = 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R) = 0.4891  
 CORRECTED R-SQ = 0.2262  
 BARTLETT'S M-SQ = 0.2262  
 STANDARD ERROR AS PERCENT OF MEAN = 56.47513  
 DURBIN-WATSON STATISTIC = 2.00

Table 17.--Regression results for trade performance measures--Cont'd.

Variable definitions: All variables are in log form, hence the coefficients can be read as elasticities.

Dependent variable: (Complete definitions are given in Table 16). These are all for 1970.

TBUS	-	U.S. trade balance
TRUS	-	Exports/imports
RMC	-	Ratio of imports to consumption
REP	-	Ratio of exports to production
UNUSTB	-	U.S. trade balance
UNUSTBWP	-	U.S. trade balance divided by world exports
UNUSTN	-	Exports/imports
XUSSXWD	-	U.S. exports as a source of world exports
KLR	-	U.S. capital per employee ratio for 1970
PROFESS	-	Professional capital per employee ratio for 1970.
GUEPUS	-	PKR U.S. effective tariff rates from GATT nominal tariff sources. This rate is from column 8 of Table 10.
EPNTBUS	-	U.S. nontariff barrier indices run through the effective tariff rate formula.

The most significant variables explaining export performance are the capital labor ratio and professionals as a percent of the labor force. The latter measure reflects technology and perhaps some concept of human capital.

U.S. exporting industries tend to have much higher percentages of professional employees than those that do not export very much. Also, U.S. export industries seem to be capital intensive by some measures. The NTB measure is not statistically significant, and the effective tariff measure is significant and positive only in the equation explaining the import consumption ratio. 1/

The import consumption ratio is the poorest performing equation, though the significance of the ET rate is consistent with the rank correlation evidence in Table 16.

Based on the variables used here, good export performance seems to be associated with professionals in the work force (or the technology and human capital factor associated with this variable). Also, by most trade performance measures, U.S. exports are in (physical) capital-intensive industries. Industries not competing well with imports tend to be more highly protected. They may also be more labor intensive and have less professionalization of the work force, though the evidence

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1/ The ET measure does have the correct sign in the trade balance equation; however, it is not statistically significant at the 95 percent level.



presented is not strong. More work needs to be done on the import side.

### Tariff Patterns

Regression equations in Table 18 give some evidence of the industry characteristics associated with nominal tariff patterns.

The tariff rates seem to be (a) inversely related to the average wage rate, (b) directly related to the degree of industrial concentration, and (c) inversely related to the share of transportation input to production. These variables are reasonable and consistent with other evidence in this study. High wage industries do not need protection, they are competitive. Low wage industries are not as competitive and have protection because of or in relation to their non-competitiveness. Industries with high transport costs in production may incur some of the costs because of the nature of the product. Goods costly to transport or needing costly inputs transported are not as likely to be traded, hence they need less protection. Finally, higher tariffs in more concentrated industries are consistent with the political clout that large companies and unions can wield, thus extracting higher tariffs. Attempts to use these variables to explain effective rate patterns were very weak statistically. This is also a reasonable result since the effective tariff concept was not available when U.S. tariffs were legislated. 1/

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1/ This does not mean that the ET concept is not relevant. Desired nominal rates yield a set of ET rates which may be different enough from the nominal rates in absolute terms to yield a quite different linear correlation pattern.

Table 18.--Regression results for tariff levels

REGRESSION OF US17070 FOR OBSERVATIONS 1 TO 306.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERR	T(302)	P-VALUE	PARTIAL-R
COACH467	0.60129E+01	0.1683E-01	3.572	0.000410	0.20191
W470	-4.1231	0.5374	-7.650	0.000000	-0.47467
TRP1063	-0.41042	0.1329	-3.088	0.002200	-0.17497

INTERCEPT= 21.76    STD.-ERROR= 1.80    T-RATIO= 12.123

DEGREES OF FREEDOM= 302  
 SUM OF SQUARES OF RESIDUALS= 0.1056E 05  
 VARIANCE OF ESTIMATE= 34.96  
 STANDARD ERROR OF ESTIMATE= 5.912  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2016  
 F(3, 302)= 25.419 P-VALUE= 0.0  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4490  
 CORRECTED R-SQ=0.1917  
 BARTLETT'S R-SQ=0.1941  
 STANDARD ERROR AS PERCENT OF MEAN= 64.93049  
 DURBIN-WATSON STATISTIC= 1.59

CORRELATION MATRIX:

	COACH467	W470	TRP1063
COACH467	1.0000	0.2540	-0.0060
W470	-0.2540	1.0000	0.0060
TRP1063	0.0060	0.0060	1.0000

REGRESSION OF USU770 FOR OBSERVATIONS 1 TO 306.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERR	T(302)	P-VALUE	PARTIAL-R
COACH467	0.20590E+01	0.1905E-01	8.443	0.000010	0.25053
W470	-4.1474	0.6080	-6.817	0.000000	-0.36516
TRP1063	-0.22080	0.1504	-1.468	0.143250	-0.08415

INTERCEPT= 21.43    STD.-ERROR= 2.03    T-RATIO= 10.537

DEGREES OF FREEDOM= 302  
 SUM OF SQUARES OF RESIDUALS= 0.1353E 05  
 VARIANCE OF ESTIMATE= 44.80  
 STANDARD ERROR OF ESTIMATE= 6.693  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.1638  
 F(3, 302)= 19.722 P-VALUE= 0.0  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4047  
 CORRECTED R-SQ=0.1515  
 BARTLETT'S R-SQ=0.1550  
 STANDARD ERROR AS PERCENT OF MEAN= 65.04976  
 DURBIN-WATSON STATISTIC= 1.67

REGRESSION OF LUSHT FOR OBSERVATIONS 1 TO 306.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERR	T(302)	P-VALUE	PARTIAL-R
LCONC	0.22102	0.5767E-01	3.832	0.000154	0.21555
LWPH	-1.2521	0.1791	-6.982	0.000000	-0.57328
LTRP	-0.22105	0.7312E-01	-3.023	0.002717	-0.17138

INTERCEPT= 3.221    STD.-ERROR= 0.278    T-RATIO= 11.566

DEGREES OF FREEDOM= 302  
 SUM OF SQUARES OF RESIDUALS= 111.1  
 VARIANCE OF ESTIMATE= 0.3678  
 STANDARD ERROR OF ESTIMATE= 0.6065  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.1786  
 F(3, 302)= 21.486 P-VALUE= 0.0  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4224  
 CORRECTED R-SQ=0.1704  
 BARTLETT'S R-SQ=0.1708  
 STANDARD ERROR AS PERCENT OF MEAN= 27.19466  
 DURBIN-WATSON STATISTIC= 1.59

REGRESSION OF LUSM FOR OBSERVATIONS 1 TO 306.

THE METHOD OF ESTIMATION WAS OLS.

VARIABLE	COEFFICIENT	STD.-ERR	T(302)	P-VALUE	PARTIAL-R
LCONC	0.19390	0.6494E-01	2.986	0.003059	0.16434
LWPH	-1.3564	0.2016	-6.690	0.000000	-0.35962
LTRP	-0.28590	0.8234E-01	-3.472	0.000591	-0.19599

INTERCEPT= 3.372    STD.-ERROR= 0.314    T-RATIO= 10.751

DEGREES OF FREEDOM= 302  
 SUM OF SQUARES OF RESIDUALS= 140.9  
 VARIANCE OF ESTIMATE= 0.4644  
 STANDARD ERROR OF ESTIMATE= 0.6829  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.1483  
 F(3, 302)= 20.441 P-VALUE= 0.0  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4104  
 CORRECTED R-SQ=0.1605  
 BARTLETT'S R-SQ=0.1609  
 STANDARD ERROR AS PERCENT OF MEAN= 32.73123  
 DURBIN-WATSON STATISTIC= 1.60

CORRELATION MATRIX:

	LCONC	LWPH	LTRP
LCONC	1.0000	0.2045	-0.0152
LWPH	-0.2045	1.0000	0.0274
LTRP	0.0152	0.0274	1.0000

Table 18.--Regression results for tariff levels--Continued

## Variable definition--Dependent variables:

- USTT7070 - U.S. nominal tariff rate for 1970, 1970 import weights were used for aggregation. This rate appears in column 3 of Table 1.
- USUT70 - Same as above except that no weights were used for aggregation. This rate appears in column 3 of Table 3.
- LUSWT, LUSUT - The above respective variables in log form.

## Independent variables:

- CONTR467 - 1967 concentration ratio, the percent of sales by the 4 largest companies.
- WPH70 - 1970 average hourly wage.
- TRPINP63 - Percent of input purchases from the transportation sector in the 1963 input-output table.
- LCONC, LWPH, LTRP - The above variables in log form.

## Comparative Advantage

Table 19 gives lists of sectors' ranks by a definition of comparative advantage (for 1970). The measure is derived by first regressing the observed comparative efficiency measure on explanatory variables such as wages and real growth rates. Then the fitted values are taken on the true protected comparative efficiency measures. This is done in order to smooth out some of the extreme points observed in the data and to account for the observed disequilibrium in the factor markets. These fitted points are then deflated by the 1970 unweighted ET rate and an NTB deflator. 1/ The NTB deflator was run through the IO table to give an effective NTB index. This does not give much weight to NTB's but it does give some weight for most sectors where they occur and it gives a lot for a few sectors. 2/

The comparative advantage rankings in Table 19 try to incorporate, into one measure, a relative status quo of industries, the ET rate, and some indicator of NTB's. 3/ These rankings are intended for use in comparison with rankings of effective rates alone. They are consistent with the model and the evidence presented explaining the status quo of comparative efficiency measures. They should be better than simple ET rates because they try to account for the existing relative health of industries in the base on which the ET (and NTB) rate is applied. The

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1/ The NTB index was inserted in a different manner for some variables; see the table explanation.

2/ Hence there is an assumption that the NTB index run through the IO table does measure the "height" of the restriction. Practically, to the extent that the assumption is false, the NTB deflator will be close to unity and then will not affect the results.

3/ This is a theoretical way around the multicollinearity problem.

reader must be cautioned that data problems may cause some sector rankings to be wrong; hence, other supplementary data should be used if possible when determining a final ranking of comparative advantage.

The rank correlation matrix shows that the derived CA measures do rank correlate with trade performance measures a bit better than do ET rates above.

Table 19.--Comparative advantage measures,  
their ranks, and associated data.

