Estimation of Trade Margins: An Application of the UN Bilateral Trade Data

A report for the Industry Commission

by

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PREFACE

This paper documents work undertaken by the authors to prepare reliable bilateral trade margins estimates for food and non-food commodities for the SALTER model. The documentation comes in two parts:

- a paper fully documenting the methodology used to estimate trade margins for food commodities

- an attachment listing the bilateral trade margins estimates for food and non-food commodities actually included in the SALTER model, along with a description of differences in the methodology actually used.

The differences arise because the data provided to the Industry Commission was provisional data, produced before the methodology and its accompanying documentation were fully completed.

Philippa Dee
Industry Commission
Canberra

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Estimation of Trade Margins For Food Products: An Application of the UN Bilateral Trade Data

By

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INTRODUCTION

The most complete and exhaustive world trade data is provided by the United Nations data base on bilateral external trade flows. Tsigas, Hertel, and Binkley (1991) used regression analysis on a small number of (exhaustive) commodities to estimate systematic reporting biases and c.i.f.-f.o.b. margins. The purpose of this paper is to extend the Tsigas *et.al.* technique to estimation of c.i.f.-f.o.b. margins for disaggregated farm and food commodities. Estimates of such margins for individual commodities from trade data can be important for trade modeling purposes, since transportation and other marketing costs pose a barrier to trade, having an effect similar to tariffs.

It is important to point out that the UN trade data cannot be accepted as is. Knowledge of its limitations are essential for its proper use. As Tsigas *et. al.* point out, there are many inconsistencies in reported imports and exports and they were able to attribute only a portion of this to systematic reporting biases. This problem increases as commodity groupings become more disaggregated. Dayton (1991) gives several examples of inconsistencies between reported export and import values at a disaggregated level and attributes part of this to differences in classification. However, large discrepancies persist , even at a highly aggregate level. The means we used to deal with data problems will be reported below. Because the nature of these discrepancies is closely related to the commodity and regional aggregation scheme, we begin by describing this scheme. Econometric findings are then presented. Finally, we provide an example of how this information can be used to generate a complete bilateral matrix of trade margins for individual commodities.

COMMODITY AGGREGATION SCHEME

The U.N. trade data contains an enormous diversity of products in food and agriculture, classified according to revision one of the U.N. standard international trade classification (SITC). A first step in obtaining a manageable data set is to develop an aggregation scheme that is both

exhaustive and contains useful categories. Since the amount of data is directly proportional to the number of aggregated groups, we are faced with the problem of reducing the size of the data set while preserving important characteristics of commodity groups. In this paper, we distinguish commodities by their level of processing. Consider for example, the two digit SITC code 04, *cereals and preparations*. It contains eight different types of bulk grains (wheat, rice, maize, etc.), four types of milled grains (wheat flour, meal, etc.), and seven processed food groups (bread, cake, macaroni, etc.). Given the diversity of products in this category, ranging from bulk grains to consumer oriented products, the need for appropriate disaggregation is apparent, especially for estimating trade margins. Bulk grains should be distinguished from flour and milled commodities, and the latter should be distinguished from processed-consumer oriented products.

The concept of vertically disaggregated commodities is illustrated in figure 1. The extent to which such a breakdown is feasible hinges on the manner in which the UN-SITC has grouped commodities. It is also constrained by our desire to exhaust all farm and food products while limiting the total number of product categories. Table 1 details the aggregation scheme with which we have chosen to work. It contains eighteen commodity groups. There are three types of bulk grains, followed by three grain-based semi-processed products. Oilseeds are a separate category, as are fats and oils. All dairy products are grouped together, as are meats. In keeping with the vertical disaggregation, fresh and processed fruits and vegetables are distinguished from one another. Beverages are disaggregated into the following categories: (a) non-alcoholic beverages and candy, for which sugar and sweeteners are a key ingredient, (b) coffee and tea, and (c) other beverages. Nonedible products (i.e. products leaving the food system) are in one group. Fish and fish products serve to exhaust food and agricultural commodities.

Since the matrix of flows for each commodity is of dimension R^2, where R is the number of regions in the data set, there is a strong incentive to limit the extent of regional disaggregation.

Table 2 details the individual countries and regional groupings which we have chosen to employ. It yields a total of eighteen, so that the number of potential transactions in each commodity matrix for each year is $18^2 = 324$. When multiplied by the number of commodities (18) and years (26: 1962-87), we obtain a total of 151,632 potential bilateral trade flows in this data set. Due to the absence of trade along some routes, the actual number of observations is 105,115.

CHARACTERISTICS OF THE DATA

In table 3, we examine individual commodity groups based on the frequency of transactions, the average value of these transactions, and the total value of trade for each commodity group. As one would expect, there are more transactions for more aggregated or broadly defined commodity groups, such as nonedibles, than for single commodities or more narrowly defined commodity groups, such as wheat or rice. Aggregate groups contain many commodities, and thus there is greater likelihood of trade between any two countries. The table also shows there is a lot of variation in the value of trade across commodity groups. Those with average annual bilateral flows in excess of $60 million include fresh fruits and vegetables, wheat, meat and livestock, nonedible products, and fish and fish products. Groups with average transactions of less than $15 million are flour and meal, processed grain-based food, and non-beverages/candy. In terms of total value of trade, fresh fruits and vegetables, meat and live animals, and coffee are the largest, and flour, processed grain-based food, and non-beverages are the smallest.

Figure 2 classifies transactions for all commodities based on reporting status and the value of the transaction. For most transactions, there is both a positive import value (M) and a positive export value (X). This is the case for 80,435 observations or 76.5% of the 105,115 cases where at least one partner reported. The remaining 24,680 observations (23.5% of the total) are "one-sided" transactions, i.e., either reported by the exporter and not the importer or vice versa. For example, in

1987, Canada reported $105,000 for rice imported from Australia, but Australia did not report a value for this transaction. This may be due to erroneous reporting on one side or the other, or it may be due to different operational definitions of trading partners as could occur in the case of transshipped commodities. Many of the remaining cases are because either the exporter or importer is a country (or group of countries) which seldom reports data to the UN.

We enumerate all of these one-sided transactions and consider the source of the problem in Figure 2. Of the total 24,680 observations of this type, 20,013 (81%) are from the regions with nonreporting countries.[1] Of the remaining 4,667 observations, there are 4,380 (93.8%) observations with value of $1 million or less, which is relatively small considering that the average is $20 million. Thus, discrepancies in these are perhaps of less concern. However, transactions over $1 million that do not involve consistently nonreporting countries may be another matter. Fortunately, however, these represent only a small number of observations, only 287 out of the total 105,115.

Table 4 offers an additional glimpse into the non-reporting problem and the extent of one-sided transactions. The largest percentages of one-sided transactions involves regions which include a great many non-reporting countries, namely Communist Asia, Sub-Saharan Africa, and Eastern Europe. (See table 1 for details of our country aggregation scheme.) Here, the coexistence of a non-zero value reported by partners outside the region, with a zero reported by the region in question, is very likely to arise. This is especially true when countries within the region have different patterns of trade.

The majority of the transactions involve cases where both the importer and exporter report a positive value, which we will denote by M and X, respectively. In this paper, we will refer to their ratio, M/X, as an "observation" for a given trade flow. For most transactions, the import value is the c.i.f. value and the export value is the f.o.b. value. In a few cases, imports are reported on an f.o.b.

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[1] A detailed exposition of the non-reporting problem is provided in the Appendix.

basis (see table 1), in which case the two values should, in theory, coincide. Because of transportation and insurance costs we normally expect (c.i.f./f.o.b) observations to fall somewhere between 1 and about 1.35. However, biased reporting, nonreporting, and errors in reporting, result in a wide range of observations outside this range.

By selecting different pairs of reporters, we can illustrate with a histogram how both the margin and reporting biases affect the distribution of observations. Graph 1 shows the distribution of observations for trade between the U. S. and Japan. (This histogram separates observations falling above 1 and below 1. Trade in both directions is reported. However, Japanese sales to the US only include years for which US reports imports on a c.i.f. basis.) These reporters were identified by Tsigas *et.al.* as two of the most reliable. Despite this, there still exist extreme observations (M/X) ranging from 0.017 to 1,232. Errors in reporting such as these occur for all trading partners but represent a small share of the total transactions. What determines "better reporting" is the share of observations falling roughly in the range: 1 - 1.35. Graph 1 shows that, in the case of US - Japan trade, a large share of the transactions fall in this range.

Graph 2 shows the distribution of observations for trade between the US and the EC. Tsigas *et al.* suggest that the EC underreports imports. This is evident in Graph 2: a larger share of the observations fall between 0.90 and 1 (16.2%) than for the US-Japan (9.0%) transactions reported in Graph 1.

Graph 3 shows the distribution of M/X observations for trade between the EC and New Zealand. This pair was chosen to demonstrate how the transport margin affects the distribution of observations. Since New Zealand is relatively remote, we expect a higher average margin than for other trade routes. This is reflected in the distribution of observations, for there is a relatively large share above 1.10.

The effect of nonreporting is illustrated in Graph 4, which shows the distribution of observations for the US and Eastern Europe. Nonreporting causes observations to be much less concentrated and spread over a much wider range. In cases where the US is exporting to Eastern Europe, we expect very low ratios to be common, whereas, when the US is the importer, M/X is likely to be very high.