ID-3IC	CA2A	RCA2A	CA3A	RCA3A	CA2B	RCA2B	CA3B	RCA3B	REP	RMC	UNUSTB	UNUSTBWD	RUSSAWD	EP70U	EPNTRUS
2015	0.221	215	0.222	216	0.204	193	0.206	145	1.2	0.2	65.4	8.3	10.5	2.4	-6.3
2022	0.057	7	0.059	7	0.147	83	0.149	87	0.2	3.9	-84.5	-11.1	0.7	84.3	114.6
2023	0.145	85	0.147	86	0.186	168	0.188	173	11.4	2.8	57.4	11.0	15.0	22.1	23.2
2026	0.145	84	0.145	82	0.144	78	0.144	78	0.0	0.0	-17.3	-1.7	4.0	12.0	-0.4
2032	0.116	75	0.139	74	0.136	67	0.137	68	0.4	0.2	26.6	3.3	8.0	11.2	-1.1
2033	0.113	38	0.115	33	0.112	30	0.114	31	3.1	5.2	-30.6	-8.7	2.9	35.5	-0.9
2034	0.177	147	0.178	150	0.177	146	0.178	148	14.6	3.2	73.0	19.4	23.5	15.7	0.1
2035	0.175	144	0.178	149	0.164	119	0.166	124	1.0	0.4	46.4	12.8	20.2	7.0	-5.4
2037	0.162	119	0.162	120	0.162	116	0.162	118	1.1	0.2	-45.9	-10.8	6.4	21.7	0.0
2041	0.129	56	0.128	54	0.169	132	0.160	128	5.0	0.7	85.3	25.1	30.4	14.9	24.5
2042	0.210	204	0.210	204	0.212	203	0.211	205	1.3	0.3	12.5	12.5	18.3	-14.7	0.6
2043	0.254	227	0.224	228	0.237	224	0.222	223	3.2	0.2	27.1	6.1	18.3	0.2	-2.5
2044	0.067	9	0.067	8	0.088	14	0.088	13	55.4	1.0	94.7	49.9	50.3	42.0	21.9
2048	0.157	79	0.155	67	0.190	72	0.198	70	6.2	1.6	-16.0	-2.4	6.3	27.3	1.6
2051	0.180	161	0.181	160	0.182	163	0.183	163	0.1	0.3	-1.6	-0.3	14.6	30.1	0.9
2071	0.124	49	0.125	49	0.153	98	0.155	101	0.9	2.6	16.6	2.7	9.6	30.6	18.7
2072	0.163	122	0.165	125	0.171	155	0.173	137	0.5	8.3	-92.3	-16.8	0.7	0.1	3.8
2073	0.194	181	0.194	182	0.210	201	0.209	202	1.2	0.8	-49.3	-10.1	5.2	13.2	6.9
2087	0.224	216	0.219	215	0.227	218	0.222	217	0.0	1.2	-47.4	-8.0	4.4	10.5	1.4
2089	0.192	178	0.186	169	0.181	160	0.176	146	2.0	0.2	23.4	1.2	3.1	-0.6	-4.6
2084	0.178	149	0.177	147	0.189	173	0.188	174	0.2	22.9	-97.6	-19.3	0.2	49.9	5.5
2085	0.137	71	0.137	69	0.144	79	0.144	77	1.0	23.8	-94.3	-52.0	1.6	37.3	4.2
2086	0.206	195	0.208	200	0.202	191	0.205	193	0.1	0.0	51.5	4.6	6.8	-7.5	-1.5
2087	0.168	130	0.168	131	0.165	123	0.163	121	3.8	0.7	-21.4	-4.8	8.6	31.6	-1.6
2091	0.028	2	0.029	2	0.025	2	0.027	2	13.2	1.2	85.0	56.2	61.2	500.0	-6.8
2092	0.197	186	0.195	186	0.194	180	0.193	181	19.2	0.0	0.0	0.0	0.0	75.6	-1.3
2093	0.159	76	0.140	75	0.136	63	0.136	63	16.5	43.9	46.8	12.5	19.6	4.0	-2.0
2094	0.122	45	0.125	44	0.121	42	0.122	41	28.5	7.7	61.5	20.4	26.8	4.1	-0.7
2096	0.049	5	0.049	5	0.064	6	0.064	6	3.4	0.0	100.0	43.2	43.2	401.9	27.1
2098	0.172	157	0.181	163	0.171	134	0.173	135	0.1	1.7	-47.7	-12.2	1.0	-2.3	-4.0
2099	0.163	168	0.164	167	0.185	166	0.186	167	0.7	1.5	43.5	14.1	23.2	8.5	1.0
2111	0.159	113	0.158	108	0.159	112	0.158	105	4.5	0.0	98.0	36.3	36.6	63.4	0.0
2121	0.097	21	0.101	23	0.097	18	0.101	20	0.5	1.5	-44.7	-4.5	2.8	3.2	0.0
2131	0.115	36	0.117	36	0.115	34	0.117	34	16.6	7.2	46.2	23.7	37.6	53.3	0.0
2241	0.129	57	0.133	60	0.133	59	0.136	63	3.1	3.2	-20.1	-5.5	11.0	26.4	1.9
2251	0.140	77	0.141	78	0.150	92	0.151	95	0.2	0.0	44.7	5.3	5.0	51.1	6.1
2284	0.116	38	0.120	40	0.118	38	0.121	39	2.0	2.2	-15.7	-2.0	5.4	31.6	1.1
2291	0.046	4	0.047	4	0.055	5	0.056	5	1.8	0.5	62.3	1.3	1.6	76.0	12.9
2292	0.100	25	0.102	25	0.108	26	0.110	25	3.7	8.8	-4.8	-0.6	5.6	46.2	6.4
2293	0.072	11	0.075	10	0.076	10	0.077	9	1.8	0.2	13.9	1.6	6.7	56.3	4.5
2295	0.147	89	0.148	90	0.141	75	0.142	74	5.3	3.8	34.5	6.9	12.4	12.8	-3.6
2296	0.088	16	0.089	16	0.113	23	0.112	23	1.7	0.3	-2.9	0.5	2.7	30.7	19.9
2298	0.076	13	0.077	13	0.086	13	0.086	13	2.9	20.7	-73.7	-22.2	9.7	5.5	9.6
2299	0.144	82	0.145	83	0.158	87	0.151	94	5.0	82.4	-73.4	-20.5	3.7	20.6	2.2
2393	0.090	18	0.092	18	0.116	35	0.119	37	0.9	0.4	56.4	2.1	2.9	10.6	21.0
2394	0.161	116	0.163	121	0.156	107	0.160	114	0.8	0.1	0.0	0.0	0.0	4.4	-1.5
2396	0.164	127	0.166	127	0.141	159	0.161	159	0.4	0.7	30.1	8.2	17.6	13.7	7.5
2399	0.209	200	0.209	203	0.219	214	0.220	215	4.8	2.0	37.8	8.8	16.0	24.3	4.3
2426	0.071	10	0.075	11	0.073	8	0.078	10	2.3	5.0	-30.3	-10.8	12.4	15.2	2.4
2428	0.049	17	0.049	19	0.089	15	0.094	16	5.4	26.2	-19.2	-12.4	26.0	5.1	0.0
2431	0.178	152	0.179	156	0.178	150	0.179	153	0.1	1.3	-35.6	-7.3	6.6	2.3	0.0
2432	0.108	29	0.109	28	0.108	25	0.109	24	1.6	13.9	-78.6	-27.4	3.7	30.6	0.0
2499	0.158	109	0.159	114	0.157	106	0.159	111	1.7	9.2	-56.4	-14.0	5.4	21.3	-0.1
2500	0.167	129	0.168	130	0.167	126	0.169	127	0.4	0.1	35.9	10.6	13.8	15.2	0.0
2515	0.116	37	0.117	37	0.118	39	0.119	38	0.1	0.0	-62.5	-15.6	4.7	33.4	1.2
2522	0.168	131	0.169	135	0.172	136	0.172	134	0.5	0.0	-62.5	-13.6	4.7	16.0	1.6
2591	0.165	126	0.165	126	0.168	128	0.169	131	0.3	0.0	-62.5	-13.6	4.7	23.0	-1.6
2611	0.152	94	0.152	94	0.152	94	0.152	96	30.1	50.9	-60.6	-20.2	20.2	-4.4	-0.1
2621	0.135	65	0.135	65	0.135	61	0.134	61	3.2	15.9	-37.4	-14.5	12.1	13.3	-0.2
2631	0.152	100	0.150	95	0.152	97	0.150	90	4.7	0.2	-64.5	-8.1	10.3	4.4	-0.1
2641	0.204	193	0.203	194	0.208	197	0.207	197	3.1	0.7	47.8	11.8	18.3	10.0	1.7
2642	0.183	167	0.182	166	0.182	164	0.182	162	0.1	0.1	15.7	1.6	-6.1	17.0	-0.1
2643	0.181	163	0.182	164	0.180	157	0.181	160	0.6	0.0	-97.0	-29.6	0.5	20.1	-0.3
2644	0.143	81	0.145	83	0.143	77	0.145	80	-6.6	13.4	-40.1	-6.2	-3.6	8.6	0.0
2645	0.136	66	0.136	68	0.136	62	0.136	64	1.2	0.1	11.3	0.8	3.7	15.9	-0.1
2647	0.252	230	0.250	231	0.251	230	0.250	232	0.3	0.0	72.6	9.0	10.7	12.3	-0.1
2649	0.123	46	0.125	46	0.122	45	0.125	46	1.2	2.2	37.1	6.4	11.9	20.0	-0.1
2661	0.130	59	0.129	56	0.130	54	0.129	53	1.7	0.8	-24.9	-5.6	8.5	24.4	-0.2
2701	0.154	105	0.151	100	0.154	101	0.152	97	9.7	4.8	34.8	12.4	24.0	14.6	0.2
2721	0.179	154	0.177	148	0.200	188	0.198	187	2.6	0.6	-52.8	-13.9	20.1	-3.8	9.5
2731	0.202	192	0.200	192	0.215	208	0.213	208	5.5	3.5	33.3	12.1	24.3	1.2	-5.5
2761	0.202	191	0.200	184	0.208	187	0.205	186	0.1	0.0	11.3	-0.8	2.7	15.2	-0.9
2782	0.179	158	0.181	162	0.179	152	0.181	156	0.5	3.4	-42.4	-13.0	8.4	13.2	-0.1
2821	0.163	123	0.161	118	0.164	122	0.162	117	14.2	1.1	22.9	13.4	15.9	22.3	0.5
2822	0.195	182	0.191	179	0.194	181	0.190	178	18.4	5.4	-7.8	-4.0	23.4	4.1	-0.2
2823	0.049	6	0.051	6	0.050	4	0.051	4	-4.0	3.2	-54.9	-6.2	2.5	46.0	0.6
2824	0.145	83	0.143	80	0.145	80	0.144	79	4.4	3.2	9.4	1.7	9.8	20.8	0.4
2841	0.206	196	0.203	195	0.207	195	0.209	192	1.3	0.1	44.7	11.0	14.0	11.3	0.3
2842	0.216	213	0.215	214	0.215	211	0.215	211	2.4	0.1	84.0	15.0	16.4	4.0	-0.3
2843	0.232	222	0.230	221	0.233	221	0.231	221	7.6	2.1	80.2	17.5	19.7	25.4	0.5
2844	0.167	128	0.167	128	0.166	124	0.166	123	0.4	0.3	32.4	5.3	10.7	37.8	-0.2
2851	0.181	162	0.181	161	0.180	156	0.180	157	1.7	0.0	-93.9	-15.4	14.8	2.8	-0.3
2861	0.100	24	0.102	24	0.103	21	0.104	21	24.5	5.1	73.4	24.4	28.8	7.8	2.0
2871	0.091	19	0.092	17	0.090	16	0.092	15	9.9	5.3	37.8	12.9	23.4	-10.6	-0.2
2879	0.292	238	0.290	238	0.292	238	0.290	238	10.5						

Table 19.--Comparative advantage measures,  
their ranks, and associated data--Cont.

CODE	CA2A	RC2A	CA3A	RC3A	CA2B	RC2B	CA3B	RC3B	REV	RPC	UNUSTG=	RUSTG=	EMTOL	EPNTH=	
3261	0.150	22	0.152	94	0.152	90	0.152	99	0.4	1.1	35.0	1.0	1.2	26.8	-0.1
3262	0.104	27	0.109	26	0.106	23	0.107	23	1.9	46.5	-92.2	-35.2	0.7	58.3	0.0
3263	0.076	14	0.081	14	0.076	11	0.081	11	3.2	48.6	-95.3	-99.3	1.2	33.8	-0.1
3264	0.154	103	0.154	104	0.154	100	0.154	100	7.8	6.3	16.0	5.5	20.0	15.4	0.0
3274	0.098	22	0.099	22	0.098	19	0.099	19	1.4	2.7	-4.3	-0.7	8.2	4.8	0.0
3275	0.042	3	0.042	3	0.042	3	0.042	3	0.4	0.1	-21.8	-2.4	4.3	238.5	0.0
3291	0.116	40	0.119	39	0.118	37	0.118	36	8.1	7.4	23.3	6.1	16.3	5.7	-0.3
3292	0.143	80	0.144	81	0.143	76	0.143	76	2.3	3.6	19.5	3.7	11.2	0.9	-0.2
3293	0.164	125	0.165	124	0.164	121	0.165	122	2.4	0.5	6.8	1.9	15.0	5.8	0.0
3295	0.188	172	0.189	176	0.188	165	0.188	164	3.3	2.9	17.2	4.2	14.3	-1.0	-1.6
3297	0.162	120	0.161	119	0.162	117	0.161	116	9.4	2.7	83.4	19.2	21.1	19.3	0.0
3299	0.114	35	0.117	35	0.113	33	0.116	33	4.5	9.8	22.5	4.7	12.7	-0.3	-0.2
3312	0.133	64	0.133	63	0.136	64	0.133	59	3.7	8.8	-16.2	-3.4	8.4	9.1	-0.2
3331	0.247	239	0.249	239	0.247	239	0.249	239	10.6	13.2	-34.4	-5.8	5.5	4.6	0.0
3332	0.369	243	0.366	243	0.360	243	0.365	243	0.4	13.3	-71.1	-14.0	3.0	-1.6	-0.1
3333	0.113	33	0.114	32	0.113	32	0.114	30	0.4	18.7	-24.2	-21.9	1.9	20.0	0.0
3334	0.175	140	0.173	137	0.173	141	0.172	136	12.2	9.6	13.3	3.6	13.1	4.6	-0.1
3339	0.180	160	0.187	173	0.180	154	0.187	171	27.9	69.7	-69.3	-23.6	5.2	10.4	-0.1
3351	0.130	38	0.130	38	0.130	37	0.130	35	7.2	3.8	-57.5	-9.3	3.4	26.3	-0.1
3352	0.131	61	0.130	57	0.131	57	0.130	54	3.3	2.1	31.5	8.1	17.0	19.3	0.0
3356	0.047	1	0.043	1	0.047	1	0.043	1	10.0	4.7	11.6	3.7	17.9	14.1	0.0
3357	0.195	184	0.195	185	0.195	183	0.195	184	1.7	2.5	-23.2	-4.8	7.9	7.8	-0.1
3361	0.150	96	0.151	96	0.150	91	0.151	91	0.4	0.7	4.8	1.0	11.5	22.7	0.0
3362	0.146	107	0.158	109	0.156	103	0.158	106	0.3	0.5	-31.4	-8.5	9.2	19.1	-0.1
3369	0.160	115	0.160	116	0.160	113	0.160	113	0.8	0.4	27.7	105.8	100.0	12.1	0.0
3391	0.198	189	0.195	184	0.198	186	0.195	183	2.7	1.5	65.4	17.8	22.5	0.9	-0.2
3392	0.211	205	0.209	202	0.210	202	0.212	195	2.8	6.8	26.5	4.5	10.8	4.0	-0.1
3399	0.207	198	0.206	196	0.207	196	0.206	196	3.4	2.6	14.4	13.3	33.0	10.8	0.0
3411	0.227	219	0.224	218	0.226	217	0.223	218	0.3	0.1	27.0	3.9	10.9	18.6	-0.4
3421	0.066	15	0.068	15	0.066	12	0.068	12	2.1	11.5	-55.0	-15.6	6.4	60.8	-0.1
3423	0.175	139	0.175	142	0.174	139	0.175	142	1.3	7.3	13.6	4.0	16.9	11.9	-0.1
3425	0.175	138	0.176	146	0.174	138	0.175	145	4.0	5.4	0.0	0.0	9.3	10.9	-0.1
3429	0.134	63	0.135	66	0.134	60	0.133	62	0.6	2.0	13.1	3.4	14.7	20.4	-0.1
3431	0.151	97	0.150	93	0.151	93	0.149	84	1.5	0.0	-59.7	-26.0	8.8	35.4	-0.1
3432	0.137	67	0.138	72	0.137	69	0.137	69	2.5	0.3	34.0	8.9	17.8	23.8	-0.1
3433	0.148	90	0.148	89	0.147	85	0.147	85	0.9	0.4	43.7	7.1	11.7	15.5	-0.2
3434	0.208	194	0.203	193	0.204	192	0.203	191	1.5	1.8	-5.2	-1.2	10.7	11.3	-0.2
3442	0.152	99	0.153	102	0.152	95	0.153	98	0.8	0.0	11.8	3.1	14.4	10.5	-0.1
3443	0.207	199	0.206	197	0.217	213	0.215	213	1.7	0.4	60.1	14.1	15.9	13.1	3.9
3444	0.198	184	0.196	188	0.197	185	0.196	185	0.7	0.2	51.4	9.0	13.3	9.9	-0.1
3446	0.188	171	0.188	174	0.187	171	0.187	172	0.5	0.1	51.4	2.0	13.3	9.3	-0.1
3449	0.230	220	0.228	220	0.230	219	0.228	219	1.4	0.0	51.4	9.0	13.3	10.4	-0.2
3461	0.176	156	0.174	150	0.176	144	0.174	140	0.2	0.2	14.1	4.8	19.4	3.7	-0.2
3491	0.146	87	0.146	85	0.145	82	0.146	82	0.4	3.6	22.0	3.9	10.9	20.6	-0.1
3493	0.289	237	0.287	237	0.288	237	0.286	237	0.9	16.0	-59.5	-31.3	18.7	5.5	-0.2
3497	0.260	233	0.257	233	0.259	233	0.257	233	4.6	7.9	-28.6	-7.6	9.4	14.8	-0.1
3499	0.210	201	0.210	205	0.209	198	0.209	201	0.9	11.0	11.9	10.0	46.8	13.1	-0.1
3501	0.146	86	0.146	84	0.145	81	0.145	81	4.0	7.6	-10.7	-3.2	13.4	21.7	-0.1
3511	0.252	231	0.248	230	0.252	231	0.248	230	0.1	2.2	-11.6	-2.7	10.2	32.0	-0.1
3519	0.242	224	0.238	224	0.242	225	0.238	225	8.8	5.5	15.5	6.9	26.7	2.1	0.0
3522	0.166	169	0.165	168	0.165	167	0.165	165	3.1	7.0	33.1	11.0	28.2	-5.0	-0.1
3531	0.213	207	0.210	207	0.212	204	0.210	203	18.8	3.4	74.6	27.6	32.3	9.5	-0.1
3532	0.175	143	0.174	139	0.175	140	0.174	139	11.6	1.4	83.3	30.3	32.3	10.8	-0.2
3533	0.184	173	0.187	172	0.188	172	0.187	175	7.0	5.1	74.7	25.4	29.7	15.0	-0.1
3534	0.215	212	0.214	211	0.215	210	0.214	209	0.9	1.1	73.3	28.0	28.3	4.4	-0.1
3535	0.195	183	0.194	183	0.195	182	0.194	182	2.4	1.1	73.3	24.0	28.3	7.1	-0.1
3536	0.311	241	0.308	241	0.311	241	0.307	241	3.3	4.8	73.3	24.0	28.3	1.6	-0.1
3537	0.176	145	0.175	143	0.176	145	0.175	143	4.8	2.3	66.9	23.5	29.3	8.3	-0.1
3541	0.161	118	0.160	117	0.161	115	0.160	115	11.6	7.5	91.1	9.5	16.3	11.8	-0.1
3542	0.174	137	0.173	136	0.174	137	0.173	138	8.6	4.6	41.0	9.4	16.2	12.8	-0.1
3548	0.158	110	0.159	110	0.158	108	0.158	107	3.2	2.5	33.0	12.6	18.2	10.2	-0.1
3551	0.175	141	0.175	141	0.175	142	0.175	143	7.3	8.3	51.6	11.4	16.3	6.0	-0.1
3552	0.122	43	0.123	43	0.122	43	0.123	43	13.2	24.9	-3.5	-0.7	2.7	14.5	-0.1
3553	0.163	121	0.163	125	0.163	118	0.163	120	6.9	6.0	48.4	10.3	15.8	7.2	-0.1
3555	0.190	176	0.189	177	0.190	176	0.189	176	2.7	8.0	30.2	8.9	19.1	11.2	-0.1
3559	0.215	210	0.213	210	0.215	207	0.213	207	0.5	0.8	35.8	9.2	18.3	2.8	-0.1
3561	0.215	209	0.213	209	0.214	206	0.213	206	7.0	2.6	66.6	21.7	27.1	2.3	-0.1
3562	0.138	74	0.137	70	0.138	71	0.137	66	0.2	5.8	14.4	4.1	16.3	12.1	-0.1
3564	0.230	221	0.230	222	0.230	220	0.230	220	1.8	2.2	57.3	19.4	26.7	2.2	-0.1
3566	0.168	124	0.163	122	0.164	120	0.163	119	0.8	2.0	68.3	15.6	19.2	18.1	-0.1
3567	0.207	196	0.206	196	0.206	194	0.206	194	2.1	2.5	18.0	15.0	19.1	14.1	-0.1
3569	0.168	132	0.170	135	0.168	129	0.169	132	2.1	16.0	60.3	15.1	20.1	5.3	-0.1
3571	0.317	242	0.314	242	0.317	242	0.314	242	3.1	5.6	34.2	14.1	27.7	4.4	0.0
3572	0.215	211	0.214	212	0.215	209	0.214	210	3.0	14.3	-18.6	-7.2	15.8	4.0	-0.1
3574	0.179	153	0.179	152	0.178	149	0.178	149	6.9	1.8	70.5	11.3	13.6	7.4	-0.2
3579	0.210	202	0.210	204	0.209	199	0.209	200	6.7	18.2	73.1	48.3	57.2	9.7	-0.1
3581	0.126	50	0.127	50	0.126	49	0.127	48	5.8	1.2	76.2	33.7	39.0	10.2	-0.1
3582	0.118	39	0.118	38	0.117	36	0.118	35	10.7	6.5	27.2	3.0	11.7	13.5	-0.3
3583	0.270	236	0.268	236	0.270	236	0.267	236	0.2	1.0	27.8	35.1	40.1	1.7	-0.1
3586	0.122	44	0.124	45	0.122	44	0.124	44	3.7	1.5	73.1	23.0	27.3	10.2	-0.1
3589	0.217	214	0.215	213	0.217	212	0.215	212	1.8	0.6	41.1	3.9	16.9	9.2	-0.1
3599	0.264	235	0.263	235	0.264	235	0.263	235	0.1	0.8	18.2	7.4	24.0	1.3	0.0
3611	0.179	156	0.179	155	0.178	151	0.179	152	13.2	7.2	63.9	24.7	31.7	28.2	0.0
3612	0.201	190	0.200	190	0.200	190	0.199	190	2.1	3.1	38.8	10.5	18.7	9.1	-0.2
3621	0.159	112	0.												

Table 19.--Comparative advantage measures,  
their ranks, and associated data--Cont.

ID-51C	CAZA		CA3A		CA2B		CA3B		RCA	UNUSTB		RUSAND		EPNTRK	
	CAZA	CA3A	CA2B	CA3B	CA2B	CA3B	UNUSTB	RUSAND							
3713.	0.243	226.	0.242	227.	0.242	227.	0.241	227.	0.9	2.6	37.0	17.6	32.7	-1.0	-0.2
3717.	0.161	117.	0.159	112.	0.161	114.	0.159	108.	3.4	12.1	17.7	27.2	18.0	-0.4	-0.2
3721.	0.212	206.	0.208	201.	0.221	215.	0.217	214.	18.1	0.5	95.3	76.4	78.3	7.3	7.5
3722.	0.189	174.	0.187	170.	0.189	174.	0.187	169.	2.7	0.7	83.1	35.6	39.2	5.7	0.0
3731.	0.177	148.	0.175	144.	0.191	177.	0.189	177.	2.4	0.2	74.0	1.3	2.5	8.1	6.6
3732.	0.150	94.	0.151	98.	0.167	125.	0.169	130.	4.2	5.7	34.0	1.3	2.5	9.4	9.9
3741.	0.131	60.	0.129	55.	0.131	56.	0.129	52.	4.0	0.0	99.4	24.4	28.3	36.9	0.0
3742.	0.153	101.	0.151	97.	0.152	96.	0.151	92.	0.5	0.5	39.1	7.3	9.8	21.5	-0.2
3751.	0.178	150.	0.179	154.	0.178	147.	0.179	150.	0.8	49.3	-48.7	-43.2	2.8	36.2	-0.1
3799.	0.306	240.	0.307	240.	0.305	240.	0.306	240.	2.5	24.5	-44.7	-16.6	10.3	0.4	-0.2
3811.	0.244	229.	0.246	229.	0.244	229.	0.246	229.	2.5	4.4	56.2	23.4	32.5	14.3	0.0
3821.	0.140	78.	0.140	76.	0.140	73.	0.140	73.	15.0	2.4	80.1	32.6	36.7	33.7	-0.1
3822.	0.112	31.	0.113	31.	0.112	31.	0.113	28.	2.0	0.2	79.4	26.6	30.0	37.9	0.0
3831.	0.156	104.	0.156	106.	0.156	104.	0.156	102.	6.6	19.6	-12.0	-7.2	13.4	36.1	0.0
3842.	0.227	218.	0.226	219.	0.234	222.	0.233	222.	0.0	0.9	67.7	20.7	29.6	8.9	2.6
3843.	0.174	102.	0.174	105.	0.175	99.	0.174	99.	1.0	2.9	73.6	30.3	35.7	19.6	-0.1
3851.	0.187	170.	0.187	171.	0.186	169.	0.187	168.	2.9	9.7	-47.4	-16.0	8.9	29.0	-0.1
3861.	0.263	234.	0.259	234.	0.263	234.	0.260	234.	6.0	5.6	32.2	11.4	23.4	15.6	0.0
3871.	0.129	53.	0.131	59.	0.129	53.	0.131	56.	0.5	17.4	-81.9	-15.6	1.7	32.0	-0.1
3941.	0.123	47.	0.125	48.	0.125	48.	0.127	50.	0.2	9.6	-65.0	-21.0	5.7	41.4	1.1
3949.	0.119	41.	0.122	41.	0.120	40.	0.123	42.	0.9	15.8	-33.0	-17.7	17.9	17.4	0.6
3951.	0.126	51.	0.127	51.	0.126	50.	0.127	49.	8.0	1.6	47.2	12.5	12.5	32.7	-0.1
3952.	0.109	30.	0.111	29.	0.110	27.	0.112	27.	1.0	2.7	33.3	7.3	14.6	21.2	1.1
3953.	0.178	151.	0.179	151.	0.178	148.	0.178	147.	1.4	0.0	81.3	15.7	17.5	2.4	-0.2
3964.	0.131	62.	0.133	62.	0.131	58.	0.133	58.	0.4	6.4	-17.2	-3.2	7.7	35.3	-0.2
3999.	0.189	93.	0.191	93.	0.189	82.	0.191	93.	1.7	20.4	32.9	84.3	100.0	24.0	0.0
4703.	0.181	164.	0.179	153.	0.181	161.	0.179	151.	1.9	2.0	37.8	10.4	19.0	19.0	0.0
5503.	0.158	111.	0.159	113.	0.158	109.	0.159	110.	1.3	5.2	48.5	12.3	18.8	36.3	-0.1
5701.	0.178	53.	0.178	53.	0.178	51.	0.178	51.	8.4	3.0	41.6	19.0	32.3	13.9	0.0

**A** REGRESSION OF FP270 FOR OBSERVATIONS 1 TO 243.

THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 236)	P-VALUE	PARTIAL-R
GVA6570	0.16265E-02	0.2123E-03	7.663	0.000000	0.44635
WPH70	0.37512E-01	0.1061E-01	3.516	0.000524	0.22313
RMC	-0.33213E-03	0.6488E-03	-0.512	0.609188	-0.04330
FP70U	0.27449E-03	0.1468E-03	1.898	0.111433	0.10343
GVP6570	0.88234E-04	0.1873E-03	0.471	0.638084	0.03064
EPNTRBUS	-0.38375E-01	0.8020E-01	-0.477	0.634010	-0.03102

INTERCEPT= 0.6330E-01 STD.-ERROR= 0.925E-01 T-RATIO= 0.685

DEGREES OF FREEDOM= 236  
 SUM OF SQUARES OF RESIDUALS= 2.367  
 VARIANCE OF ESTIMATE= 0.1003E-01  
 STANDARD ERROR OF ESTIMATE= 0.1001  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2254  
 F( 6, 236)= 11.447 P-VALUE= 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4748  
 CORRECTED R-SQ=0.2037  
 BARTEN'S R-SQ=0.2067  
 STANDARD ERROR AS PERCENT OF MEAN= 92.47267  
 DURBIN-WATSON STATISTIC= 1.88

**B** REGRESSION OF FP370 FOR OBSERVATIONS 1 TO 243.

THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 236)	P-VALUE	PARTIAL-R
GVA6570	0.15985E-02	0.2121E-03	7.537	0.000000	0.44067
WPH70	0.34369E-01	0.1060E-01	3.242	0.001353	0.20648
RMC	-0.26995E-03	0.6482E-03	-0.416	0.677469	-0.02710
FP70U	0.24008E-03	0.1466E-03	1.637	0.102298	0.10598
GVP6570	0.10914E-03	0.1872E-03	0.583	0.560377	0.03793
EPNTRBUS	-0.37719E-01	0.8043E-01	-0.469	0.639529	-0.03051

INTERCEPT= 0.7261E-01 STD.-ERROR= 0.924E-01 T-RATIO= 0.786

DEGREES OF FREEDOM= 236  
 SUM OF SQUARES OF RESIDUALS= 2.363  
 VARIANCE OF ESTIMATE= 0.1001E-01  
 STANDARD ERROR OF ESTIMATE= 0.1001  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2173  
 F( 6, 236)= 10.923 P-VALUE= 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.4662  
 CORRECTED R-SQ=0.1974  
 BARTEN'S R-SQ=0.1984  
 STANDARD ERROR AS PERCENT OF MEAN= 92.37350  
 DURBIN-WATSON STATISTIC= 1.88



Table 19.--Comparative advantage measures,  
their ranks, and associated data--Cont.

**C** REGRESSION OF  $FP270$  FOR OBSERVATIONS 1 TO 293.  
THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT THIS REGRESSION USES ONLY THE FIRST RESIDUALS FROM THE PREVIOUS REGRESSION OF  $FP270$   
THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 205)	P-VALUE	PARTIAL-R
GVA6570	0.10076E-02	0.9274E-04	10.865	0.0	0.60449
WPH70	0.28961E-01	0.8839E-02	6.411	0.000000	0.40867
RMC	-0.96812E-03	0.3066E-03	-3.157	0.001852	-0.21534
EP70U	-0.12224E-04	0.8839E-04	-0.210	0.834258	-0.01463
GVP6570	0.11629E-03	0.8475E-04	1.372	0.173521	0.09560
EPNTBUS	0.91689E-04	0.3174E-03	0.163	0.870803	0.01137

INTERCEPT= 0.5721E-01 STD.-ERROR= 0.168E-01 T-RATIO= 3.485

DEGREES OF FREEDOM= 205  
SUM OF SQUARES OF RESIDUALS= 0.3042  
VARIANCE OF ESTIMATE= 0.1487E-02  
STANDARD ERROR OF ESTIMATE= 0.3856E-01  
COEFFICIENT OF DETERMINATION (R-SQ)=0.4415  
F( 6, 205)= 27.012 P-VALUE= 0.000000  
MULTIPLE CORRELATION COEFFICIENT (R)=0.6645  
CORRECTED R-SQ=0.4252  
BARTEN'S R-SQ=0.4259  
STANDARD ERROR AS PERCENT OF MEAN= 22.02097  
DURBIN-WATSON STATISTIC= 1.60

**D** REGRESSION OF  $FP370$  FOR OBSERVATIONS 1 TO 293.  
THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT THIS REGRESSION USES 31 OF THE FIRST RESIDUALS FROM THE PREVIOUS REGRESSION OF  $FP370$   
THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 205)	P-VALUE	PARTIAL-R
GVA6570	0.97853E-03	0.8949E-04	10.935	0.0	0.60696
WPH70	0.25935E-01	0.8283E-02	5.938	0.000000	0.38309
RMC	-0.90680E-03	0.2959E-03	-3.065	0.002470	-0.20932
EP70U	-0.63813E-05	0.5629E-04	-0.149	0.881784	-0.01040
GVP6570	0.12632E-03	0.8178E-04	1.545	0.123977	0.10726
EPNTBUS	0.68353E-04	0.3063E-03	0.223	0.823624	0.01559

INTERCEPT= 0.6751E-01 STD.-ERROR= 0.158E-01 T-RATIO= 4.262

DEGREES OF FREEDOM= 205  
SUM OF SQUARES OF RESIDUALS= 0.2834  
VARIANCE OF ESTIMATE= 0.1385E-02  
STANDARD ERROR OF ESTIMATE= 0.3721E-01  
COEFFICIENT OF DETERMINATION (R-SQ)=0.4359  
F( 6, 205)= 26.407 P-VALUE= 0.000000  
MULTIPLE CORRELATION COEFFICIENT (R)=0.6603  
CORRECTED R-SQ=0.4194  
BARTEN'S R-SQ=0.4201  
STANDARD ERROR AS PERCENT OF MEAN= 21.26738  
DURBIN-WATSON STATISTIC= 1.58

**E** REGRESSION OF  $FP270$  FOR OBSERVATIONS 1 TO 293.  
THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT → REGRESSION IS FOR ONLY THE 99 LARGEST SECTORS AS MEASURED BY 1963 TO VALUE-ADDED  
THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 90)	P-VALUE	PARTIAL-R
GVA6570	0.27563E-02	0.4548E-03	6.293	0.000000	0.55280
WPH70	0.67777E-01	0.1982E-01	3.420	0.000943	0.33919
RMC	0.38632E-03	0.2173E-02	0.178	0.859243	0.01674
EP70U	0.56463E-02	0.6291E-03	6.810	0.000000	0.56313
GVP6570	0.13733E-03	0.3696E-03	0.426	0.671338	0.04463
EPNTBUS	-0.59442E-02	0.4472E-02	-1.330	0.186803	-0.13886

INTERCEPT= -0.1656 STD.-ERROR= 0.786E-01 T-RATIO= -2.146

DEGREES OF FREEDOM= 90  
SUM OF SQUARES OF RESIDUALS= 1.114  
VARIANCE OF ESTIMATE= 0.1258E-01  
STANDARD ERROR OF ESTIMATE= 0.1113  
COEFFICIENT OF DETERMINATION (R-SQ)=0.5276  
F( 6, 90)= 16.751 P-VALUE= 0.000000  
MULTIPLE CORRELATION COEFFICIENT (R)=0.7263  
CORRECTED R-SQ=0.4961  
BARTEN'S R-SQ=0.4982  
STANDARD ERROR AS PERCENT OF MEAN= 30.62564  
DURBIN-WATSON STATISTIC= 1.94

Table 19.--Comparative advantage measures,  
their ranks and associated data--Cont.