Observations greater than 10 or less than 0.10, imply reported export value and reported import value differing by a factor of 10 or more. Certainly these observations are extreme cases and the most likely cause is regions involving many non-reporters. In table 5 are listed frequencies in which each region was involved in such transactions in 1973. Eastern Europe, Communist Asia, other Southeast Asia, Subsaharan Africa, Middle East, Latin America, and South Asia all appear to be poor reporters, according to this ranking. This is consistent with appendix tables A.1 through A.6, where reporting and nonreporting countries are identified across all years. There are many cases of sporadic reporting. For example, South Africa reported in only 2 of the 26 years. No countries in the Subsaharan Africa region reported during 1986 and 1987. In the Eastern Europe region, Yugoslavia reported for 25 of 26 years, but Romania never reported in any of the 26 years. In table A.3, representing the Communist Asia region, the People's Republic of China reported only in 1984 while the other reporters in this region stopped reporting after 1976. Individual countries representing trade partners by themselves are shown in table A.6. These countries, along with the regions: Old Asian NICs, New Asian NICs, Other Western Europe, and EC-12 generally appear to be good reporters. The countries in these regions are consistent reporters for most of the 26-year period. Extreme observations reported from the good reporting countries and regions are more likely the result of mistakes in reporting or differences in classification than nonreporting.

PROBLEMS CAUSED BY EXTREME OBSERVATIONS

Thus far, we have explained why observations might fall outside the expected range of 1 to (1 + margin). Biased reporting, as appears to be the case for US-EC trade, has the tendency to increase or decrease the percentage observations slightly above or below 1.00, but it is generally not the cause of extreme observations. Similarly, variations in margins can shift this distribution slightly, but again, it is not expected to contribute to extreme observations. Extreme observations are generally associated with nonreporting or differences in the way trading partners define a transaction. We stated earlier that one of the problems in working with disaggregated data is that extreme observations occur more frequently than when using highly aggregated data. This becomes a serious problem when trying to estimate commodity-specific margins since these types of errors can severely distort the estimates. This may be illustrated by examining the distribution of observations on a commodity-by-commodity basis.

Graph 5 shows the distribution of observations for oilseeds using only good reporters. With no extreme observations, the mean should more or less coincide with the mode (i.e., the bar with greatest frequency). However, as a result of an extraordinary number of extreme observations in the right-hand tail of the distribution, the mean falls far above the mode, at 1.41. Consequently the estimated margin is likely to be excessive (unless the extreme observations can be explained by systematic reporting biases--which is unlikely). Graph 6 shows the distribution of observations for wheat, again using only good reporters. In this case, the mean falls far below 1, at 0.87, due to a disproportionate share of extremely small observations. The distribution of observations for fresh fruits and vegetables in Graph 7 is shifted to the right somewhat, relative to oilseeds or wheat. Yet the mean is identical to that of oilseeds.

In order to shed some light on these "distorted" means, it is helpful to examine the share of extreme observations in both the upper and lower ends of the distributions. In table 6, we examine

the share of observations that fall above 3.00 and below 0.33 along with the geometric mean for each commodity group. It seems apparent that commodities having a greater share of observations above 3.00 than below 0.33 all have high geometric means. Likewise, commodities with a larger share of observations below 0.33 than above 3.00 tend to have low geometric means. Since these extreme observations do not appear to be associated with any particular reporters, but rather are contributed by all reporters, using a regression model that estimates reporting biases would not resolve the problem. Removing these extreme observations from the data set seems to be an appropriate step for improving the quality of the margins estimates. We therefore need to establish cut-off points determining what observations need to be excluded.

Our objective in selecting a cut-off point is to eliminate observations associated with nonsystematic reporting i.e., variability not related to margins or reporting biases. Histograms provide a useful guide to determining the cut-off points. Histograms for good reporters, poor reporters, and all reporters are reported in graphs 8-10. By examining the histograms for good reporters and all reporters, along with histograms at various pairs of reporters for all commodities, we find a distinct drop in the share of observations after the point: $\ln(M/X) = -0.70$. This is a likely point where observations are less influenced by changes in margins and reporting biases, and where nonsystematic errors in reporting begin to play a greater role. We therefore select this as the lower cut-off point. On the upper end, we select $\ln(M/X) = 1.20$ as the cut-off point, applying the same criteria.

Table 7 reports the geometric means for all commodities using three different data sets: all reporters, "good" reporters, and "good" reporters with extreme observations excluded. Comparison of the first two columns shows that simply excluding the regions which include non-reporters does not

resolve the problem.[2] It is necessary to cut off the tails of the entire distribution. When this is done there are several commodity groups where large changes occur in the geometric mean (the final column of table 6). For example, the mean for oilseed drops from 1.41 to 1.16, which is more consistent with what the distribution of observations for this commodity indicates. Likewise, the geometric mean for wheat increases when extreme observations are excluded.

DEVELOPING A REGRESSION MODEL

In this section, margins for the 18 commodity groups are estimated using a modified and expanded version of the technique employed by Tsigas *et.al.* Their model accounted for systematic reporting biases among countries. However, in order to improve estimates of trade margins for particular commodities, we add three explanatory variables: distance, a freight rate index, and volume of shipments, thereby creating a more complete model.

For each trade flow, we have a reported export value X_{ijt} and an import value M_{ijt}. There are basically three factors that would explain why they differ: biased reporting (consistent underreporting and overreporting by the exporter and/or importer), inconsistent reporting, and the presence of transfer costs. This gives rise to the following relationships:

$$\begin{aligned} X_{ijt} &= \beta_i \, X^*_{ijt} \, e_{it} \\ M_{ijt} &= \alpha_j \, M^*_{ijt} \, e_{jt} \end{aligned} \qquad (1)$$

[2]There is not much difference between geometric means using all reporters and good reporters which would suggest that the extreme observations are not only a result of nonreporting, but also errors in reporting by good reporting countries.

The e's are the unsystematic errors due to inconsistent reporting and β_i and α_j are systematic biases. The terms X^*_{ijt} and M^*_{ijt} are bias-free export and import values. These values differ by the transport margin. This relationship can be written as:

$$\frac{M^*_{ijt}}{X^*_{ijt}} = 1 + g = \gamma \qquad (2)$$

Here, g represents the margin, or the proportion of the total value of imports that is a result of transport and insurance costs.

Combining (1) and (2), yields:

$$\frac{M_{ijt}}{X_{ijt}} = \frac{\alpha_j e_{jt}}{\beta_i e_{it}} \gamma \qquad (3)$$

Rewriting (3) in natural logarithms we have:

$$\ln\left(\frac{M_{ijt}}{X_{ijt}}\right) = \ln\alpha_j - \ln\beta_i + \ln\gamma + \ln e_{jt} - \ln e_{it} \qquad (4)$$

Tsigas, *et al.* used this approach to obtain the estimates of systematic reporting biases. By assuming that margins do not vary by route or time period, the model is kept simple. For our purposes, however, we wish to include time-and-route-specific variables that might influence margins.

Binkley and Harrer (1981) have suggested it is reasonable to expect that as the volume of shipments on a route rises, the average rate charged declines, due to favorable external effects. A more active trade route will involve larger shipments and ports with more efficient handling facilities and better ship provisioning and maintenance. For this reason, we include the volume of trade as an explanatory variable in the regression model. Because the individual commodities in this data set are quite disaggregate, we focus on the effects of average volume for *all* farm and food commodities

along a given route. This volume is proxied by a simple average of food export and import values, in a given year (t), between regions i and j. We denote this variable V_{ijt}, and it is invariant to the specific commodity considered.

We must also consider those factors that influence margins over time. Transport cost could vary for several reasons, of which varying fuel costs in the short-run, and technological change in the longer term are especially important. An appropriate variable for capturing these effects over time is an ocean-freight rate index. We can incorporate this variable into our model by assigning to each individual year that we have data (1962-1987) the average freight rate for that year (F_t) (OECD, Maritime Transport). The final factor of importance is the distance on a particular trade route. Distances were measured between countries and regions with the help of a Mercator's map which gives the mileage for various water routes (D_{ij}). These are provided at the top of table 9 for a subset of the regions in the full data set.

In order to include these additional determinants of the trade margin, we must specify a functional relationship between γ and these arguments. The Cobb Douglas form is convenient:

$$\gamma_{kijt} = \gamma_k D_{ij}^{\theta_D} F_t^{\theta_F} V_{ijt}^{\theta_v} \qquad (5)$$

where γ_{kijt} represents the margin for commodity k, shipped from i to j in time period t.

This gives rise to the following regression model:

$$Y_s = \mu + \sum_{i=1}^{N-1} \alpha_i \ln X_{is1} - \sum_{i=1}^{N-1} \beta_i \ln X_{is2} + \sum_{i=1}^{K} \gamma_i \ln X_{is3} + \theta_D \ln D_{ij} + \theta_F \ln F_t + \theta_V \ln V_{ijt} + e_s \quad (6)$$

Here, we have simplified the dependent variable by letting $Y_s = \ln(\frac{M_s}{X_s})$, where $S = 1 \cdots S_1$ the total set of observations. The X's are dummy variables that serve to identify each observation s. The variables X_{is1}, X_{is2}, and X_{is3}, identify the importer, exporter, and the commodity, indexes

respectively. D_{ij}, F_t, V_{ijt}, are distance, average freight rate, and volume of trade, respectively. The estimated coefficients for γ_i are the average margin estimates. When combined with the parameters for distance, freight rates and volume, these may be used to generate route-specific margins via application of (5)[3]. This will be demonstrated in below.

MARGIN ESTIMATES

In table 8 we show the results of the margin estimates from our regression model using a ten-region subset of the full data set, with two alternative treatments of extreme observations. (We found that estimation of the trade margins using this subset of good reporters resulted in more precise estimates.) The first set of regression results uses all data, including extreme observations. These are reported in the first column of table 8. As can be seen, they vary considerably (and unrealistically) across commodities. Even though we have accounted for country-specific reporting biases in our regression model, we still obtain some unusually high margins as well as some negative margins ($\hat{\gamma}_i < 1$). As was shown previously in table 6, there is a tendency for certain commodities to have a larger share of observations above 3.00 than observations below 0.33 or vice versa. This appears to explain the fact that the estimated margins for oilseeds and sugar are unusually high while estimated margins for flour and non- beverages are actually negative.