**F** REGRESSION OF FP370 FOR OBSERVATIONS 1 TO 243.

THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT → REGRESSION INCLUDES ONLY SECTORS WITH IMPORT/EXPORT RATIO'S EQUAL TO OR GREATER THAN 5%

THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 90)	P-VALUE	PARTIAL-R
GVA6570	0.76871E-02	0.4294E-03	6.258	0.000000	0.55065
MPH70	0.66228E-01	0.1757E-01	3.388	0.001047	0.35630
RMC	0.55026E-03	0.2146E-02	0.256	0.798195	0.02702
EP70U	0.57848E-02	0.8188E-03	7.065	0.000000	0.59727
GVP6570	0.20836E-03	0.3650E-03	0.571	0.569474	0.06407
EPNTBUS	-0.65805E-02	0.4416E-02	-1.490	0.139709	-0.15516

INTERCEPT= -0.1665 STD.-ERROR= 0.774E-01 T-RATIO= -2.149

DEGREES OF FREEDOM= 90  
 SUM OF SQUARES OF RESIDUALS= 1.086  
 VARIANCE OF ESTIMATE= 0.1207E-01  
 STANDARD ERROR OF ESTIMATE= 0.1099  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.5373  
 F( 6, 90)= 17.417 P-VALUE= 0.000000  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.7330  
 CORRECTED R-SQ=0.5064  
 BARTEN'S K-SQ=0.5085  
 STANDARD ERROR AS PERCENT OF MEAN= 30.27824  
 DURBIN-WATSON STATISTIC= 1.92

**G** REGRESSION OF FP270 FOR OBSERVATIONS 1 TO 243.

THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT → REGRESSION INCLUDES ONLY SECTORS WITH IMPORT/EXPORT RATIO'S EQUAL TO OR GREATER THAN 5%

THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 71)	P-VALUE	PARTIAL-R
GVA6570	0.10370E-02	0.2488E-03	4.171	0.000085	0.44360
MPH70	0.30503E-01	0.1425E-01	3.244	0.002192	0.34769
RMC	-0.34704E-03	0.6459E-03	-0.537	0.592730	-0.06364
EP70U	0.38524E-03	0.4084E-03	0.943	0.342789	0.11124
GVP6570	0.15184E-03	0.1880E-03	0.808	0.422040	0.09590
EPNTBUS	0.44538E-02	0.4227E-02	1.054	0.295637	0.12407

INTERCEPT= -0.1234E-01 STD.-ERROR= 0.513E-01 T-RATIO= -0.232

DEGREES OF FREEDOM= 71  
 SUM OF SQUARES OF RESIDUALS= 0.3648  
 VARIANCE OF ESTIMATE= 0.5139E-02  
 STANDARD ERROR OF ESTIMATE= 0.7168E-01  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.3073  
 F( 6, 71)= 5.249 P-VALUE= 0.000160  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.5543  
 CORRECTED R-SQ=0.2947  
 BARTEN'S K-SQ=0.2550  
 STANDARD ERROR AS PERCENT OF MEAN= 39.04491  
 DURBIN-WATSON STATISTIC= 0.87

**H** REGRESSION OF FP370 FOR OBSERVATIONS 1 TO 243.

THE OBSERVATIONS WERE WEIGHTED BY THE VARIABLE WT → REGRESSION INCLUDES ONLY SECTORS WITH IMPORT/EXPORT RATIO'S EQUAL TO OR GREATER THAN 5%

THE METHOD OF ESTIMATION WAS OLS

VARIABLE	COEFFICIENT	STD.-ERROR	T( 71)	P-VALUE	PARTIAL-R
GVA6570	0.99578E-03	0.2481E-03	4.013	0.000147	0.42998
MPH70	0.46713E-01	0.1322E-01	3.285	0.001583	0.36424
RMC	-0.32083E-03	0.6445E-03	-0.498	0.620174	-0.05897
EP70U	0.38731E-03	0.8076E-03	0.938	0.351451	0.11063
GVP6570	0.17652E-03	0.1876E-03	0.941	0.350024	0.11096
EPNTBUS	0.43676E-02	0.4219E-02	1.035	0.304026	0.12193

INTERCEPT= 0.1815E-02 STD.-ERROR= 0.532E-01 T-RATIO= 0.034

DEGREES OF FREEDOM= 71  
 SUM OF SQUARES OF RESIDUALS= 0.3633  
 VARIANCE OF ESTIMATE= 0.5114E-02  
 STANDARD ERROR OF ESTIMATE= 0.7154E-01  
 COEFFICIENT OF DETERMINATION (R-SQ)=0.2891  
 F( 6, 71)= 4.813 P-VALUE= 0.000359  
 MULTIPLE CORRELATION COEFFICIENT (R)=0.5377  
 CORRECTED R-SQ=0.2729  
 BARTEN'S K-SQ=0.2455  
 STANDARD ERROR AS PERCENT OF MEAN= 38.64960  
 DURBIN-WATSON STATISTIC= 0.87

Table 19.--Comparative advantage measures, their ranks, and associated data--Cont.

VARIABLE	(NO)	(FOR 243 OBSERVATIONS)
CA2A	( 2)	
CA3A	( 3)	
CA2B	( 4)	
CA3B	( 5)	
REP	( 6)	
RMC	( 7)	
UNUSTR	( 8)	
UNUSTBWD	( 9)	
XUSSXWD	(10)	
EP70U	(11)	
EPNTBUS	(12)	

## SPEARMAN RANK CORRELATION MATRIX

	( 2)	( 3)	( 4)	( 5)	( 6)	( 7)	( 8)	( 9)	(10)	(11)	(12)
( 2)	*****	0.999	0.987	0.985	-0.046	-0.164	0.251	0.269	0.260	-0.485	-0.133
( 3)	*****	*****	0.985	0.985	-0.052	-0.157	0.243	0.262	0.255	-0.485	-0.135
( 4)	93.678	90.151	*****	0.999	-0.046	-0.166	0.255	0.271	0.254	-0.462	-0.049
( 5)	89.740	89.861	*****	*****	-0.051	-0.158	0.247	0.264	0.249	-0.460	-0.047
( 6)	-0.720	-0.809	-0.711	-0.793	*****	0.316	0.338	0.366	0.435	-0.098	0.018
( 7)	-2.577	-2.464	-2.615	-2.490	5.173	*****	-0.423	-0.325	-0.062	0.023	-0.006
( 8)	4.030	3.885	4.100	3.964	5.575	-7.252	*****	0.940	0.727	-0.214	0.024
( 9)	4.334	4.210	4.376	4.247	6.111	-5.336	42.751	*****	0.846	-0.230	0.054
(10)	4.180	4.096	4.085	3.987	7.507	-0.966	16.454	24.605	*****	-0.263	0.039
(11)	-8.598	-8.600	-8.085	-8.033	-1.524	0.356	-3.394	-3.676	-4.234	*****	0.257
(12)	-2.076	-2.123	-0.762	-0.731	0.282	-0.095	0.370	0.833	0.603	4.137	*****

THE UPPER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE "T" SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 241

Table 19.--Comparative advantage measures, their ranks, and associated data--Continued

Definitions of the variables:

Comparative advantage measures were derived by taking estimated values of (value added/total factors) and deflating by the effective tariff rate. Two methods were used in an attempt to incorporate information on NTB's. Method A was to multiply the ET deflator times an effective NTB index. Method B was to calculate a predicted value of comparative efficiency which set the NTB independent variable equal to zero. CA measures were run for two- and three-factor models. The units are free trade dollars of value-added per dollar of factor (capital and labor).

CA2A	-	(Fitted value of FP270)/[1 + (EP70U/100)] X [1 + (EPNTBUS/100)] for a two-factor model (capital and labor).
CA3A	-	As above (using FP370) for a three-factor model (capital, non-production workers, and production workers).
CA2B	-	(Predicted value of FP270 setting EPNTBUS=0)/[1 + (EP70U/100)] for a two-factor model.
CA3B	-	As above (using FP370) for a three-factor model.
RCA2A, RCA3A, RCA2B, RCA3B	-	Ranks of above (from low to high comparative advantage)
REP	-	Ratio of exports to production
RMC	-	Ratio of imports to consumption
UNUSTB	-	U.S. trade balance (exports-imports) over (exports + imports). (U.N. sourced data)
UNUSTBWD	-	U.S. trade balance divided by world trade (exports)

Table 19.--Comparative advantage measures, their ranks, and associated data--Continued.

XUSSXWD	-	U.S. exports as a share of world exports (U.N. sourced)
EP70U	-	1970 effective tariff rate using unweighted nominal tariff averages
EPNTBUS	-	NTB frequency indices run through the ET formula
FP270	-	Observed comparative efficiency for 1970 in a two-factor model. Labor is converted to capital units via sector size weighted averages of the rates of return to capital and the wage rate
FP370	-	Observed comparative efficiency measure for 1970 using a three-factor model. Calculated in the same manner as FP270
WPH70	-	Average 1970 wage
GVA6570	-	Growth of value-added from 1965 to 1970
GVP6570	-	Growth of the effective price index from 1965 to 1970. The effective price index was calculated by running sector price deflators through the ET formula.

Table 19.--Comparative advantage measures, their ranks, and associated data--Continued.

Various types of regressions follow the table of comparative advantage measures and their ranks.

The first two equations (A & B) are used to estimate the fitted and predictive values for the CA2A, CA2B, CA3A, and CA3B. The remaining regression equations are attempts to improve the explanatory fit of observed comparative efficiency measures by in effect removing certain observations from the original set of 243 industries (using a dummy weighting scheme).

The fit (in terms of  $R^2$ ) does improve remarkably in many cases. (It might be productive to re-run the CA measures using data from these improved reduced sample equations.)

The first two additional equations (C & D) removed 31 of the worst residuals from equations A & B. The  $R^2$  doubled.

Equations E & F are the most interesting because they cover approximately the 97 largest sectors of the economy (as measured by value-added). Here the fit is remarkable. Furthermore, the ET rate is highly significant, indicating that for the large industries in the economy, the ET helps to more than maintain the existing comparative efficiency.

Equations G & H cover industries with import consumption ratios of above five percent.

Generally, the significant explanatory variables are growth rates and wages. However, for large industries, it appears that the ET rate may also be helping to boost comparative industry performance.

Table 19.--Comparative advantage measures, their ranks, and associated data--Continued.

There was a small amount of multicollinearity in the equations, a factor which must be considered when doing more refined explanatory work. However, since these equations were used for forecast or predicted values of the dependent variable (to smooth the CA measure), the multicollinearity problem was not considered serious.

A rank correlation matrix of the various measures presented appears at the end of the table.

## APPENDICES





APPENDIX A -- Cont.  
 Concordance relating the 5-digit Standard International  
 Trade Classification (SITC) to the IO-SIC

NO. OF MASTER CODE	MASTER CODE	SUBCODES BELONGING TO MASTER CODE	(A STAR (*) BEFORE THE SUBCODE INDICATES THAT THE SUBCODE IS ALSO MATCHED TO OTHER MASTER CODES)	NO. OF SUB-CODES PER MASTER CODE
59	2087	* 53.30 * 112.40 * 292.91 * 551.81 * 581.22 * 551.23 * 551.24		7
60	2091	* 81.30 * 243.28 * 421.30		3
61	2092	* 421.20		1
62	2093	* 81.30 * 421.40 * 421.50 * 421.60 * 421.70 * 422.10 * 422.20 * 422.30 * 422.40 * 422.50		11
63	2094	* 422.90 * 431.20 * 421.40 * 241.11 * 291.94 * 291.99 * 411.10 * 411.31 * 411.32 * 411.33 * 411.35 * 411.39		12
64	2095	* 71.10 * 71.30		2
65	2096	* 91.30 * 91.40		2
66	2097	* 111.01		1
67	2098	* 48.30		1
68	2099	* 17.30 * 45.90 * 51.71 * 53.90 * 54.83 * 55.10 * 55.41 * 55.62 * 55.83 * 55.84 * 55.51 * 55.52 * 61.60 * 61.90 * 62.02 * 71.10 * 74.70 * 75.10 * 75.22 * 75.73 * 75.74 * 75.79 * 97.01 * 97.02 * 97.06 * 97.07 * 97.09 * 112.20 * 292.43		32
69	2100	* 631.82 * 632.10 * 632.20 * 899.22		4
70	2111	* 122.20		1
71	2121	* 122.10		1
72	2131	* 122.30		1
73	2141	* 121.00		1
74	2201	* 652.11 * 652.12 * 652.13 * 652.21 * 652.22 * 652.23 * 652.29 * 653.11 * 653.12 * 653.13		11
		* 653.21 * 653.22 * 653.31 * 653.32 * 653.33 * 653.61 * 653.62 * 653.63 * 653.91 * 653.92		11
		* 653.93 * 653.94 * 653.95 * 655.50 * 655.53 * 655.83 * 656.20 * 656.61 * 656.92		11
75	2251	* 581.10 * 581.20 * 621.01 * 621.02 * 621.03 * 621.04 * 621.05 * 651.71 * 651.72 * 651.73		11
		* 651.74 * 651.75 * 651.91 * 651.92 * 651.93 * 651.94 * 653.92 * 653.93 * 653.94 * 653.95		11
		* 654.01 * 654.02 * 654.03 * 655.30 * 655.82 * 656.20 * 656.92 * 899.21		11
76	2251	* 841.42		1
77	2252	* 841.29 * 841.42 * 841.44 * 841.45 * 841.60		5
78	2253	* 841.12 * 841.29 * 841.43 * 841.44 * 841.45 * 841.53 * 841.60		7
79	2254	* 841.43		1
80	2256	* 653.70		1
81	2259	* 656.10 * 656.91 * 841.29 * 841.41 * 841.44 * 841.45 * 841.60		7
82	2280	* 261.30 * 266.22 * 266.32 * 581.10 * 581.20 * 621.01 * 621.02 * 621.03 * 621.04 * 621.05		11
		* 651.11 * 651.12 * 651.13 * 651.14 * 651.15 * 651.21 * 651.22 * 651.23 * 651.24 * 651.25		11
		* 651.30 * 651.41 * 651.42 * 651.61 * 651.62 * 651.63 * 651.64 * 651.65 * 651.71 * 651.72		11
		* 651.73 * 651.74 * 651.75 * 651.81 * 651.91 * 651.92 * 651.93 * 651.94 * 651.95 * 653.92 * 653.93 * 653.94		11
		* 653.95 * 654.01 * 654.02 * 654.03 * 655.30 * 655.82 * 656.20 * 656.92		11
83	2284	* 266.22 * 266.32 * 651.11 * 651.12 * 651.13 * 651.14 * 651.15		6
		* 651.61 * 651.62 * 651.63 * 651.64 * 651.65		5
84	2291	* 655.10 * 655.81		2
85	2292	* 654.04 * 654.05 * 654.06 * 656.20 * 656.91 * 656.92		6
86	2293	* 262.31 * 655.81		2
87	2294	* 261.20 * 262.60 * 262.90 * 263.30 * 263.40 * 264.00 * 265.10 * 266.33 * 266.40 * 655.61		11
		* 655.63 * 655.83		2
88	2295	* 655.42 * 655.43 * 655.44 * 655.45 * 655.46		5
89	2296	* 652.11 * 652.12 * 652.13 * 653.61		4
90	2297	* 262.20 * 262.30 * 262.70 * 262.80 * 262.90 * 266.23 * 411.34		7
91	2298	* 655.61 * 655.62 * 655.63 * 894.41		4
92	2299	* 262.51 * 264.00 * 265.10 * 265.20 * 265.30 * 265.40 * 265.50 * 265.60 * 265.80 * 292.92 * 292.93		11
		* 292.94 * 651.21 * 651.22 * 651.23 * 651.24 * 651.25 * 651.31 * 651.32 * 651.33 * 651.34 * 651.35		11
		* 651.72 * 651.73 * 651.74 * 651.75 * 651.91 * 651.92 * 651.93 * 651.94 * 652.21 * 652.22		11
		* 652.23 * 652.29 * 653.21 * 653.31 * 653.32 * 653.40 * 653.92 * 653.93 * 653.94 * 653.95		11
		* 653.96 * 654.01 * 654.03 * 655.41 * 655.46 * 655.50 * 655.81 * 655.82 * 655.83 * 656.91		11
93	2301	* 856.91		1
94	2302	* 629.30 * 629.98 * 629.99 * 652.21 * 652.22 * 652.23 * 652.29 * 653.80 * 653.96 * 655.10		11
		* 656.20 * 656.62 * 656.69 * 656.71 * 656.72 * 657.70 * 664.94 * 719.94 * 821.01 * 821.02		11
		* 821.03 * 821.09 * 841.29 * 841.44 * 841.45 * 841.60 * 893.00		11
95	2303	* 656.10		1
96	2305	* 654.02 * 654.06 * 656.20 * 656.91 * 656.92		5
97	2306	* 654.01 * 655.81 * 656.20 * 656.92 * 899.21		5
98	2307	* 613.00 * 654.03 * 654.06 * 656.91 * 841.22		5
99	2309	* 629.40 * 654.06 * 655.91 * 655.92 * 656.20 * 656.92 * 841.29 * 841.44 * 841.45 * 841.60		11
		* 899.98		1
100	2411	* 242.10 * 242.21 * 242.22 * 242.31 * 242.32 * 242.40 * 242.90 * 243.22 * 292.30 * 631.84		10
101	2421	* 241.10 * 243.10 * 243.21 * 243.22 * 243.31 * 243.32 * 631.83 * 631.86		8
102	2426	* 243.22 * 243.32 * 631.84 * 632.40 * 821.01 * 821.02 * 821.03 * 821.09 * 894.31 * 894.32		11
		* 894.33		1
103	2429	* 631.82 * 631.83 * 631.85 * 631.86 * 632.20 * 632.89		6
104	2431	* 631.87 * 632.40		2
105	2432	* 631.10 * 631.21		2
106	2433	* 631.85 * 632.89		2
107	2491	* 243.22 * 243.32 * 631.87 * 632.40		4
108	2499	* 241.10 * 244.01 * 244.02 * 292.30 * 631.41 * 631.42 * 631.81 * 631.83 * 631.85 * 631.86		11
		* 631.87 * 632.71 * 632.72 * 632.73 * 632.81 * 632.82 * 632.89 * 633.01 * 633.02 * 641.60		11
		* 657.80 * 657.92 * 657.93 * 651.03 * 651.04 * 651.05 * 661.93 * 897.12 * 897.13 * 899.22		11
		* 641.96 * 642.11 * 642.12 * 642.94 * 642.95		5
110	2511	* 821.01 * 821.02 * 821.03 * 821.09		4
111	2512	* 821.01 * 821.02 * 821.03 * 821.09		4
112	2514	* 821.01 * 821.02 * 821.03 * 821.09		4
113	2515	* 821.01 * 821.02 * 821.03 * 821.09		4
114	2519	* 821.01 * 821.02 * 821.03 * 821.09		4
115	2521	* 821.01 * 821.02 * 821.03 * 821.09		4
116	2522	* 821.01 * 821.02 * 821.03 * 821.09		4
117	2531	* 821.01 * 821.02 * 821.03 * 821.09		4
118	2561	* 821.01 * 821.02 * 821.03 * 821.09		4
119	2542	* 821.01 * 821.02 * 821.03 * 821.09		4
120	2591	* 821.01 * 821.02 * 821.03 * 821.09		4
121	2599	* 724.99 * 821.01 * 821.02 * 821.03 * 821.09		5
122	2605	* 892.13 * 892.30 * 892.41 * 892.42 * 892.91 * 892.93 * 892.94 * 892.99 * 894.24 * 896.04		10



APPENDIX A --Cont.
Concordance relating the 5-digit Standard International Trade Classification (SIC) to the IO-SIC

Table with columns: NO. OF MASTER CODE, MASTER CODE, SUBCODES BELONGING TO MASTER CODE, (A STAR (\*) BEFORE THE SUBCODE INDICATES THAT THE SURCODE IS ALSO MATCHED TO OTHER MASTER CODES), and NO. OF SUB-CODES PER MASTER CODE. The table lists various master codes (e.g., 2899, 2901, 4951, 2952, 3011, 3021, 3031, 3069, 3079, 3101, 3111, 3121, 3141, 3147, 3151, 3161, 3171, 3172, 3199, 3221, 3241, 3251, 3253, 3255, 3259, 3261, 3262, 3263, 3264, 3269, 3271, 3272, 3273, 3274, 3275, 3281, 3291, 3292, 3293, 3295, 3296, 3297, 3299, 3312) and their corresponding subcodes, along with the number of subcodes per master code.