In the second column of table 7, we show the estimated margins after excluding extreme observations i.e., those above $Y_s = 1.20$ and below $Y_s = -0.70$. We find these margin estimates much more reasonable. They correspond quite well to what we would expect for specific commodities. In particular, transportation costs should represent a larger share of the total c.i.f.

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[3] A further complexity could be introduced by permitting Θ_D, Θ_F, and Θ_V to vary by commodity.

value for bulk commodities and a lower share of the c.i.f value for processed high-value commodities. In this model, the bulk commodities generally do have higher margins while the processed, high-value commodities (e.g., non- beverages and candy) have low margins. Furthermore, among the bulk commodities, the higher value products have a smaller margin. For example, the margin on oilseeds and wheat is almost half that on corn, which reflects their higher value per bushel of product. The highest margin is associated with fresh fruits and vegetables, which seems reasonable given the extra handling costs associated with these products. We also find that distance and freight rates have a positive influence on the margins, while increased volume diminishes them (see footnote c, table 8).

GENERATING BILATERAL TRADE MARGINS

Having estimated (6) we are now in a position to generate bilateral trade margins for use in empirical analysis of trade relationships. For this purpose we use the following equation derived by substituting results from table 8 into (5):

$$\hat{Y}_{kij} = \hat{Y}_k \left[A * D_{ij}^{0.048795} \bar{F}^{0.026018} \bar{V}_{ij}^{-0.007087} \right] \qquad (7)$$

This equation generates estimates of route-specific margins for commodity k, based on the geometric mean freight rate index ($\bar{F}$) and route-specific volume ($\bar{V}_{ij}$). The adjustment factor, A, forces the term in brackets to equal one when D and V are set equal to their sample-wide geometric means. It is a function of the estimated systematic biases and may be computed as follows:

$$A = e^{\hat{\mu}} \prod_{i=1}^{N-1} \bar{X}_{i1}^{\hat{\alpha}_i} \bar{X}_{i2}^{-\hat{\beta}_i} \quad . \qquad (8)$$

where $\bar{X}_{i1}$ and $\bar{X}_{i2}$ are the sample-wide geometric means of these indicator variables, $\hat{\mu}$ is the estimated intercept, and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated importer and exporter biases.

Table 9 illustrates this technique for generating route-specific margins in the case of wheat. From table 8 we observe that the average margin for wheat $\gamma_{wheat} = 1.086$. Distances and geometric mean volumes for each route, for all farm and food products, are provided at the top of table 9. Application of (7) generates the bilateral margins matrix for wheat at the bottom of table 9. Note that, while we have not constrained μ_{kij} to lie above one, it does in every case. The smallest margins occur along the short-haul, high volume routes such as between the US and Canada. As expected, low volume, high distance rates, such as Australia-Other Western Europe have high margins. [4]

[4]This approach lends itself well to implementation in a spreadsheet format, and we have done so. Additional regions may be readily added, or countries disaggregated, by adding estimates of the relevant distances and volumes.

SUMMARY AND CONCLUSIONS

In this paper we use the UN bilateral trade data to obtain estimates of commodity and route-specific trade margins for 18 disaggregate food products. Our basic approach follows earlier work by Tsigas *et. al.*, capitalizing on the presence of two observations for each trade flow--namely that of the importer and that of the exporter. Discrepancies between these two values may be explained by the presence of transportation and insurance costs, as well as systematic reporting biases.

Descriptive analysis of the 18 commodity, 18 region, 25 year data set used in this paper illustrates the importance of extreme observations, largely the result of non-reporting, in estimating margins for certain commodities. Indeed, our regression model based on the full data set yields quite a number of implausible estimates for mean, commodity-specific margins. However, if we truncate the tails of the distribution of import/export value ratios, these problems vanish. We find that transportation margins are largest for fresh fruits and vegetables and bulk commodities.

Our model also permits margins to vary by route and time period by using information on distance, trade volume, and an index of freight rates. These arguments are statistically significant and their effects carry the expected signs. We illustrate, for the case of wheat, how this statistical model may be used to generate matrices of bilateral trade margins. The procedure generates sensible results, and may be easily replicated for the full set of commodities. These route-and-commodity-specific margins provide a sound basis for incorporating transportation costs into models of international trade.