APPENDIX A--Cont.  
 Concordance relating the 5-digit Standard International  
 Trade Classification (SIC) to the IO-SIC

NO. OF MASTER CODE	MASTER CODE	SUBCODES BELONGING TO MASTER CODE	(A STAR **) BEHIND THE SUBCODE INDICATES THAT THE SUBCODE IS ALSO MATCHED TO OTHER MASTER CODES)	NO. OF SUB- CODES PER MASTER CODE
276	3564	* 719.22		1
277	3565	* 899.11 * 899.12 * 899.13 * 899.14 * 899.15 * 899.16 * 899.17 * 899.18		8
278	3566	* 699.30		1
279	3567	* 719.14 * 729.92		2
280	3569	* 699.82 * 711.70 * 711.89 * 717.11 * 717.14 * 717.20 * 717.30 * 718.51 * 718.52 * 719.11		12
281	3571	* 699.23 * 719.51 * 719.62 * 719.66 * 719.80 * 719.99		8
282	3572	* 714.10 * 714.20 * 714.30 * 714.91 * 716.29 * 891.11 * 895.01		8
283	3573	* 714.92		1
284	3574	* 719.63		1
285	3575	* 719.65		1
286	3577	* 717.15		1
287	3578	* 719.12 * 719.15 * 719.22 * 719.42		4
288	3579	* 719.21		1
289	3580	* 719.67 * 719.66 * 719.80 * 725.73		4
290	3581	* 711.50 * 719.66 * 719.80		3
291	3611	* 722.70 * 720.51 * 729.57 * 720.70 * 729.98 * 729.99		6
292	3612	* 722.10 * 729.52		2
293	3613	* 722.20		1
294	3621	* 722.10		1
295	3622	* 722.20 * 729.51 * 729.70 * 729.98 * 729.99		5
296	3623	* 699.87 * 729.92		2
297	3624	* 699.83 * 729.96		2
298	3625	* 722.10 * 729.51 * 729.70 * 729.95 * 729.98 * 729.99		6
299	3631	* 725.05		1
300	3632	* 719.42 * 725.01		2
301	3633	* 725.02		1
302	3634	* 725.04		1
303	3635	* 725.03		1
304	3636	* 717.30		1
305	3639	* 699.03 * 719.43 * 725.03 * 725.04 * 725.05		5
306	3641	* 729.70 * 729.51 * 729.70 * 729.98 * 729.99		5
307	3642	* 455.82 * 920.47 * 812.42 * 812.43		4
308	3651	* 724.10 * 724.20 * 724.92 * 891.11 * 891.12		5
309	3652	* 891.20		1
310	3661	* 724.91		1
311	3667	* 724.20 * 724.90 * 729.93 * 729.94 * 891.11		5
312	3674	* 722.10 * 729.51 * 729.70 * 729.98 * 729.99		5
313	3679	* 724.20 * 724.92 * 729.30 * 729.63 * 891.11 * 891.12 * 891.20 * 899.61		8
314	3691	* 729.12		1
315	3692	* 729.11		1
316	3693	* 724.20 * 861.71		2
317	3694	* 723.10 * 729.41		2
318	3699	* 729.10 * 729.51 * 729.70 * 729.91 * 729.98 * 729.99		6
319	3702	* 678.10 * 678.50 * 679.10 * 679.70 * 691.10 * 719.22 * 719.70 * 731.70		8
320	3713	* 731.60 * 732.70 * 732.81 * 732.89		4
321	3715	* 733.70 * 733.40		2
322	3717	* 699.01 * 711.50 * 719.21 * 722.10 * 732.20 * 732.30 * 732.40 * 732.50 * 732.60 * 732.70		12
323	3721	* 732.81 * 732.89		2
324	3722	* 734.10 * 734.91		2
325	3723	* 711.41 * 711.47		2
326	3724	* 734.92 * 899.99		2
327	3731	* 734.93 * 899.05		2
328	3732	* 745.30 * 745.40 * 745.91 * 745.92 * 745.93		5
329	3741	* 735.30 * 735.40 * 735.91 * 735.92 * 735.93		5
330	3742	* 731.10 * 731.20 * 731.30 * 897.12 * 897.13		5
331	3747	* 731.40 * 731.50 * 731.61 * 731.62 * 731.63 * 731.70		6
332	3751	* 699.84 * 732.91 * 732.92 * 733.11 * 733.12		5
333	3791	* 733.30 * 733.40		2
334	3799	* 733.10 * 733.40		2
335	3811	* 861.00 * 730.52 * 461.91 * 861.92 * 861.93 * 861.98 * 861.99 * 899.57 * 891.00 * 891.00		10
336	3821	* 961.00 * 991.10 * 991.20 * 981.30 * 981.40 * 981.50 * 981.60 * 982.00		7
337	3822	* 729.57 * 861.81 * 861.82 * 861.93 * 861.96 * 861.97 * 861.99		7
338	3827	* 861.97 * 861.99		2
339	3831	* 729.52 * 861.11 * 861.12 * 861.31 * 861.32 * 861.33 * 861.74 * 861.39 * 861.71 * 861.91		12
340	3841	* 861.93 * 861.98		2
341	3842	* 724.10 * 821.01 * 821.02 * 821.03 * 821.09 * 861.71 * 735.93 * 861.71 * 861.72 * 899.61		11
342	3843	* 841.91 * 841.90 * 735.30 * 735.80 * 735.91 * 735.92		6
343	3844	* 899.62		1
344	3851	* 861.99 * 861.71 * 899.62		3
345	3852	* 861.11 * 861.21 * 861.22		3
346	3861	* 512.11 * 512.12 * 512.13 * 512.14 * 512.21 * 512.22 * 512.23 * 512.24 * 512.25 * 512.26		11
347	3862	* 512.27 * 512.28 * 512.31 * 512.32 * 512.33 * 512.41 * 512.42 * 512.43 * 512.51 * 512.52		11
348	3863	* 512.53 * 512.61 * 512.62 * 512.63 * 512.64 * 512.69 * 512.71 * 512.72 * 512.73 * 512.74		11
349	3864	* 512.75 * 512.76 * 512.77 * 512.78 * 512.79 * 512.81 * 512.82 * 512.83 * 512.84 * 512.85		11
350	3865	* 512.86 * 512.87 * 512.91 * 512.92 * 512.99 * 719.91 * 861.12 * 861.40 * 861.50 * 861.61		11
351	3871	* 861.69 * 861.91 * 861.98 * 867.30 * 867.41 * 867.42 * 867.43 * 895.01		8
352	3872	* 711.70 * 711.89 * 864.11 * 864.12 * 864.13 * 866.21 * 866.22 * 866.23 * 866.25 * 866.26		11
353	3873	* 864.29		1
354	3874	* 864.14		1
355	3911	* 899.83 * 897.11 * 897.14 * 897.20 * 899.34		5
356	3912	* 899.84 * 897.11 * 897.20		3
357	3913	* 667.20 * 667.30 * 667.40 * 864.74		4
358	3914	* 899.01 * 896.06 * 896.07 * 897.12 * 897.13		5
359	3915	* 719.27 * 891.41 * 891.42 * 891.43 * 891.81 * 891.82 * 891.83 * 891.84 * 891.85 * 891.89		10
360	3916	* 891.90		1
361	3941	* 744.10 * 894.21 * 894.23 * 894.24 * 894.25		5
362	3942	* 899.30 * 899.34 * 899.35 * 891.12 * 891.00 * 894.22 * 894.23		8
363	3943	* 894.10 * 894.23		2
364	3944	* 861.30 * 861.72 * 894.24 * 894.41 * 894.42 * 894.50 * 895.23 * 899.22		8

APPENDIX A--Cont.  
 Concordance relating the 5-digit Standard International  
 Trade Classification (SITC) to the IO-SIC

IO-SIC	MASTER CODE	SUBCODES BELONGING TO MASTER CODE	NO. OF SUB-CODES PER MASTER CODE
34	3951	* 698.91 * 861.93 * 895.21 * 895.22	4
35	3952	* 533.33 * 855.21 * 895.22 * 895.23 * 895.91 * 895.94	6
36	3953	* 895.21 * 895.22	2
37	3955	* 641.92 * 641.93 * 641.94	3
38	3961	* 665.20 * 665.81 * 665.82 * 665.84 * 667.40 * 698.83 * 897.20 * 899.54	8
39	3962	* 292.71 * 292.72 * 899.26 * 899.92 * 899.93	5
40	3963	* 899.52	1
41	3964	* 698.51 * 698.52 * 698.53 * 698.91 * 717.13 * 717.30 * 897.11 * 897.12 * 897.13 * 899.53	11
42	3981	* 899.23 * 899.24 * 899.25 * 899.27	4
43	3982	* 657.41 * 657.42	2
44	3983	* 899.32 * 899.33	2
45	3984	* 899.31	1
46	3998	* 698.12 * 895.11	2
47	3993	* 698.86	1
48	3995	* 899.41 * 899.42 * 899.43	3
49	3999	* 291.14 * 291.15 * 291.91 * 291.92 * 291.97 * 351.00 * 599.20 * 599.71 * 599.75 * 599.76 * 599.77 * 599.78 * 599.91 * 599.92 * 599.93 * 599.94 * 599.95 * 599.99 * 629.30 * 629.98 * 629.99 * 665.20 * 665.81 * 665.82 * 665.89 * 696.02 * 696.05 * 719.94 * 725.04 * 821.01 * 821.02 * 821.03 * 821.09 * 891.49 * 891.90 * 892.13 * 893.00 * 894.24 * 894.25 * 895.95 * 899.11 * 899.12 * 899.13 * 899.14 * 899.15 * 899.17 * 899.18 * 899.34 * 899.35 * 899.54 * 899.57 * 899.94 * 899.95 * 911.00 * 931.00 * 961.00 * 981.10 * 981.20 * 981.30	64
70	4101	* 694.11 * 694.12 * 694.21 * 694.22	4
71	4268	* 678.20 * 678.40 * 678.50 * 682.26 * 683.23 * 683.24 * 684.25 * 684.26 * 686.22 * 686.23	11
72	47C3	* 695.24 * 719.54 * 719.91 * 821.93	5
73	55C3	* 722.20	1
74	5701	* 723.30	1
75	8001	* 251.10 * 351.00 * 641.96 * 642.99 * 653.31 * 653.32 * 653.40 * 861.94 * 862.43 * 862.44 * 862.45 * 863.01 * 863.09 * 891.20 * 892.13 * 892.92 * 896.01 * 896.02 * 896.33 * 896.05 * 896.06 * 899.57 * 911.00 * 931.00 * 941.00 * 961.00 * 981.10 * 981.20 * 981.30 * 981.40 * 991.50 * 981.60 * 982.00	31
76	8300	* 81.91 * 81.92 * 81.94 * 81.99 * 231.30 * 244.01 * 251.10 * 267.01 * 267.02 * 276.61 * 287.00 * 284.01 * 284.02 * 284.03 * 284.04 * 284.05 * 284.06 * 284.07 * 284.08 * 284.09 * 285.02 * 292.40 * 351.00 * 513.25 * 581.10 * 581.20 * 581.32 * 621.01 * 621.02 * 621.33 * 621.04 * 621.05 * 621.06 * 629.10 * 664.11 * 664.12 * 664.13 * 689.41 * 689.42 * 689.50 * 712.50 * 732.10 * 894.31 * 894.32 * 894.33 * 899.57 * 911.00 * 931.00 * 961.00 * 981.10 * 981.20 * 981.30 * 981.40 * 981.50 * 981.60 * 982.00	56
77	9999	* 284.01 * 295.02 * 653.11 * 653.12 * 841.12 * 897.12 * 897.13	7

NUMBER OF UNIQUE MASTER CODES IS 377

NUMBER OF UNIQUE PAIRS OF MASTER AND SUBCODES IS 3347

Source: Prepared by V. Roningen and S. Kontos at the U.S. Tariff Commission.

Note: The master code in the input-output related Standard Industrial Classification (IO-SIC) as defined in the 478 sector 1963 U.S. input-output table. The subcodes original to each IO-SIC are the pure 5-digit Standard International Trade Classification (SITC) numbers. Definition of the SITC can be found in: Commodity Indexes for the Standard International Trade Classification, Series M, No. 38, Vol. 1, United Nations 1963.

A star (\*) before each subcode indicates that this particular subcode also appears after another master code. The following description of the preparation of the concordance will emphasize its tentative nature. It was done in such a manner as to minimize the amount of manual work and maximize the reliance on computer operation in the various preparation stages.

First, modifications of a TSUSA-import based SIC were carried out. This consisted of assignments of IO-SIC numbers to TSUSA numbers. This assigned all IO-SIC numbers (for sectors associated with physical quantities of output) a tariff rate. Some TSUSA numbers were assigned to two or more IO-SIC numbers. The original master tape also had U.S. import-based SITC numbers for each TSUSA number. When pure SITC numbers were matched with U.S. import-based SITC numbers, it was possible to run the concordance from pure SITC to IO-SIC. Because of some of the shortcuts

in the TSUSA to IO-SIC and pure SITC to import-based-SITC concordances, the resulting pure SITC to IO-SIC concordance may have same SITC numbers assigned to inappropriate IO-SIC sectors. The concordance is better for converting tariff data to IO-SIC than it is for converting trade data.

All of the concordances are modifications of the basic trade data-production data concordances in: U.S. Foreign Trade Statistics, Classifications and Cross-Classifications, 1970, U.S. Department of Commerce, Bureau of the Census, Wash., D.C., 20233, Feb. 1971



APPENDIX B

CONCORDANCE RELATING THE 5-DIGIT BRUSSELS  
TARIFF NOMENCLATURE (BTN) TO THE IO-SIC





APPENDIX B--Cont.