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LIST OF FIGURES, TABLES, AND GRAPHS ACCOMPANYING TEXT

Figure 1. Vertical Linkages for Food Commodities

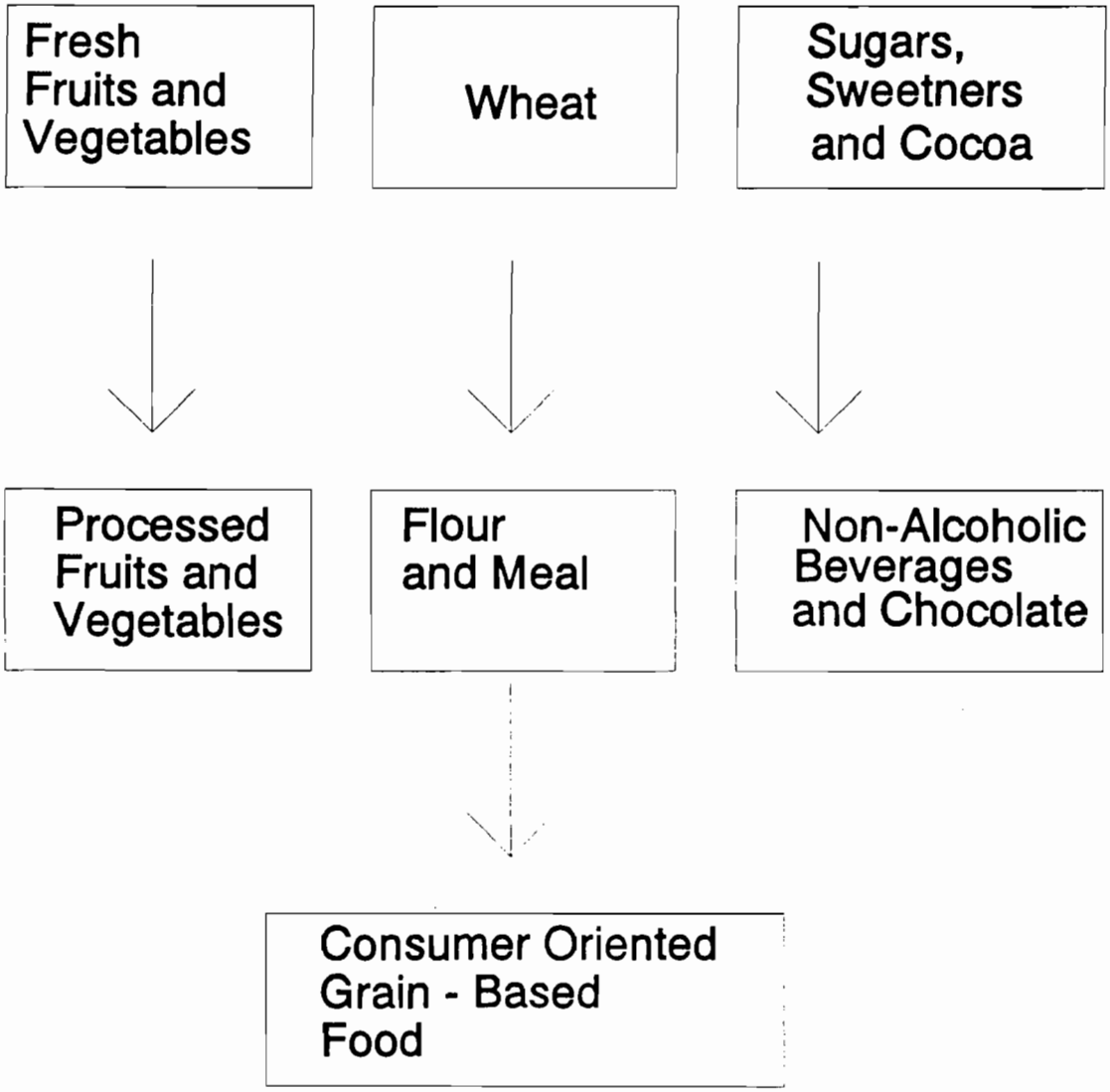


Figure 2. Classification of Transactions Along With the Number of Observations

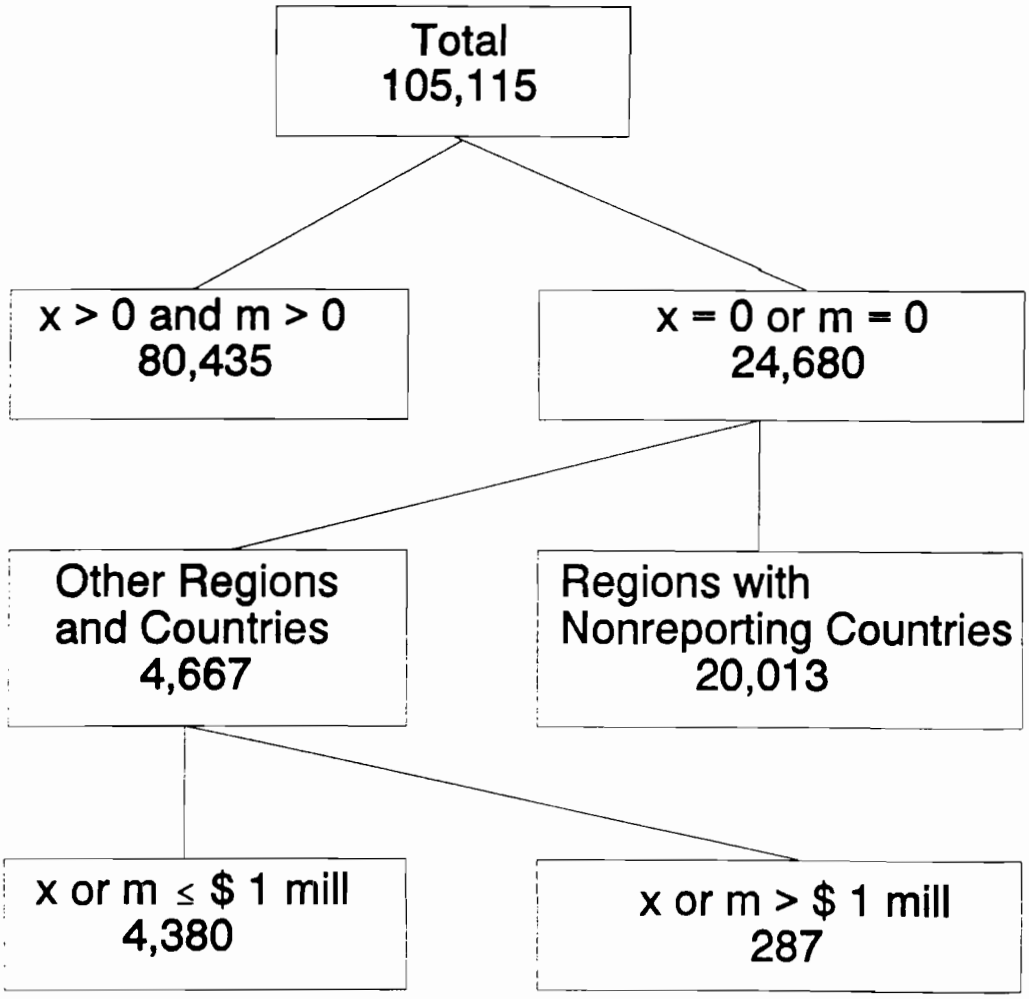


Table 1. Commodity Aggregation Scheme for Food and Agriculture

Commodity Name	UNSITC Codes Included
1. Rice	042
2. Wheat	041
3. Corn and Other Grain	043, 044, 045
4. Flour and Meal	046, 047
5. Processed Grain-Based Foods	048
6. Animal Feed and By-products	08, 2219, 5995
7. Oilseeds	2211-2218
8. Fats and Oils	091, 41, 42, 4311, 4312, 4313
9. Dairy Products	022, 023, 024
10. Meats and Live Animals	001, 01, 025
11. Nonedible Products	21, 261-265, 291, 291, 2311, 4313,
12. Fresh Fruits and Vegetables	051, 0541-0545, 0548,
13. Processed Fruit and Vegetables	052, 053, 0547, 055, 09903-09909
14. Sugar, Sweeteners, and Cocoa	061, 072
15. Non- Beverages	062, 073, 111
16. Coffee, Tea, and Spices	071, 074, 075, 09901, 09902
17. Beverages and Tobacco	112, 12
18. Fish and Fish Products	03

Table 2. Regional Aggregation Scheme

Individual Countries

Australia (f.o.b. reporter)	Japan	United States (f.o.b. reporter prior to 1974)
Brazil	Mexico	USSR (non reporter)
Canada (f.o.b reporter)	New Zealand	

Regions

Subsaharan Africa--47 Countries

Angola, Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagasgar, Malawi, Mali, Mauritania, Mauritius, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, St. Helena, Sudan, Swaziland, Tanzania, Togo, Uganda, Upper Volta, Zaire, Zambia, Zanzibar-Pemba, Zimbabwe.

Latin America (excluding Mexico)--40 countries

Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, Chile, Columbia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, St. Christopher-Nevis, St. Kitts-Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, US Virgin Islands, Venezuela.

Middle East and North Africa--23 countries

Algeria, Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta and Gaza, Morocco, Mozambique, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates, Democratic Yemen, Yemen.

South Asia--9 countries

Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sikkim, Sri Lanka.

Old Asian NICs--4 countries

Hong Kong, Singapore, South Korea, Taiwan.

New Asian NICs--5 countries

Malaysia, Peninsula Malaysia, Sabah, Sarawak, Thailand.

Other Southeast Asia--22 countries

American Samoa, Brunei, Christmas Island, Fiji, French Polynesia, Guam, Indonesia, Kiribati, Macau, New Caledonia, Norfolk Islands, Papua N.G., Philippines, Pitcairn Island, Ryukyu Island, Solomon Islands, Tokelau Islands, Tonga, Vanuatu, Wake Island, Wallis and Futuna, Western Samoa.

EC-12--13 countries

Andorra, Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, United Kingdom, West Germany.

Eastern Europe (f.o.b. except Hungary and Czechoslovakia)--8 countries

Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania, Yugoslavia.

Other Western Europe --10 countries

Austria, Faeroe Islands, Finland, Gibraltar, Greenland, Iceland, Norway, Sweden, Switzerland.

Communist Asia--7 countries

Burma, Kampuchea, Laos, Mongolia, North Korea, People's Republic of China, Vietnam.

Table 3. Trade Flows For Individual Commodity Groups For All Countries And Regions

Commodity Group	Frequency of Transaction 1962-1987	Frequency of Transaction in 1987	Average Value in 1987 of Transaction (thousands)
Fresh Fruits and Vegetables	5,555	200	61,104
Wheat	1,591	63	81,072
Corn	2,870	105	45,511
Nonedible Crop and Livestock	7,033	255	81,389
Coffee, Tea, Spices	5,523	210	49,434
Meat and Live Animals	5,120	183	78,299
Oilseeds	3,786	154	40,819
Sugar and Cocoa	4,737	172	34,065
Fish and Fish Products	5,392	201	89,146
Beverages and Tobacco	5,925	206	59,370
Animal Feedstuff	5,210	200	44,405
Dairy Products	3,500	135	35,348
Fats and Oils	5,329	197	26,793
Processed Fruit and Vegetables	5,852	235	39,771
Rice	2,364	67	20,574
Flour and Meal	2,435	95	8,238
Processed Grain-Based Food	4,177	169	12,088
Non-Alcoholic Beverages and Candy	4,036	166	13,214
TOTAL	80,435	3,013	

Table 4. Regions and Countries Involved in "One-Sided" Transactions

	Number of Transactions	Percentage of Total
Communist Asia	4,990	20.2
Subsaharan Africa	3,157	12.8
Eastern Europe	2,870	11.6
Latin America	2,511	10.2
Middle East and North Africa	2,284	9.3
South Asia	2,249	9.1
Other Southeast Asia	1,945	7.9
Other Western Europe	1,017	4.1
New Asian NICs	772	3.1
Old Asian NICs	670	2.7
Australia	503	2.0
EC - 12	466	1.8
New Zealand	439	1.7
Mexico	407	1.6
*Rest of Countries	400	1.6
TOTAL	24,680	

* Japan, United States, Canada, and Brazil

Table 5. Frequency of Country or Region Reporting Erroneous Value

	Export Value is Incorrect $\frac{M}{X} \geq 10$	Import Value is Incorrect $\frac{M}{X} \leq 0.01$	
	Frequency n_x	Frequency n_m	TOTAL n_t
1. Eastern Europe	191	144	335
2. Communist Asia	228	130	258
3. Other Southeast Asia	123	80	203
4. Subsaharan Africa	140	128	268
5. Middle East	98	82	180
6. Latin America	65	52	117
7. South Asia	70	66	136
8. Other Western Europe	59	27	86
9. Mexico	58	24	82
10. EC-12	34	44	78
11. Old Asian NICs	52	18	70
12. New Asian NICs	37	33	70
13. Japan	75	23	98
14. Australia	58	8	66
15. United States	34	28	62
16. Brazil	30	20	50
17. New Zealand	30	11	41
18. Canada	20	9	29
Total	1402	927	2329

Table 6. Percentage Of Extreme Ratios And Geometric Mean For Individual Commodity Groups

Commodity Group	Percentage of Observations Greater Than 3.00	Percentage of Observations Less than 0.33	Geometric Mean of Ratio
Oilseeds	18.18	7.54	1.41
Fresh Fruits and Vegetables	15.22	6.49	1.41
Coffee, Tea, and Spices	19.42	10.77	1.40
Sugar and Cocoa	12.40	5.65	1.36
Animal Feedstuff	15.89	6.41	1.34
Corn	17.33	11.68	1.28
Nonedible Crop and Livestock	11.14	5.01	1.27
Fish and Fish Products	8.1	3.89	1.23
Meat and Live Animals	9.68	4.24	1.23
Beverages and Tobacco	9.31	3.70	1.22
Fats and Oils	8.63	4.38	1.22
Processed Grain-Based Food	9.95	5.46	1.20
Processed Fruit and Vegetables	8.00	4.89	1.12
Dairy Products	8.46	6.38	1.12
Rice	11.60	8.69	1.11
Non- Beverage and Candy	7.30	6.86	1.02
Flour and Meal	13.13	16.87	0.88
Wheat	5.44	10.0	0.87

Table 7. Geometric Means For All Commodities Using Three Different Data Sets

Commodity Group	Geometric Mean For All Reporters	Geometric Mean For Regular Reporters[a]	Geometric Mean For Regular Reporters Extreme Observations Excluded
Oilseeds	1.41	1.41	1.16
Fresh Fruits & Vegetables	1.57	1.41	1.28
Coffee, Tea, & Spices	1.53	1.40	1.22
Sugar & Cocoa	1.43	1.36	1.18
Animal Feedstuff	1.33	1.34	1.19
Corn & Other Grain	1.14	1.28	1.24
Nonedible Crop & Livestock	1.29	1.27	1.18
Fish & Fish Products	1.27	1.23	1.17
Meat & Live Animals	1.15	1.23	1.18
Beverages & Tobacco	1.28	1.22	1.15
Fats & Oils	1.10	1.22	1.15
Process Grain-Based Food	1.08	1.20	1.21
Process Fruit & Vegetables	1.24	1.12	1.13
Dairy Products	1.16	1.12	1.13
Rice	0.98	1.11	1.11
Non- Beverages & Candy	0.88	1.02	1.12
Flour & Meal	0.7	0.88	1.18
Wheat	0.79	0.87	1.18

[a] Regular reporters are those where the individual member countries regularly report to the UN. These include 4 regions: Old Asian NICs, New Asian NICs, EC-12 and other Western Europe, as well as the 7 individual countries identified in the Appendix.

Table 8. Estimated Margin Parameters (γ_i = 1 + margin)From Regression Model[a]

Commodity Group	Extreme Observations Included	Standard Error	Extreme[c] Observations Excluded	Standard Error
Non- Beverage and Candy	0.77	(0.0487)	1.01	(0.0167)
Processed Fruit and Vegetables	1.14	(0.0465)	1.04	(0.0160)
Processed Grain-Based Food	1.03	(0.0482)	1.04	(0.0165)
Fats and Oils	1.45	(0.0460)	1.03	(0.0160)
Rice	0.98	(0.0539)	1.05	(0.0205)
Flour	0.80	(0.0529)	1.07	(0.0194)
Beverages and Tobacco	1.18	(0.0464)	1.04	(0.0159)
Wheat	1.01	(0.0566)	1.08	(0.0200)
Dairy Products	1.23	(0.0497)	1.06	(0.0172)
Fish and Fish Products	1.12	(0.0459)	1.10	(0.0159)
Meat and Live Animals	1.10	(0.0460)	1.10	(0.0161)
Oilseeds	1.45	(0.0491)	1.08	(0.0178)
Sugar	1.31	(0.0479)	1.08	(0.0165)
Coffee, Tea, and Spices	1.41	(0.0469)	1.09	(0.0172)
Corn	1.16	(0.0517)	1.15	(0.0183)
Animal Feedstuff	1.28	(0.0459)	1.10	(0.0165)
Nonedible Crop and Livestock	1.43	(0.0461)	1.07	(0.0159)
Fresh Fruits and Vegetables	1.44	(0.0467)	1.22	(0.0163)

[a] Obtained by estimating (6).
[b] Extreme observations are those which lie outside the interval: $-0.70 \leq \ln (M/X) \leq 1.20$.
[c] Other coefficients of interest include (standard error in parentheses): Θ_D = 0.0487 (0.0029), Θ_F = 0.0260 (0.0067), and Θ_V = -0.0070 (0.0010).

Table 9. Computation of Bilateral Trade Margins

Distance (Thousands of Miles)

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		2.1	4.2	8.2	9.6	10	13.5	13.5	2.5	2.5
NWZ	2.1		5.5	8.6	10	8.8	15	15	3.7	3.7
JPN	4.2	5.5		6.8	6.8	12	14	14	2	2
USA	8.2	8.6	6.8		2.8	5.5	5	5	8	8
CAN	9.6	10	6.8	2.8		7.5	6	6	8	8
BRZ	10	8.8	12	5.5	7.5		10	10	11	11
EEC	13.5	15	14	5	5.6	10		3.1	13.5	13.5
OWE	13.5	15	14	5	6	10	3.1		13.5	13.5
OAS	2.5	3.7	2	8	8	11	13.5	13.5		2.3
NAS	2.5	3.7	2	8	8	11	13.5	13.5	2.3	

Mean Trade Flow Values (Thousands of US Dollars) All Food Commodities

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
NAS	0	1026	9274	3711	944	216	7718	860	5218	2398
NWZ	1549	0	3439	3292	404	72	6671	441	963	254
JPN	311	66	0	2838	373	52	2202	294	3702	743
USA	1706	419	38730	0	37378	1644	76241	8701	20464	2137
CAN	284	119	6800	27915	0	295	20506	1018	792	140
BRZ	434	155	3113	16303	1292	0	33705	3751	1106	246
EEC	2438	554	12431	32248	6012	2255	0	68094	5708	2762
OWE	290	34	1559	6290	744	245	31588	0	484	191
OAS	272	47	9054	2714	470	189	1922	259	0	7356
NAS	570	331	10805	4658	763	3528	6857	943	16081	0
MEAN	700	248	7839	8241	1817	507	14457	3047	3540	981

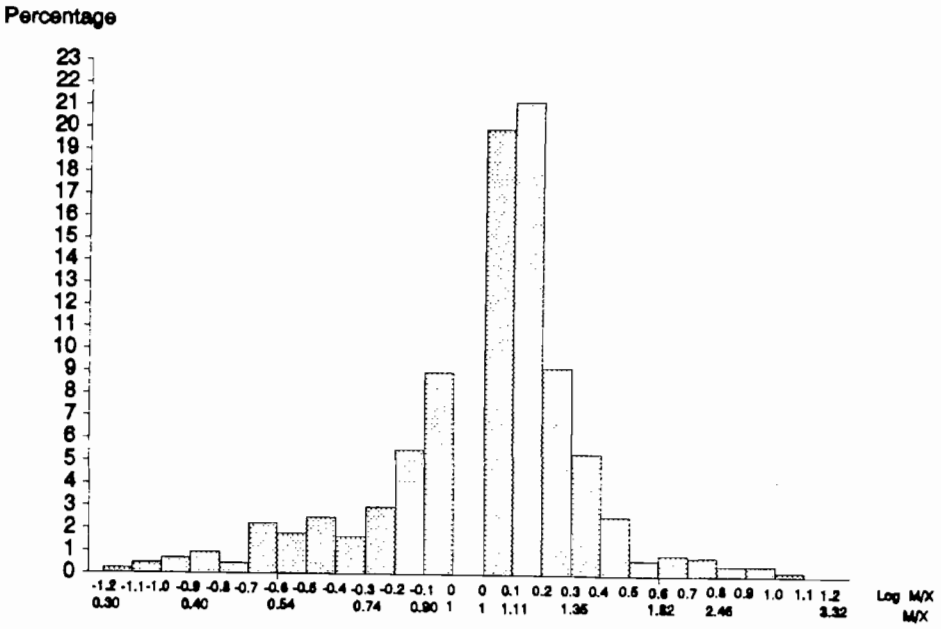
Estimated Trade Margins Commodity: Wheat
Ave. Margin 1.086

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.042	1.059	1.101	1.121	1.135	1.123	1.140	1.037	1.043
NWZ	1.039		1.081	1.105	1.130	1.137	1.130	1.152	1.070	1.080
JPN	1.085	1.112		1.094	1.109	1.157	1.135	1.151	1.028	1.040
USA	1.108	1.121	1.073		1.028	1.086	1.052	1.069	1.087	1.104
CAN	1.130	1.140	1.087	1.030		1.117	1.072	1.095	1.112	1.126
BRZ	1.129	1.130	1.124	1.069	1.105		1.095	1.112	1.127	1.134
EEC	1.132	1.150	1.121	1.059	1.077	1.116		1.029	1.125	1.131
OWE	1.149	1.173	1.138	1.071	1.097	1.134	1.035		1.145	1.153
OAS	1.059	1.093	1.022	1.103	1.116	1.141	1.134	1.150		1.030
NAS	1.053	1.078	1.020	1.098	1.113	1.118	1.124	1.140	1.025	

Regional Abbreviations: AUS = Australia, NWZ = New Zealand, JPN = Japan, USA = United States, CAN = Canada, BRZ = Brazil, EEC = European Community, OWE = Other Western Europe, OAS = Old Asian NICs, NAS = New Asian NICs

Graph 1

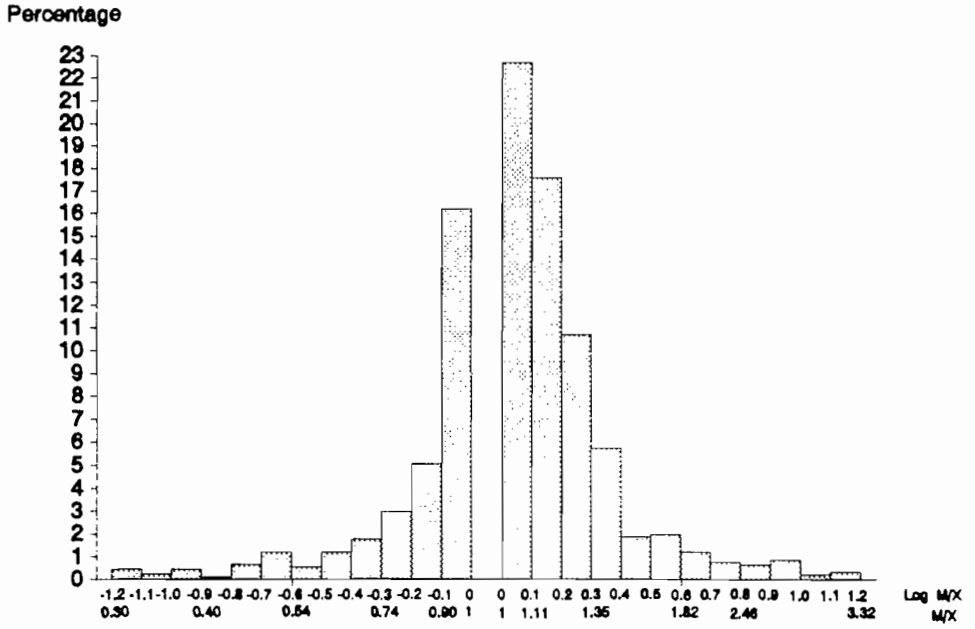
Histogram of Observations for US and Japan With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 2