Concordance relating the 5-digit Brussels  
Tariff Nomenclature (BTN) to the 10-SIC

Table with columns: NO. OF MASTER CODE, MASTER CODE, SUBCODES BELONGING TO MASTER CODE, (A STAR (\*) BEFORE THE SUBCODE INDICATES THAT THE SUBCODE IS ALSO MATCHED TO OTHER MASTER CODES), NO. OF SUB-CODES PER MASTER CODE. The table lists various 5-digit Brussels Tariff Nomenclature (BTN) codes and their corresponding 10-SIC codes.

APPENDIX B--Cont.
Concordance relating the 5-digit Brussels
Tariff Nomenclature (BTN) to the IO-SIC

Table with columns: IO-SIC CODE, MASTER CODE, SURCODES BELONGING TO MASTER CODE, SURCODE IS ALSO MATCHED BY OTHER INDICATED CASES, and IO-SIC CODES PER MASTER CODE. The table lists various codes and their corresponding surcodes across multiple rows.



APPENDIX B--Cont.  
 Concordance relating the 5-digit Brussels  
 Tariff Nomenclature (BTN) to the IO-SIC

NO. OF MASTER CODE	MASTER CODE	SUBCODES BELONGING TO MASTER CODE	(A STAR (*) BEFORE THE SUBCODE INDICATES THAT THE SUBCODE IS ALSO MATCHED TO OTHER MASTER CODES)	NO. OF SUB-CODES PER MASTER CODE
113	3313	* 25.29 • 26.21 • 28.26 • 28.29 • 28.30 • 28.31 • 28.32 • 28.33 • 28.34 • 28.35 • 28.36 • 28.37 • 28.38 • 28.39 • 28.40 • 28.41 • 28.42A • 28.42B • 28.43 • 28.44 • 28.45 • 28.46 • 28.47 • 28.49 • 28.49 • 28.49 • 28.53 • 28.54 • 28.55 • 28.56A • 28.56B • 24.57 • 26.5A • 73.02A • 73.02B • 73.11 • 83.05		34
211	3315	* 73.09 • 73.10B • 73.13A • 73.13B • 73.13C • 73.13E • 73.150 • 73.15P • 73.15Q • 73.15A		2
212	3316	* 73.15S • 73.15T • 73.15U • 73.15V		14
213	3317	* 73.18A • 73.18C • 73.19		3
214	3331	* 26.03 • 74.01C • 74.01D • 74.02		4
215	3332	* 26.03 • 76.01R • 83.15		3
216	3333	* 26.03 • 74.01R • 79.03B • 79.04		4
217	3334	* 76.01B		1
218	3335	* 26.01P • 26.01Q • 26.03 • 26.02 • 28.04A • 28.04B • 28.04C • 28.04D • 28.05B • 34.04 • 34.07 • 36.07 • 38.03 • 38.13 • 38.14 • 38.15 • 38.16 • 38.17 • 38.18 • 38.19A • 71.05 • 71.09 • 71.11A • 75.01A • 75.01C • 77.01B • 77.02 • 77.04 • 80.01B • 81.01 • 81.22 • 81.03 • 81.04A • 81.04B • 89.07 • 26.01P • 26.01Q • 26.03 • 28.02 • 28.04A • 28.04B • 28.04C • 28.04D • 28.05B • 34.04 • 36.07 • 36.07 • 38.03 • 38.13 • 38.14 • 38.15 • 38.16 • 38.17 • 38.18 • 38.19A • 71.05 • 71.11A • 74.06 • 75.01A • 75.04 • 75.05 • 77.01B • 77.02 • 77.04 • 80.01B • 81.01 • 81.02 • 81.03 • 81.04A • 81.04B • 89.09 • 74.07 • 74.04 • 74.07		35
219	3341	* 74.07 • 74.04 • 74.07		36
220	3351	* 76.07 • 76.07 • 76.04 • 76.06 • 76.07		3
221	3352	* 71.05 • 71.06 • 71.09 • 71.10 • 71.13 • 71.14 • 75.02 • 75.03 • 75.04 • 75.05		5
222	3356	* 77.01B • 77.02 • 77.04 • 78.02 • 78.03 • 78.05 • 79.02 • 79.01B • 79.04 • 80.02 • 80.03 • 80.04 • 80.05 • 81.01 • 81.02 • 81.03 • 81.04B		27
223	3357	* 74.03 • 74.10 • 76.02 • 76.12 • 85.23		5
224	3361	* 76.01B • 76.15 • 76.16		3
225	3362	* 74.14 • 74.19		2
226	3369	* 75.06 • 77.03 • 78.06 • 79.06 • 80.06		5
227	3301	* 73.30 • 73.40C • 73.40D • 84.09		6
228	3352	* 74.01C • 76.01B • 81.04B		3
229	3359	* 75.05A • 74.06 • 75.03 • 76.05 • 74.04 • 79.03B • 79.04 • 80.02 • 80.03 • 80.04 • 80.05		11
230	3411	* 73.23 • 73.24 • 76.10 • 76.11		4
231	3421	* 73.33 • 82.01 • 82.03 • 82.04 • 82.09 • 82.10 • 82.11 • 82.12 • 82.13 • 82.14 • 83.15		11
232	3423	* 82.01 • 82.03 • 82.04 • 82.05 • 82.06 • 82.14 • 85.11 • 90.16		8
233	3425	* 82.02		1
234	3429	* 71.13 • 71.14 • 83.01 • 82.02 • 83.04 • 98.15		6
235	3431	* 71.13 • 71.14 • 74.18		3
236	3437	* 74.08		1
237	3433	* 74.17 • 84.13		3
238	3441	* 73.11A • 73.15K • 73.15L • 73.21 • 73.28 • 74.12 • 76.09 • 76.14 • 79.05		9
239	3442	* 73.21 • 83.02 • 83.04		3
240	3443	* 73.22 • 73.37 • 74.09 • 76.09 • 84.01 • 84.02 • 89.01B • 89.02 • 89.03 • 89.04 • 89.05		11
241	3444	* 76.21 • 79.08 • 79.05		3
242	3447	* 73.31 • 76.08 • 79.05		3
243	3440	* 73.21 • 76.09 • 79.05		3
244	3461	* 73.38A • 83.13 • 87.04A • 87.04B • 87.05 • 87.06 • 87.15J • 73.15J • 73.15U • 73.15V • 73.15W		6
245	3471	* 73.10P • 73.12 • 73.13D • 73.13E • 73.14 • 73.15I • 73.15J • 73.15U • 73.15V • 73.15W • 73.15X • 73.15Y • 74.03 • 74.03A • 74.04 • 81.04B • 73.10B • 73.12 • 73.13D • 73.13E • 73.14 • 73.15I • 73.15J • 73.15U • 73.15V • 73.15W • 73.15X • 73.15Y • 74.03 • 74.03A • 74.04 • 81.04B		16
246	3470	* 73.10B • 73.12 • 73.13D • 73.13E • 73.14 • 73.15I • 73.15J • 73.15U • 73.15V • 73.15W • 73.15X • 73.15Y • 74.03 • 74.03A • 74.04 • 81.04B		16
247	3491	* 73.31 • 73.25 • 73.26 • 73.27 • 73.29 • 73.40U • 74.10 • 74.11 • 74.13 • 75.06 • 76.12 • 76.15 • 76.16		13
248	3491	* 73.27 • 73.24 • 76.10 • 76.11		4
249	3492	* 81.03		1
250	3493	* 73.35 • 74.16		2
251	3496	* 73.23 • 73.24 • 76.10 • 76.11		5
252	3497	* 32.34 • 71.05 • 71.29 • 71.13 • 71.14 • 73.09 • 73.13A • 73.13B • 73.13C • 73.15U • 73.15Q • 73.15S • 74.05 • 76.04 • 78.04 • 79.03B • 79.04 • 80.02 • 80.03 • 80.04 • 81.04A • 81.04B		22
253	3499	* 73.31 • 73.31 • 73.38B • 73.40D • 74.14 • 74.15 • 74.18 • 74.14 • 75.04 • 75.05 • 75.06 • 76.15 • 76.16 • 77.03 • 78.06 • 79.06 • 80.06 • 81.04B • 82.04 • 83.11 • 83.32		21
254	3501	* 82.01 • 59.12 • 70.01 • 70.02 • 70.03 • 70.04 • 70.05 • 70.06 • 70.07 • 70.08 • 70.09 • 70.10 • 70.11 • 70.12 • 70.13 • 70.14 • 70.15 • 70.16 • 70.17 • 73.18 • 70.19 • 70.20A • 73.21 • 85.25 • 85.26 • 90.01 • 97.05		27
255	3511	* 84.04 • 84.05 • 84.07 • 84.08A		4
256	3519	* 84.06B • 84.08P		2
257	3522	* 84.17A • 84.21 • 84.24 • 84.25 • 84.26 • 84.27 • 84.28 • 87.01A • 87.04A • 87.04B • 87.05 • 87.06		12
258	3531	* 82.05 • 84.09 • 84.22 • 84.23 • 84.49 • 84.56 • 87.01A		7
259	3532	* 82.05 • 84.09 • 84.22 • 84.23 • 84.56		5
260	3533	* 82.05 • 84.09 • 84.23 • 84.59B • 86.10		5
261	3534	* 84.22		1
262	3535	* 84.22		1
263	3536	* 84.22		1
264	3537	* 87.07		1
265	3541	* 84.45 • 84.48		2
266	3542	* 84.45 • 84.49		2
267	3543	* 84.44 • 84.4C • 95.05		4
268	3551	* 84.28 • 84.17A • 84.18A • 84.19 • 84.24 • 84.30 • 84.16 • 84.36 • 84.37 • 84.38 • 84.39 • 84.40A • 84.59B • 85.10 • 90.21 • 84.47 • 84.48 • 84.49		9
269	3552	* 84.47		3
270	3553	* 84.48		3
271	3554	* 84.16 • 84.31 • 84.33		3
272	3555	* 74.04 • 84.32 • 84.34 • 84.35 • 84.40A		5
273	3559	* 84.21 • 84.43 • 84.56 • 84.59B • 86.10		5
274	3561	* 84.10 • 84.11 • 84.21		3
275	3562	* 84.62		1

APPENDIX B--Cont.  
 Concordance relating the 5-digit Brussels  
 Tariff Nomenclature (BTN) to the IO-SIC

NO. OF MASTER CODE	MASTER CODE	SUBCODES BELONGING TO MASTER CODE	IF STAR IS BEFORE THE SUBCODE INDICATES THAT THE SUBCODE IS ALSO MATCHED TO OTHER MASTER CODES	NO. OF SUB-CODES PER MASTER CODE
276	3564	* 84.11		1
277	3565	* 95.01		8
278	3566	* 75.24 * 84.63		2
279	3567	* 84.14 * 85.11		2
280	3568	* 84.08 * 84.03 * 84.0PC * 84.18M * 84.19 * 84.36 * 84.39 * 84.41 * 84.42 * 84.46		17
281	3571	* 84.44 * 84.56 * 84.57 * 84.59A * 84.59B * 84.65 * 86.10		8
282	3572	* 82.04 * 84.35 * 84.31 * 84.52 * 84.53 * 84.54 * 92.11 * 98.07		2
283	3576	* 84.20		1
284	3579	* 84.55		1
285	3581	* 84.58		1
286	3582	* 84.4CA		1
287	3585	* 84.11 * 84.12 * 84.15A * 84.15B		4
288	3586	* 84.1C		1
289	3589	* 84.19 * 84.59B * 85.05 * 86.10		4
290	3594	* 84.06A * 84.59B * 86.10		3
291	3611	* 85.19 * 85.22A * 85.22B * 85.28 * 90.26A * 90.28		6
292	3612	* 95.01 * 90.28		2
293	3613	* 85.11		1
294	3621	* 85.01		1
295	3622	* 85.19 * 85.22A * 85.22B * 85.24 * 90.26A		5
296	3623	* 93.15 * 85.11		2
297	3624	* 85.11 * 85.24		2
298	3629	* 85.01 * 85.18 * 85.22A * 85.22B * 95.2P * 90.26A		6
299	3631	* 85.12		1
300	3632	* 84.15A * 94.15C		2
301	3633	* 84.40B		1
302	3634	* 85.07		1
303	3635	* 85.26		1
304	3636	* 94.41		1
305	3639	* 84.17A * 85.06 * 85.07 * 85.12		5
306	3641	* 85.20 * 85.22A * 85.22B * 85.28 * 90.26A		5
307	3642	* 85.14 * 85.07 * 85.09 * 85.10		4
308	3651	* 85.14 * 85.15A * 85.15B * 92.11 * 92.11		5
309	3652	* 92.12		1
310	3653	* 85.15		1
311	3662	* 85.15B * 85.15C * 85.16 * 85.17 * 92.11		5
312	3674	* 85.21 * 85.21		6
313	3679	* 85.14 * 85.15B * 85.18 * 95.2T * 90.19A * 92.11 * 92.12 * 92.13		6
314	3681	* 85.04		1
315	3682	* 85.03		2
316	3693	* 90.17B * 90.20		2
317	3694	* 85.08 * 85.23		2
318	3699	* 85.02 * 85.22A * 85.22B * 95.23 * 85.28 * 90.26A		6
319	3702	* 75.17 * 73.20 * 73.21 * 73.40A * 73.40B * 84.44 * 84.62 * 86.09		4
320	3713	* 87.04A * 87.05 * 87.06		4
321	3715	* 87.11 * 87.14		2
322	3717	* 73.40D * 84.06B * 84.10 * 87.01A * 87.02A * 87.02B * 87.02C * 87.03 * 87.04A * 87.04B		12
323	3721	* 87.05 * 87.06		2
324	3722	* 86.01 * 86.02		2
325	3723	* 84.06A * 84.06A		2
326	3727	* 86.03 * 86.05		2
327	3731	* 89.01B * 89.02 * 89.03 * 89.04 * 89.05		5
328	3732	* 89.01B * 89.02 * 89.03 * 89.04 * 89.05		5
329	3741	* 71.13 * 71.14 * 86.01 * 86.02 * 86.03		5
330	3742	* 86.04 * 86.05 * 86.06 * 86.07 * 86.08 * 86.09		6
331	3751	* 87.11 * 87.09 * 87.10 * 87.12A * 87.12B		5
332	3754	* 87.11 * 87.14		2
333	3799	* 87.22A * 87.11		2
334	3811	* 87.11 * 26.013 * 27.17 * 71.07A * 71.07B * 71.08 * 71.11B * 72.01A * 72.01B		8
335	3821	* 72.01C * 90.14 * 90.15 * 90.16 * 92.25 * 90.28 * 90.29 * 98.16		7
336	3822	* 90.24 * 90.29		2
337	3831	* 90.01 * 90.02 * 90.05 * 90.06 * 90.11 * 90.12 * 90.13 * 90.14 * 90.16 * 90.17B		12
338	3841	* 90.25 * 90.28		2
339	3842	* 90.17A * 90.17A * 94.01 * 94.02 * 94.03 * 94.04 * 89.05 * 90.17B * 90.18 * 90.19A		11
340	3843	* 30.04 * 30.25		2
341	3851	* 90.19B * 30.05 * 90.17B * 90.19B		3
342	3861	* 60.01 * 90.03 * 90.04 * 15.10B * 15.11 * 22.08 * 20.01A * 29.01A * 29.02 * 29.23 * 29.04B * 29.04C * 29.05		15
		* 29.06 * 29.07 * 29.08 * 29.09 * 29.10 * 29.11 * 29.12 * 29.13 * 29.14 * 29.15		
		* 29.16 * 29.17 * 29.18 * 29.19 * 29.20 * 29.21 * 29.22 * 29.23 * 29.24 * 29.25		
		* 29.26 * 29.27 * 29.28 * 29.29 * 29.30 * 29.31 * 29.32 * 29.33 * 29.34 * 29.35		
		* 29.36 * 29.37 * 29.40 * 29.43 * 29.45 * 29.45 * 37.01 * 37.02 * 37.03 * 37.04 * 84.54		
		* 40.02 * 87.07 * 90.08 * 90.09 * 90.10 * 90.14 * 90.25 * 98.07		58
343	3871	* 84.33C * 84.59A * 91.01 * 91.02 * 91.03 * 91.04 * 91.05 * 91.07 * 91.08 * 91.10		11
		* 91.11		1
344	3872	* 91.09		1
345	3911	* 71.12 * 71.15 * 71.16 * 83.10 * 98.10		5
346	3912	* 71.12 * 71.16 * 83.10		3
347	3913	* 71.02B * 71.03 * 91.11		4
348	3914	* 71.13 * 71.14 * 82.09 * 92.14 * 82.15		5
349	3931	* 84.11 * 92.01 * 97.02 * 97.03 * 92.04 * 92.05 * 92.06 * 97.07 * 97.08 * 92.09		11
		* 92.10		1
350	3941	* 82.02 * 97.01 * 97.03 * 97.04 * 97.05		5
351	3942	* 90.07 * 40.12 * 40.14 * 40.16 * 61.02 * 84.64 * 97.02 * 97.03		8
352	3943	* 87.13 * 97.03		2
353	3949	* 42.03 * 46.03 * 90.18 * 97.04 * 97.06 * 97.07 * 97.08 * 98.05		8