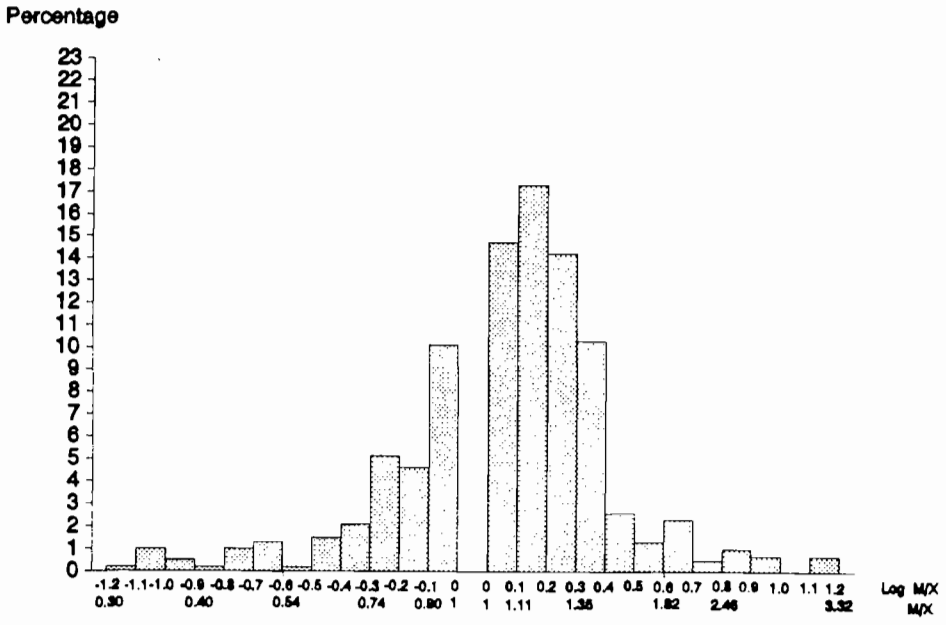
Histogram of Observations for US and EC With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 3

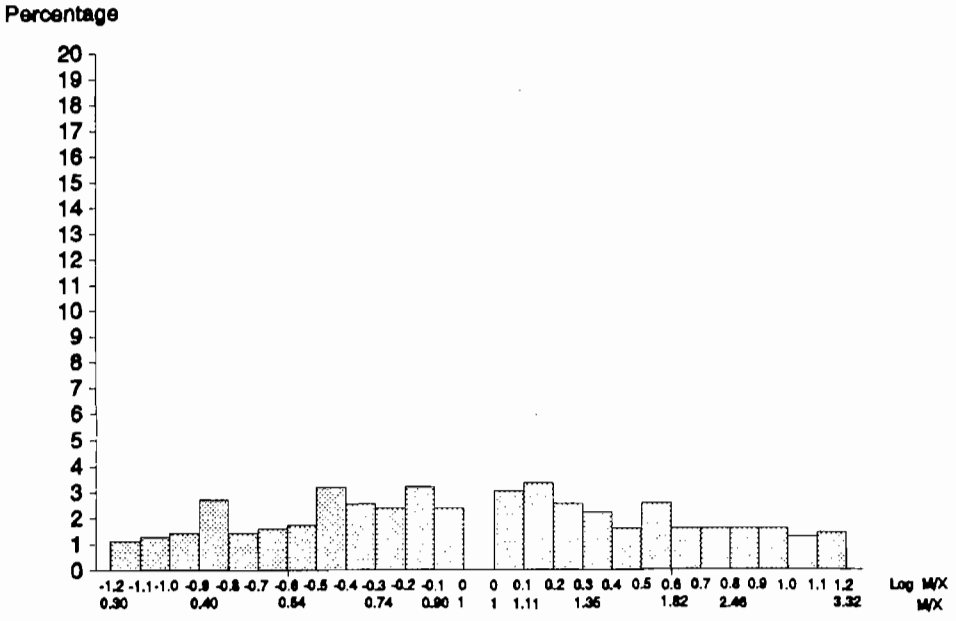
Histogram of Observations for EC and New Zealand With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 4

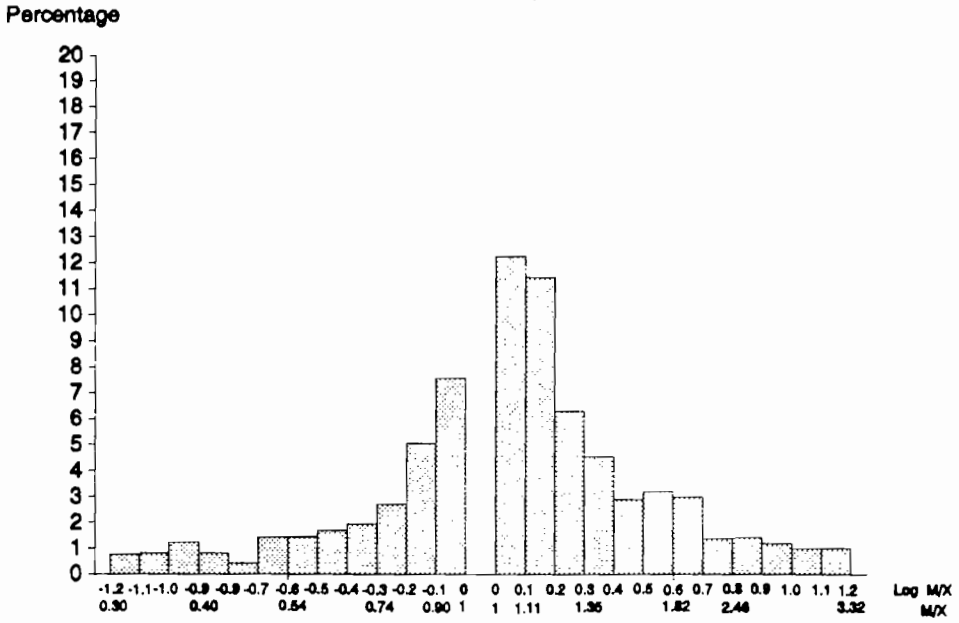
Histogram of Observations for US and Eastern Europe With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 5

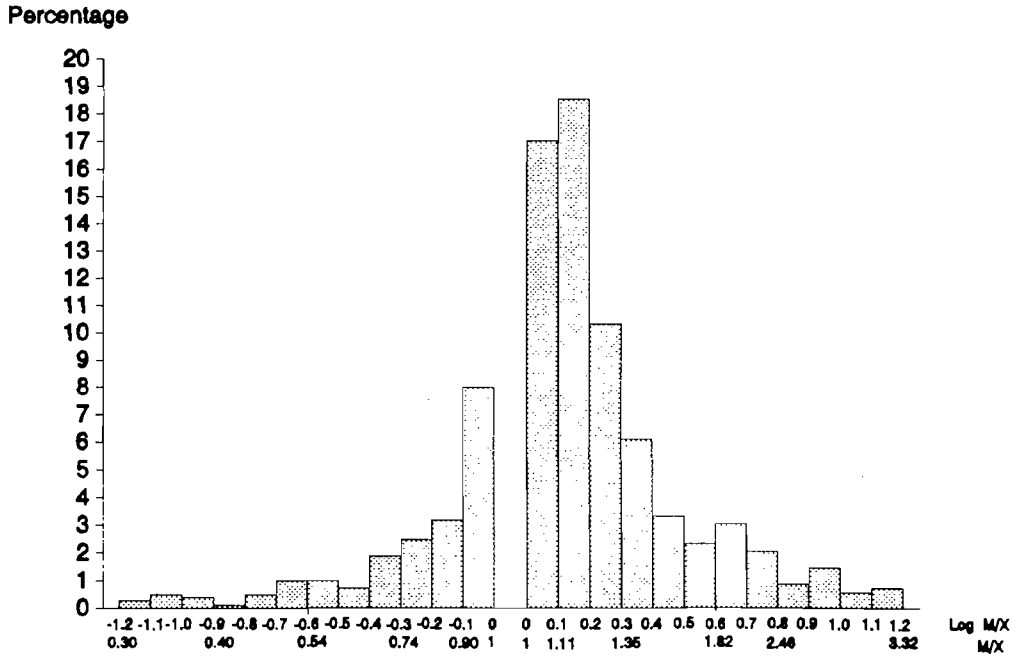
Histogram of Observations for Oilseeds and Regular Reporters



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 6

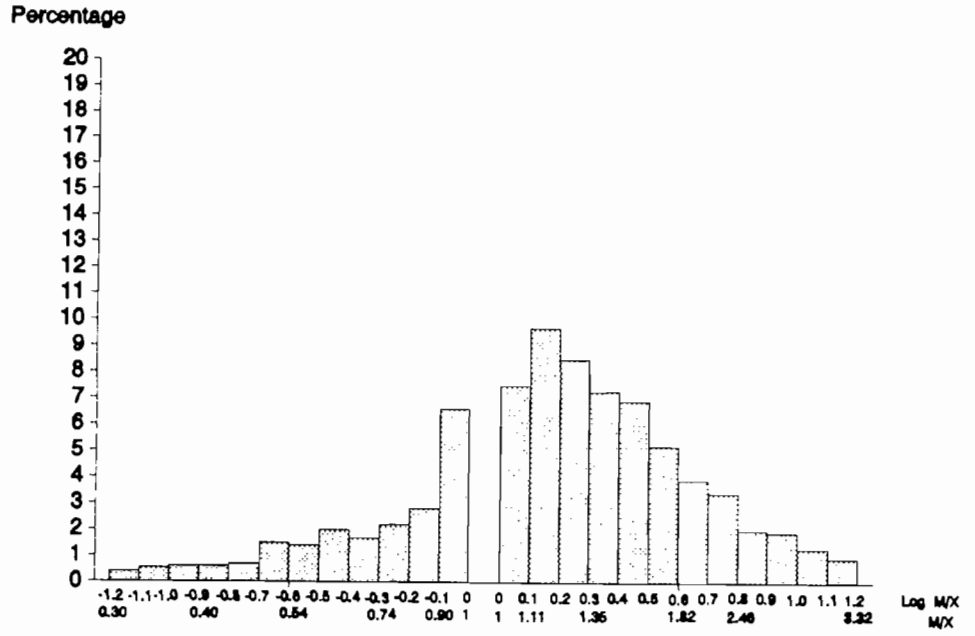
Histogram of Observations for Wheat and Regular Reporters



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 7

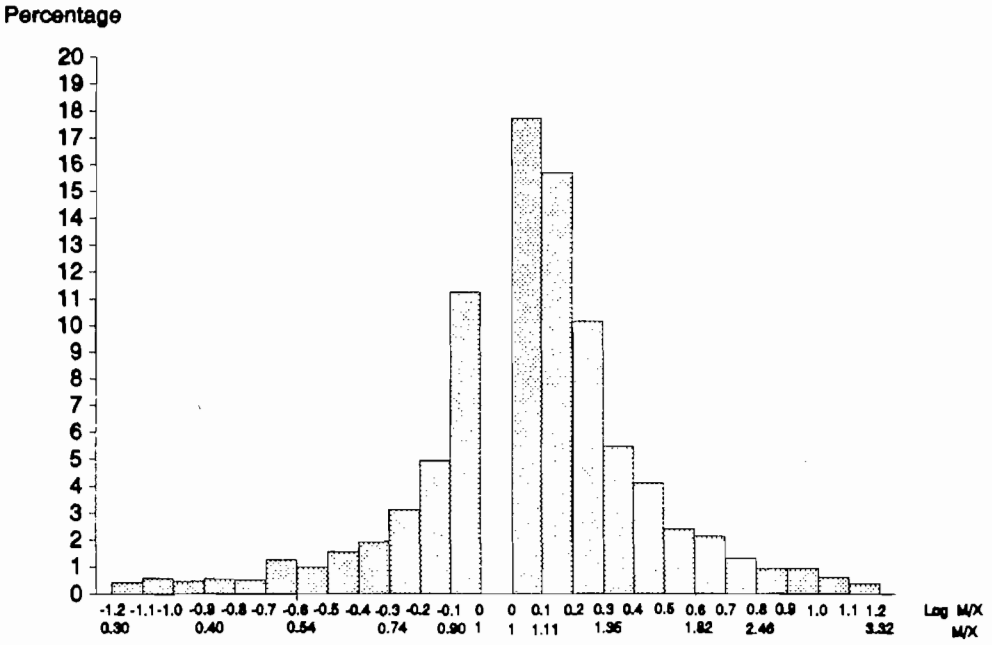
Histogram of Observations for Fresh Fruit and Vegetables and Regular Reporters



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 8

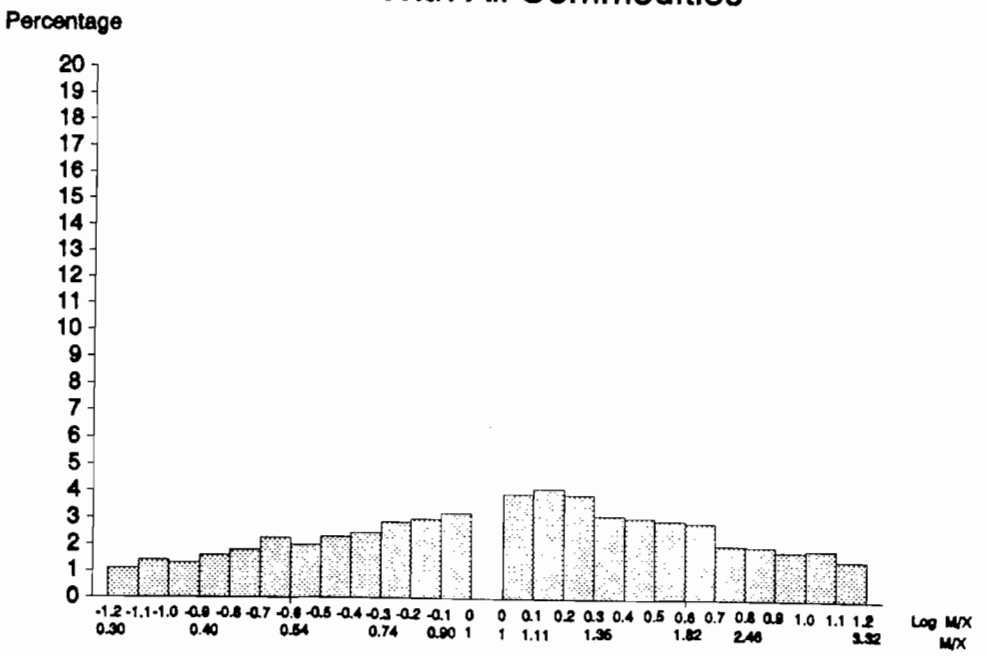
Histogram of Observations for Regular Reporters With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 9

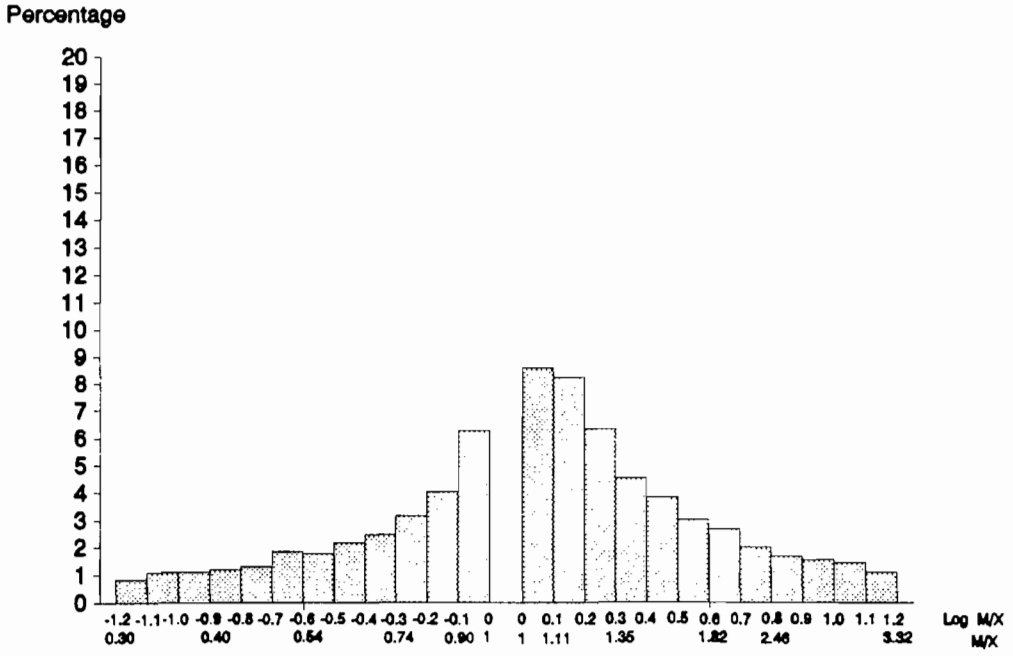
Histogram of Observations for Irregular Reporters With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

Graph 10

Histogram of Observations for All Reporters With All Commodities



*Note: Observations exist above 3.32 and below 0.30 but are not shown.

APPENDIX INCIDENCE OF NON-REPORTING BY INDIVIDUAL COUNTRIES IN THE UN BILATERAL TRADE DATA SET: 1962-87

Tables A1-A6 provide information regarding the incidence of non-reporting among countries included in five regions of our data set. The tables are arranged by country and year, for the period 1962-87. An "X" indicates the country in question reported data to the UN in that year. This does not necessarily mean that the reporting was *exhaustive*. However, the absence of an "X" does mean that *no reporting took place*. Finally, it should be noted that this data base is continually updated. More recent "runs" will fill in some of the missing years, especially towards the end of the period in question.

Table A1. Subsaharan Africa

Years 1962-1987

Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Angola												X	X				X	X	X	X						
Botswana																										
Burundi													X	X	X											
Chad	X	X	X	X	X	X		X	X	X	X	X	X	X												
Congo	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X					X	X		
Ethiopia	X					X		X	X	X	X	X	X	X				X	X	X	X		X	X		
Gambia			X						X	X	X	X	X	X												
Ghana	X	X	X	X	X	X		X	X	X	X	X	X	X	X						X					
Kenya									X	X	X	X	X	X	X	X	X	X	X		X	X				
Niger	X	X	X	X	X	X		X	X	X	X	X	X	X	X					X						
Nigeria	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X								
Sudan		X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X						
S.Africa																				X	X					
Uganda									X	X	X	X	X	X	X											
Zaire	X			X					X		X	X	X	X												
Zambia					X	X			X	X	X	X	X	X												
Zimbabwe																										

* Note: Not all countries shown.
X denotes when reporting took place.

Table A2. Eastern Europe

Years 1962-1987																									
Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Albania																										
Bulgaria																										
Czech											X	X	X	X	X	X	X	X	X	X	X	X	X		X	
E.Germany																										
Hungary			X	X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Poland																			X		X	X	X	X	X	
Romania																										
Yugoslavia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Table A3. Communist Asia

Years 1962-1987																										
Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Burma	X	X	X	X	X	X		X	X	X	X	X	X	X	X											
Kampuchea	X	X	X	X	X	X		X	X	X	X															
Laos	X	X	X	X	X	X	X	X	X	X	X	X	X													
Mongolia																										
N. Korea																										
P.R. China																							X			
Vietnam																										

X denotes when reporting took place.