APPENDIX B--Cont.  
 Concordance relating the 5-digit Brussels  
 Tariff Nomenclature (BTN) to the SIC

NO. OF MASTER CODE	MASTER CODE	SUBCODES BELONGING TO MASTER CODE										NO. OF SUB- CODES PER MASTER CODE
354	3951	• 71.400	• 90.16	• 98.03	• 99.04							4
355	3952	• 32.10	• 32.13	• 98.03	• 98.04	• 98.05	• 98.08					6
356	3953	• 48.03	• 48.04									2
357	3954	• 48.04	• 48.05	• 48.06								3
358	3955	• 70.13	• 70.17	• 70.19	• 70.21	• 71.01	• 71.16	• 43.13	• 98.12			9
359	3956	• 67.01	• 67.02	• 67.01	• 67.02	• 96.04						5
360	3957	• 71.12	• 71.13	• 71.14	• 72.33	• 73.24	• 73.400	• 43.09	• 94.38	• 94.41	• 98.02	11
361	3958	• 94.13										4
362	3959	• 56.01	• 92.02	• 96.03	• 96.06							2
363	3960	• 49.12	• 58.10									2
364	3961	• 36.26	• 36.29									2
365	3962	• 34.06										1
366	3963	• 41.02	• 93.04									1
367	3964	• 43.14										1
368	3965	• 66.01	• 66.02	• 66.03								3
369	3966	• 05.01	• 05.02	• 05.01	• 05.11	• 05.12	• 05.13	• 75.015	• 77.17	• 34.04		64
		• 24.07	• 24.07	• 38.01	• 38.11	• 38.13	• 38.14	• 38.15	• 38.16	• 38.17	• 38.18	4
		• 39.19A	• 39.07	• 40.12	• 40.14	• 40.16	• 49.05	• 57.04	• 67.04	• 70.13	• 70.17	4
		• 70.10	• 70.21	• 71.07A	• 71.07B	• 71.11B	• 71.08	• 71.11B	• 72.01A	• 72.01B	• 72.01C	4
		• 82.13	• 84.64	• 85.01	• 82.08	• 82.13	• 84.31	• 94.07	• 44.13	• 54.04	• 45.01	4
		• 65.02	• 35.03	• 45.04	• 95.05	• 95.06	• 95.07	• 95.08	• 27.04	• 97.05	• 98.03	4
		• 56.10	• 39.11	• 98.12	• 05.16							4
370	4101	• 73.11	• 73.12	• 74.14	• 74.15							4
371	4204	• 73.14A	• 73.16	• 73.20	• 74.08	• 75.04	• 75.05	• 76.04	• 76.07	• 79.03B	• 79.04	11
		• 16.01		• 44.48	• 44.60	• 90.18						5
372	4703	• 45.05	• 45.07	• 51.06								3
373	5501	• 45.10	• 45.27									1
374	5731	• 45.21										1
375	8001			• 01.06B	• 26.015	• 27.17	• 37.03	• 37.04	• 37.05	• 37.06	• 37.37	33
		• 47.37	• 49.38	• 44.21	• 44.05	• 44.06	• 54.05	• 57.09	• 57.10	• 71.07A	• 71.07B	4
		• 71.08	• 71.11B	• 72.01A	• 72.01B	• 72.01C	• 90.21	• 92.12	• 94.16	• 99.01	• 99.02	4
		• 29.33	• 29.05	• 09.06								4
		• 09.01B		• 12.07	• 14.02	• 23.05	• 23.07	• 26.015	• 26.02	• 26.03		4
376	9300	• 27.07	• 29.05A	• 39.01	• 39.02	• 39.03B	• 40.03	• 40.05	• 40.06	• 47.37	• 47.08	4
		• 47.39	• 48.11	• 47.15	• 45.01	• 47.02	• 63.01	• 64.07	• 70.01	• 70.02	• 70.03	4
		• 71.07A	• 71.07B	• 71.08	• 71.11A	• 71.11B	• 72.01A	• 72.01B	• 72.01C	• 72.05	• 74.01B	4
		• 75.11B	• 76.01A	• 77.01A	• 78.01A	• 79.01A	• 79.03A	• 80.01A	• 81.01	• 81.02	• 81.03B	4
		• 87.11A	• 97.02A	• 93.04	• 93.05	• 93.06A	• 98.16					50
377	9900	• 76.03	• 50.09	• 50.10	• 61.02	• 71.11A	• 71.13	• 71.14				7

THE NUMBER OF UNIQUE MASTER CODES IS 377

THE NUMBER OF UNIQUE PAIRS OF MASTER AND SUBCODES IS 3367

Source: Prepared by V. Roningen.

Note: The master code in the IO-SIC. The subcodes are the 5-digit BTN numbers which relate on a one-to-one basis to pure SITC numbers. The 5-digit BTN numbers are found in: Nomenclature for the Classification of Goods in Customs Tariffs, Customs Co-operation Council, Fourth edition (1972), Brussels, Belgium.

This concordance is identical to the one in Appendix A relating SITC numbers to IO-SIC numbers since each 5-digit BTN number corresponds to a 5-digit pure SITC number on a one-to-one basis.



## APPENDIX C

Methodology of Effective Tariff Rate Calculation in the Study

Two calculation techniques used in the study differ slightly from usual effective tariff (ET) types of calculations. The results of the calculation with and without these techniques do not differ very much as an overall basis, but do differ for some industries. The results presented in the study proper incorporate the techniques while tables in appendix D present ET calculations both with and without one of the techniques.

The first technique was one of trying to calculate a vector of tariffs for input purposes that differed from the output tariff vector. This was done because: An industry produces a mix of goods; some goods are sold to consumers while some may be sold mostly to other industries as input materials. The tariff average covering an industry's output should include all types of output. The nominal tariff averages presented in Parts I and II are of this type. However, the tariffs of input goods into an industry's production should really exclude products which are designated as final consumption products. <sup>1/</sup> Thus a tariff average covering final and intermediate output of an industry is not necessarily the same tariff average that should reflect that industry's tariff costs to other industries buying the intermediate product. Therefore, a second vector of tariff averages which excluded products specifically designated as final manufactures was calculated and was used for the input tariffs in the ET formula.

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<sup>1/</sup> If it were possible, it would be better to specifically designate the input products for each sector. However, it was not possible with the available data. Much sector expertise would be needed to make this type of a modification.

This calculation was made possible by the following State of Transformation Codes which appeared on a TSUSA-SIC concordance tape for each TSUSA number.

- A= Agriculture - raw material
- B= Agriculture - semiprocessed
- C= Agriculture - manufactured
- D= Agriculture - combination of raw material and/or semiprocessed and/or manufactured goods
- E= Industry - raw material
- F= Industry - semimanufactured
- G= Industry - manufactured
- H= Industry - combination of raw material and/or semiprocessed and/or manufactured goods
- J= Fishing - fresh fish
- K= Fishing - semiprocessed
- L= Fishing - manufactured
- X= Not susceptible to classification in any one of the above categories

Input tariff averages excluded C, G, and L designated TSUSA numbers.

The Special Advisor for Trade Agreements at the U.S. International Trade Commission provided these designations and the tariff computer tapes.

The second calculation technique was concerned with the use of the 478 sector U.S. input-output table for 1963 to get input weights and the ratio of value-added to total output, all of which are needed in the ET formula. A computer tape of the IO table and an accompanying description were obtained from the Bureau of Economic Analysis, U.S. Department of Commerce. More description of the table details plus information on indirect taxes at the 80-sector IO level was found in: Albert J. Walderhaug, "The Composition of Value-Added in the 1963 Input-Output Study," Survey of Current Business, April 1973. Additional data on indirect tax collection, especially for the liquor and tobacco

industries, was used to get approximations of indirect tax rates for most 1963 IO sectors.

All of the above data were used in conjunction with adjustment techniques to prepare a final adjusted vision of the IO table for use in ET formula 1.

First, only "direct allocations" and "domestic margin transactions" were used to define the input-output structure. This avoids the use of the item in the transaction table called "transfers." These are industries whose secondary products are treated as if sold to the industries where they would be primary. The use of these transfers would lead to double counting in the output structure. Transferred inputs would be counted as a purchase both from the industry where the product is actually produced as a secondary product and as an input from the primary industry where it is transferred. <sup>1/</sup> A better theoretical procedure might have been to include the transfer in the primary industry and subtract it from the industry for which the product was secondary; however the information was not available for this procedure.

Next, indirect taxes were netted out both from value-added and from purchased inputs. The philosophy represented here is that in the long run, indirect taxes are paid by the final consumer. Resources in any sector receiving lower returns because of indirect tax burdens should move to more lucrative production activities. The resultant 1963 IO-based output value (inputs + value-added) figures arrived

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<sup>1/</sup> The omission of transfers was suggested by J. Ozello of the U.S. State Department.

at in the above manner correlated the best with the 1963 shipments figures from the Census of Manufactures. The latter were found in Industry Profiles, 1970, Bureau of the Census, Department of Commerce. The Industry Profile shipments figures do not include "transfers" and exclude indirect taxes; hence they were a useful check on the above adjustment procedures.

Preliminary estimates of ET rates showed some sector rates to be highly unstable, i.e., they would change from being large and positive to being large and negative. This occurs when free trade value-added in the ET formula approaches zero and becomes negative. This problem may reflect reality (which would be an industry that could not even pay materials input costs if protection were removed) or it may reflect an overly small value-added share of total output value for the sector in the IO table. The latter was observed to be the case for some of the troublesome industries. Attempts were also made, using other data as checks, to determine whether the IO data were credible. Finally, the following adjustment procedure was adopted. Price deflators for 1963, 1965, and 1967 were prepared for all IO-SIC sectors. Most of the manufacturing deflators were aggregated from a tape of such data supplied by the Federal Reserve Board. Broad price deflators were added covering agriculture, mining, and construction. In many of the non-manufacturing sectors, the same deflator was used. The result was a crude vector of price deflators covering all IO production sectors for the named years. These were then run through the ET calculation. The output for each year was a vector of "value-added price deflators."

These were checked for erratic behavior. The argument used was that if the IO table presumably describes reality, then real price deflators run through the table should also reflect a realistic situation as far as the price incentives in resource movement are concerned. Here again, however, certain sectors (mostly the same ones giving trouble with tariff rates) exhibited erratic behavior. It was then decided to use this price information to adjust the value-added figures of the IO table in such a way as to stabilize the price behavior of the IO table over the three years. The following method was used to calculate the adjustment coefficient for value-added for each sector in the IO table.

A change in value-added price results in a new coefficient for value-added per unit output. The problem is to find an adjustment coefficient for the new value-added coefficient that implies a "reasonable" or desired change in value-added price when a vector of sector prices is run through the IO table. Let:

$V$  = old value-added coefficient

$\tilde{V}$  = observed percentage change in value-added price

$\tilde{V}_D$  = desired percentage change in value-added price that would yield new adjusted value-added coefficient

$V'_A$  = the new adjusted value-added coefficient

$V'$  = the new unadjusted coefficient

$V'_A \equiv V'(1+A)$  where  $A$  is the desired adjustment coefficient

$V' \equiv V(1 + \tilde{V})$  and  $V'_A = V(1 + \tilde{V}_D)$

$$\text{therefore } V'(1 + A) = V(1 + \tilde{V}_D)$$

$$\text{and } V(1 + \tilde{V})(1 + A) \equiv V(1 + \tilde{V}_D)$$

$$1 + A = \frac{1 + \tilde{V}_D}{1 + \tilde{V}}$$

$$A = \frac{1 + \tilde{V}_D - 1 - \tilde{V}}{1 + \tilde{V}} = \frac{\tilde{V}_D - \tilde{V}}{1 + \tilde{V}}$$

Thus, an adjustment coefficient for value-added per unit output for each industry could be obtained by calculating a percentage change in value-added price  $\tilde{V}$ , selecting a desired or target change ( $\tilde{V}_D$ ), and inserting these values into the formula for A.

Two versions of A were calculated. They were then normalized; i.e., the sector size weighted mean was subtracted from the coefficient for each sector. Finally, 3/4 of the sum of the normalized coefficient was used to adjust value-added input up or down for each sector in the 1963 input-output table.

The Federal Reserve deflators for 1963, 1965, and 1967 were run through the IO table using formula 1 in the text. This gave percentage changes in "value-added" prices for the IO sectors from a base year of 1958 = 100. <sup>1/</sup>

The two adjustment coefficients required a theoretical target ( $\tilde{V}_D$ ) percentage value-added price change. One target was to assume that given the maximum absolute change in the calculated  $\tilde{V}$ 's (from 1958 to 1967), the adjustment would be such that the target change ( $\tilde{V}_D$ )

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<sup>1/</sup> Here again, the problem of input versus output indices arises in the same manner as in the calculation of ET rates.



would not exceed the overall sector size weighted average maximum change. This restriction said in effect that value-added price changes in any sector should not realistically change too much from the average maximum change. The effect of this coefficient was to dampen down some of the enormous changes for a few sectors.

The second adjustment was done by assuming that the maximum value-added price change should not exceed the maximum absolute price change. This adjustment said that maximum changes in value-added prices should not greatly exceed maximum changes in sector prices for each sector. <sup>1/</sup>

The rationale for both of these restrictions is that an unreasonable degree of disequilibrium between factor returns in various sectors is not credible. In the first case, if a sector's value-added price change deviates too much from the average, resources would flow into or out of the sector. In the second case, sectors that are super-sensitive to output price changes as far as returns to factors are concerned are suspect. Thus, one adjustment dampens value-added price changes on a cross-section comparison basis while the other does it on a within-sector price to value-added price change comparison. Expediency led to a final coefficient of 0.75 of the sum of the two types of adjustments. This seemed to catch the worst of the outlying ET rates.

The final adjustment coefficient simply changed the protected value-added coefficient. Input coefficients used in ET calculation were not changed.

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<sup>1/</sup> In these adjustments maximum absolute changes were the difference between the absolute value of the maximum and minimum indices. If I is an index and DX is the maximum absolute change:

$$\begin{aligned} DX &= \text{Absolute value (maximum (I}_1, I_2, I_3))} \\ &\quad - \text{Absolute value (minimum (I}_1, I_2, I_3))} \end{aligned}$$

Comparison of ET rates using completely unadjusted and adjusted IO coefficients showed that the ET rates for most sectors were almost identical. Only the erratic sectors were damped, and in most of the cases the previously erratic ET rates now settled down to positive high values.

A list of IO-SIC sectors and their unadjusted and adjusted ET rates follows for those sectors where the ET rate changed more than 10 percentage points.

PKR ET rates changing more than 10 percentage points in the adjustment procedure.

IO-SIC	Old Unadjusted PKR ET Rates	New Adjusted PKR ET Rates
2021-----	3354.7	271.7
2022-----	139.1	65.0
2023-----	11.0	21.0
2092-----	-154.0	44.6
2093-----	52.3	5.9
2096-----	798.5	557.6
2131-----	-9.3	11.0
2141-----	88.2	69.5
2292-----	53.5	37.2
2247-----	280.0	52.8
2298-----	53.3	28.2
2299-----	121.0	18.4
2392-----	16.0	26.1
3151-----	247.7	348.9
3253-----	50.0	36.7
3333-----	36.5	23.9
3339-----	84.1	11.6
3751-----	45.8	23.7
3831-----	47.4	27.0
3872-----	54.2	39.8
3913-----	31.0	15.8
3942-----	37.9	27.0
3962-----	105.7	21.5
3995-----	362.1	114.2

For the sectors in the list, those adjusted ET rates which move from very high rates to slightly higher or lower ones are credible, since their movement will not greatly affect sector rankings of ET rates. However, a more complete adjustment procedure could be made by using other data (such as capital and labor data) in the context of a model that crudely forced certain equilibrium conditions to be true. A simple model such as that presented in Part III might be useful for this purpose. The only other adjustment procedure would be the generous application of sector expertise.

## APPENDIX D

Calculation of U.S. effective tariff rates with and without separate input tariff vectors.

Tables D-1 and D-2 show separate sets of nominal tariff averages for output tariffs and input tariffs. Table D-1 shows data using import weighted nominal tariffs while table D-2 uses unweighted nominal tariff averages. The rates in both tables are for 1965, 1970, and PKR rates.

The nominal output rates (NO) appearing in columns 2, 6, and 10 are the averages covering all of the TSUSA AVE's in each IO-SIC sector. These are the same averages that appear in tables 1, 3, 8, and 10.

The nominal input (NI) rates in columns 3, 7, and 11 are the input tariff vectors used in the ET calculations in tables 8 and 10 and in the ET calculations in columns 5, 9, and 13 of the tables in this appendix. Thus the ET rates (labelled EI in the appendix) are the same as those in tables 8 and 10 (calculated from TSUSA-sourced data). The input tariff vectors were calculated in the manner described in appendix C. Basically, they exclude TSUSA items that were designated only as final manufactures.

Columns 4, 8, and 12 of the tables in this appendix give alternative ET calculations which do not use the input tariff vector. Instead, the ET rates (column labelled EO) simply use the NO tariff vector to represent both the output and input tariff averages in the ET formula.

The appendix tables also include ET rates for those IO table sectors which do not produce goods competitive with imports. These are mostly construction and service sectors; their nominal tariff averages are set at zero; however, they do have ET rates since they purchase material inputs from sectors which are covered by tariffs. Their ET rates are negative, roughly indicating how much tariff protection elsewhere raises their production costs. The main point of including these sectors is to re-emphasize the complexity of protection effects when one uses the effective tariff concept.

The output (NO) and input (NI) nominal tariffs are highly correlated as indicated by rank correlation coefficients of about 0.95 or better between them. (See the rank correlation matrix at the end of each table in this appendix.) The ET rates calculated with (EI) and without (EO) the use of the separate input tariff sectors are also highly correlated. Their rank correlation coefficients hover around 0.99. Thus while there are some differences for specific sectors, and while there is some small overall difference between output and input tariff sectors as they were calculated, there is very little difference on a rank basis in the ET rates calculated with and without the separate input tariff vectors. (This lack of difference may simply mean that the input tariff vector calculated was not adequate.)















Table D-1.--U.S. effective tariffs using import weighted nominal tariff averages--Cont.

Table with 13 columns: SIC (1), SECTOR DESCRIPTION (2), 1965 NOMINAL (3, 4) and EFFECTIVE (5, 6) tariffs, 1970 NOMINAL (7, 8) and EFFECTIVE (9, 10) tariffs, and PER NOMINAL (11, 12) and EFFECTIVE (13, 14) tariffs. Rows include sectors like TELEVISION, ELECTRIC UTILITIES, GAS UTILITIES, and various services.

SPEARMAN RANK CORRELATION MATRIX

Matrix showing Spearman rank correlation coefficients between sectors (1) through (13). The matrix is symmetric and shows values like 0.928, 0.955, 0.920, etc.

THE LOWER RIGHT HALF OF THE MATRIX CONTAINS THE SPEARMAN RANK CORRELATION COEFFICIENTS. THE LOWER LEFT HALF CONTAINS THE 5% SIGNIFICANCE STATISTICS. THE NUMBER OF DEGREES OF FREEDOM IS 476

Source: Calculated from a databank at the U.S. International Trade Commission.









Table D-2.--U.S. effective tariffs using simple nominal tariff averages--Cont.

Table with columns for IO-SIC, SECTOR DESCRIPTION (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l) and rows for various industrial sectors such as paper products, chemicals, and metals.







APPENDIX E

CONCORDANCE OF THE TSUSA TO THE IO-SIC











APPENDIX E.--Concordance of the TSUSA to the IO-SIC--Cont.

Table with columns IO-SIC and TSUSA NUMBERS. The table lists numerical mappings between IO-SIC codes and TSUSA numbers, organized in blocks of 10 rows each, starting from 2094 and ending at 3251.



APPENDIX E.--Concordance of the TSUSA to the IO-SIC--Cont.

Table with 14 columns: IO-SIC, TSUSA NUMBERS, and 12 additional columns. The table lists various IO-SIC codes and their corresponding TSUSA numbers across multiple rows.











APPENDIX E.--Concordance of the TSUSA to the IO-SIC--Cont.

Table with columns labeled IO-SIC and TSUSA NUMBERS. The table contains multiple rows of numerical data, representing a concordance between IO-SIC and TSUSA numbers. The data is organized into several distinct groups or blocks.

APPENDIX E.--Concordance of the TSUSA to the IO-SIC--Cont.

IO -SIC	TSUSA NUMBERS
3534	6641010
3535	6641020 6641030
3536	6641035 6641040 6641045 6641100
3537	6924000
3541	6743000 6743210 6743220 6743230 6743232 6743234 6743240 6743250 6743254 6743258 6743260 6743270 6743274
3541	6743280 6743304 6743306 6743508 6743510 6743520 6743530 6743532 6743534 6743538 6743540 6743544 6743548
3541	6743546 6743552 6743555 6743558 6743560 6743565 6743570
3542	6743565 6743566 6743565 6743570
3548	6742000 6746000 6747500 6748000 6749000 6832020 6832040
3551	6625700 6617000 6618500 6621020 6621040 6621060 6621500 6621800 6622065 6622100 6622510 6622520 6622530
3551	6622540 6622550 6622560 6622570
3552	6615000 6615100 6685020 6700200 6700400 6700600 6700620 6700640 6700660 6700680 6701200 6701240 6701400 6701402
3552	6701700 6701800 6701900 6702000 6702200 6702300 6702500 6702700 6702900 6703300 6703500 6703320 6704300
3552	6704350 6704360 6705000 6705200 6705300 6706000 6706900 6707000 6707200 6707400 6707500 6708000 6814000
3553	6744000 6744210 6744220 6744240 6745300 6747000 6747020 9117000
3554	6614000 6614300 6615500 6680020 6680040 6680220 6680240 6680260 6680400 6680600 6680700
3555	6530500 6530700 6681020 6681040 6682025 6692030 6682035 6682040 6682045 6682050 6682520 6682540 6683000
3555	6683400 6683600 6685000 6685030
3559	6624000 6741020 6741040 6742040 6743510 6743520 6743530 6743540 6743550
3561	6609420 6609440 6609460 6611240 6611260 6611300 6611500 6611600 6625000 6625020 6625040 6625100
3562	6803020 6803025 6803030 6803040 6803050 6803100 6803300 6803400 6803504 6803505 6803512 6803514 6803520 6803522
3562	6803526 6803530 6803540 6803550 6803560 6803600 6803620 6803640 6803660
3564	6611000 6611100
3565	6600700
3566	6521220 6521240 6521520 6521540 6521800 6523900 6604500 6604700 6604800 6605000 6605200 6605400
3567	6613000 6613520 6613560
3569	6520900 6521000 6602000 6602200 6607500 6608500 6608600 6619000 6619200 6619300 6619500 6619600 6622000
3569	6622020 6622040 6622060 6622070 6700000 6720500 6744250 6744260 6745300 6745310 6745320 6745330 6745340 6745350 6745360 6745370 6745380 6745390
3569	6733020 6733040 6783200 6783220 6783240 6783500 6784520 6784540 6784560 6784580 6784600 6785000 6785020 6785040 6785060 6785080 6785100 6785120 6785140 6785160 6785180 6785200
3569	6805800 6806000 6807000 6809000 6809100
3571	6513300 6642005 6642010 6642015 6682020 6761000 6761200 6761500 6761510 6762010 6762020 6762025 6762030 6762040 6762050
3571	6762060 6762065 6762080 6762085 6762200 6762320 6762340 6762360 6762370 6762380 6762500 6762510 6762520 6762530 6762540 6762550
3571	6763050 6654000 6654010 6654020 6654040 6654042 6654045
3572	6760510 6760520 6760530 6760540 6760560 6760700 6765000
3576	6622500 6622600 6623000
3579	6685040 6745200
3581	6784000
3582	6704010 6704020 6704030 6704100 6704120 6704140 6704200 6704330 6704370
3585	6611220 6612020 6612040 6612100 6613550 6613600
3586	6609440 6609460
3589	6621040 6621060 6745000 6745060 6633025 6633030 6633040 6633060 6633200
3599	6605200 6605300 6605400 6605500 6785000 6785060
3611	6661020 6661025 6661040 7124900 7125000 7125100 7130700 7130900
3612	6620500 6620720 6620740 6620760 6621020 6621040 6621060 6621080 6622000 6622060 6622300 6622400
3613	6859000
3621	6622000 6622500 6623000 6624020 6624040 6924060 6925000 6625200 6625500 6626000 6626020 6626100 6626020 6626100 6626120 6626140
3621	6626060 6626500
3622	6059000 6844000
3623	6531500 6629000
3624	5176100 5177100 5177400 5178100 5178200 5179100 9092500
3629	6626060 6630400 6684000
3631	6642000 6643000
3632	6613505 6613510 6613513 6613517 6613520 6613523 6613525 6613530 6613537 6613540 6613542 6613545 6613548 6613551 6613554
3633	6704040 6704050
3634	6635020
3635	6633010 6633015 6633020 6633030 6633040
3636	6721000 6721520 6721540 6722200 6722520 6722540
3639	6507700 6507720 6507740 6614000 6845060 6845200 6845040 6845060 6845080 6845100 6845120 6845140 6845160 6845180 6845200 6845220 6845240 6845260 6845280 6845300 6845320 6845340 6845360 6845380 6845400 6845420 6845440 6845460 6845480 6845500 6845520 6845540 6845560 6845580 6845600
3639	6844100 6844200 6844300 6844400 6844500 6844600 6844700 6844800 6844900 6845000 6845100 6845200 6845300 6845400 6845500 6845600





## APPENDIX E.--Concordance of the TSUSA to the IO-SIC--Cont.

IO-SIC	TSUSA NUMBERS															
4703	6494305	6494310	6494315	6494320	6494325	6494330	6494335	6494340	6494345	6494350	6494355	6494360	6494365	6494370	6494375	6494380
4703	6494890	6494900	6495300	6745000	6745000	6745500	6745600	6800500	6801000	6901100	6801200	6801500	7106500	7106800		
5503	6859000	6859100	6861045	6861100	6863000	6863500	7156000	7156200	7156400	7156600	7156800					
5701	6875000	6875020	6875030	6875040	6875050	6875060	6875100	6876005	6876010	6876020	6876040	6876100	6876200			
8001	1418100	1906800	1908000	2500420	2734500	2735000	2735500	2736000	2744500	3500000	3565000	3565040	3565040	3565040	3565040	3565040
8001	6022032	6532220	6532240	6532260	6705000	6785020	6785040	6844020	7240500	7241020	7241040	7241200	7241500	7241500	7241500	7241500
8001	7242000	7370500	7650300	7650500	7650700	7651000	7651500	7652000	7652500	7653000	7662000	7662520	7662540	7662540	7662540	7662540
8001	7662560	7902000	8000000	8000020	8000040	8000060	8000080	8010000	8011000	8011000	8011000	8011000	8011000	8011000	8011000	8011000
8001	8061000	8062020	8062040	8063020	8063040	8300000	8310000	8501000	8511000	8511500	8515000	8522000	8522000	8522000	8522000	8522000
8001	8622000	8701000	8702700	8703000	9991000	9992000	9999500									
8300	1565000	2200500	2200520	2200540	2500440	3901000	3901220	3901240	3902000	3902000	3902000	3902000	3902000	3902000	3902000	3902000
8300	5401900	6030500	6031500	6057040	6057060	6071000	6071100	6071200	6120800	6121020	6121040	6121060	6121060	6121060	6121060	6121060
8300	6200240	6200400	6221000	6240400	6261000	6282500	6282520	6282540	6285540	6287000	6292500	6292600	6292600	6292600	6292600	6292600
8300	6323420	6921040	6921140	6923000	7245000	7302300	7302320	7302340	7710000	7711000	7711500	7725155	7725155	7725155	7725155	7725155
8300	8670000	9111100	9111260	9111280												
9999	2706500	3374000	3820464	6032000	6035050	6035060	6562000	6562500	6563000	6563500						

Source: Prepared by V. Roningen at the U.S. International Trade Commission. The concordance is a modification of the ones on computer header tapes at the Commission. Some TSUSA numbers were assigned to two or more IO-SIC numbers in order that each IO-SIC sector producing traded goods would be covered by the tariff schedule.

APPENDIX F  
VARIABLES USED IN THE ANALYSIS IN PART III



General Data Sources

1. Industry shipments, wages, employment, etc.--U.S. Dept. of Commerce, Bureau of the Census, Annual Survey of Manufactures, 1970, Industry Profiles, Washington, D. C., issued 1973.

2. Industry capital data--

Book value of fixed assets and rental payments from U.S. Dept of Commerce, Bureau of the Census, Annual Survey of Manufactures, 1970, Book Value of Fixed Assets and Rental Payment for Buildings and Equipment, issued August 1973; other income from U.S. Dept. of the Treasury, IRS, Statistics of Income, 1970, Corporation Income Tax Returns, 1970; the formula for deriving the ratio of rented assets to owned assets was from George J. Stigler, Capital and Rates of Return in Manufacturing Industries, National Bureau of Economic Research, Princeton University Press, Princeton, New Jersey, 1963.

Total capital stock (for 1967 and 1970) was found by adding the value of rented assets and average inventories (from 1) to the book value of fixed assets. The ratio of rented assets to owned assets was derived by dividing rentals paid by (depreciation plus net income before taxes and interest paid).

3. Direct tax data--

U.S. Dept. of Treasury, IRS, Statistics of Income, 1970, Corporation Income Tax Returns, Washington, D.C., 1970.

A ratio of taxes to income was calculated and used to deduct direct taxes from value-added.



4. Input-output data--  
1963 input-output tape for 478 production sectors and accompanying documentation, from the Bureau of Economic Analysis, U.S. Dept. of Commerce, Washington, D.C.
5. Indirect tax data and explanatory details concerning the 1963 IO study--  
Albert J. Walderhoug, "The Composition of Value-Added in the 1963 Input-Output Study", Survey of Current Business, April 1973.
6. U.S. import data and nominal tariff data--  
U.S. International Trade Commission computer tapes.
7. U.S. sourced export data--  
Dept. of Commerce, the computer tapes of U.S. exports.
8. U.N., U.S., and world trade data--  
World trade estimates for 1970 are from the United Nations.  
Other data came from U.N. tapes of trade data and from U.N. publications of trade data by the SITC code.
9. Non-tariff barrier indices and GATT sourced tariff rates--  
A databank for the study, Trade Barriers Report to the Committee on Finance of the United States Senate, Parts I, II, III, and IV, U.S. Tariff Commission, Washington, D.C., April 1974.
10. Effective tariff rates--  
Calculated at the U.S. International Trade Commission.
11. Professionals in the work force--  
U.S. Dept. of Commerce, Bureau of the Census, Census Population, Subject Report PC(2)-TC, Occupation by Industry, Washington, D.C., 1972

12. Industry price inflation--

Federal Reserve Board computer tapes plus some data compiled at the U.S. International Trade Commission.

About 300 variables were maintained in databank ordered by IO-SIC. Many of the variables were slightly different versions of the same measure. A more complete description of data sources can be found in an appendix to the Commission's study, "An Industry Characteristics Analysis of the Competitiveness of U.S. Industries." The bulk of that study worked with a databank of variables ordered by the TC-SIC described in Part I. However, the sources of data were the same for both the TC and IO-SIC databanks. Programs automatically aggregated data down to both levels where possible.

All statistical routines were run with programs that pulled clean data matrices from the databanks and inserted them directly into the statistical programs.