Table A4. Middle East and North Africa

Years 1962-1987																										
Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Algeria					X									X	X	X	X	X	X	X	X	X	X	X	X	X
Bahrain									X		X	X	X	X	X	X	X	X	X	X						
Egypt				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Iran		X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Iraq		X									X	X	X	X	X											
Israel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jordan			X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kuwait									X	X	X	X	X	X	X	X		X	X	X		X	X			
Lebanon						X		X	X	X	X	X														
Morocco	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Mozambique																										
S. Arabia							X	X					X	X	X	X		X	X	X	X					
Syria													X	X				X				X	X			
Tunisia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Turkey	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Libya	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X					
D. Yemen															X			X	X							

* Note: Not all Countries shown.
X denotes when reporting took place.

Table A5. Latin America

Years 1962-1987

Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Antigua																										
Argentina	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bolivia	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X	X		
Chile	X	X	X	X	X	X		X	X	X	X	X	X	X							X	X	X	X	X	
Columbia	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Costa Rica				X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Cuba																		X	X							
Dominican										X	X		X			X	X	X	X	X	X		X	X		
Ecuador	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X			
El Salvador		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Haiti													X	X	X	X										
Honduras		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		
Jamaica	X	X												X	X			X	X	X	X					
Nicaragua				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Paraguay	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X		
Peru	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X		X	
Uruguay														X	X	X		X	X	X	X	X	X	X	X	X
Venezuela	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		

* Note: Not all Countries shown.
X denotes when reporting took place.

Table A6. Individual Countries

Years 1962-1987

Countries	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
Australia*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
N. Zealand*			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Japan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
U. S.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Canada	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mexico*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X		
Brazil	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

ATTACHMENT

This attachment lists the bilateral trade margins data actually incorporated in the SALTER model. It gives estimates for both food and non-food commodities.

The trade margins estimates for *food* commodities differ from those documented in the first part of this paper in the following respects:

(i) The regression coefficients in this attachment are based on a 10 commodity rather than an 18 commodity aggregation scheme, with several of the categories in the first part of the paper aggregated together. The commodity aggregation scheme for this attachment is shown in Table AT1.

(ii) The freight rate used in the first part of this paper was the geometric mean, whereas in this attachment it is based on the value of F_t in 1988.

(iii) In this attachment, the estimated distance on the shortest routes has been raised in order to give positive margins for rice (compare Table AT2 in this attachment with Table 9 in the first part of the paper).

These variations in methodology have only a small impact on the results. This can be seen by comparing the two matrices of wheat margins. The full set of food trade margins data used for SALTER is shown in Table AT2 (sources shown in rows, destinations in columns).

The procedure for generating the *non-food* margins differed slightly from that documented in the first part of this paper. For non-food commodities, a separate regression was estimated for each product, in order to permit the volume and distance effects to vary across commodity groups. Thus in this attachment, there are as many value matrices as margins matrices for non-food products. However, this comes at the cost of not being able to estimate biases and margins simultaneously. A two-stage strategy was adopted whereby biases were estimated first, the 'best' reporting pair was identified, and all other value flows were adjusted accordingly. These adjusted trade flow matrices are shown in this attachment. At the second stage, a margins regression was estimated using the bias-corrected data.

In a few cases the bilateral non-food margins came out lower than one. This was a consequence of extraordinarily high values along particular routes. To correct this problem, the corresponding "effective values" were adjusted downward. This problem affected a few of the bilateral trade margins for finished capital goods, and the downwards adjusted value flows for this commodity are also shown in this attachment. In addition, the Light Industry margin does not change across routes because the regression coefficients were not significant for distance and trade values. The commodity aggregation scheme for non-food margins is shown

in Table AT3. The full set of non-food trade margins data used for SALTER is shown in Table AT4.

Table AT1. **Commodity Aggregation Scheme for Food Trade Margins used in SALTER**

1. Rice
2. Wheat
3. Corn and Other Grains
4. Dairy
5. Meat & Live Animal
6. Nonedible Crops
7. Tropical Crops: Coffee, Tea, Spices, Sugar, Cocoa, Candy and Non Alcoholic Beverages
8. Other Food: Flour, Processed Food, Fats and Oils, Fruits and Vegetables
9. Fish
10. Tobacco and Alcoholic Beverages

Table AT2. **Computation of Bilateral Trade Margins for Food**

Distance (Thousands of Miles)

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		2	4.2	8.2	9.6	10	13.5	13.5	2.5	2.5
NWZ	2		5.5	8.6	10	8.8	15	15	3.7	3.7
JPN	4.2	5.5		6.8	6.8	12	14	14	2	2
USA	8.2	8.6	6.8		2.5	5.5	5	5	8	8
CAN	9.6	10	6.8	2.5		3.5	6	6	8	8
BRZ	10	8.8	12	5.5	7.5		10	10	11	11
EEC	13.5	15	14	5	5.6	10		4.3	13.5	13.5
OWE	13.5	15	14	5	6	10	4.3		13.5	13.5
OAS	2.5	3.7	2	8	8	11	13.5	13.5		2.3
NAS	2.5	3.7	2	8	8	11	13.5	13.5	2.3	

Mean Trade Flow Values (Thousands of US dollars) All Food Commodities

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	1026	9274	3711	944	216	7718	860	5218	2398
NWZ	1549	0	3439	3292	404	72	6671	441	963	254
JPN	311	66	0	2838	373	52	2202	294	3702	743
USA	1706	419	38730	0	37378	1644	76241	8701	20464	2137
CAN	284	119	6800	27915	0	295	20506	1018	792	140
BRZ	434	155	3113	16303	1292	0	33705	3751	1106	446
EEC	2438	554	12431	32248	6012	2255	0	68094	5708	2732
OWE	290	34	1559	6290	744	245	31588	0	484	191
OAS	272	47	9054	2714	470	189	1922	259	0	7356
NAS	570	331	10805	4658	763	3528	6857	943	16081	0
MEAN	700	248	7839	8241	1817	507	14457	3047	3540	981

Correction factor for bias reporting = 1.042

Estimated Food Trade Margins Commodity: Rice

Ave. Margin 1.053

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.014	1.035	1.076	1.095	1.109	1.097	1.114	1.014	1.019
NWZ	1.012		1.056	1.080	1.104	1.111	1.104	1.125	1.046	1.056
JPN	1.061	1.086		1.069	1.084	1.130	1.109	1.125	1.005	1.017
USA	1.082	1.096	1.049		1.000	1.062	1.029	1.045	1.062	1.079
CAN	1.105	1.114	1.062	1.002		1.052	1.048	1.070	1.087	1.100
BRZ	1.103	1.105	1.098	1.045	1.080		1.070	1.087	1.101	1.108
EEC	1.106	1.123	1.095	1.035	1.053	1.091		1.022	1.099	1.105
OWE	1.123	1.146	1.112	1.047	1.072	1.108	1.028		1.119	1.126
OAS	1.035	1.068	0.999	1.078	1.091	1.115	1.108	1.124		1.007
NAS	1.030	1.054	0.998	1.073	1.087	1.092	1.098	1.114	1.002	

Table AT2. **Computation of Bilateral Trade Margins for Food** *(Cont'd)*

Estimated Food Trade Margins Commodity: Wheat

Ave. Margin 1.086

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.046	1.068	1.110	1.130	1.144	1.132	1.149	1.046	1.051
NWZ	1.043		1.090	1.114	1.139	1.145	1.138	1.160	1.078	1.089
JPN	1.094	1.120		1.102	1.118	1.165	1.144	1.160	1.037	1.049
USA	1.116	1.130	1.082		1.031	1.095	1.061	1.077	1.096	1.113
CAN	1.139	1.148	1.096	1.033		1.085	1.080	1.104	1.121	1.135
BRZ	1.138	1.139	1.132	1.078	1.114		1.104	1.121	1.136	1.143
EEC	1.141	1.159	1.130	1.068	1.086	1.125		1.054	1.134	1.140
OWE	1.158	1.182	1.146	1.080	1.106	1.143	1.060		1.154	1.161
OAS	1.068	1.102	1.030	1.111	1.125	1.150	1.143	1.159		1.039
NAS	1.062	1.087	1.029	1.107	1.121	1.127	1.132	1.148	1.033	

Estimated Food Trade Margins Commodity: Corn and Other Grain

Ave. Margin 1.150

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.108	1.131	1.176	1.196	1.211	1.198	1.217	1.107	1.113
NWZ	1.105		1.154	1.179	1.206	1.213	1.206	1.229	1.142	1.153
JPN	1.158	1.186		1.167	1.184	1.234	1.211	1.228	1.098	1.110
USA	1.182	1.197	1.146		1.092	1.160	1.124	1.141	1.160	1.179
CAN	1.206	1.216	1.160	1.094		1.148	1.144	1.169	1.187	1.202
BRZ	1.205	1.206	1.199	1.141	1.179		1.169	1.187	1.203	1.210
EEC	1.208	1.227	1.196	1.130	1.150	1.191		1.116	1.201	1.207
OWE	1.226	1.251	1.214	1.144	1.171	1.210	1.122		1.222	1.230
OAS	1.131	1.167	1.091	1.177	1.191	1.218	1.210	1.227		1.100
NAS	1.125	1.151	1.090	1.172	1.187	1.193	1.199	1.216	1.094	

Estimated Food Trade Margins Commodity: Dairy

Ave. Margin 1.061

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.022	1.043	1.085	1.104	1.117	1.105	1.123	1.022	1.027
NWZ	1.019		1.064	1.088	1.112	1.119	1.112	1.134	1.054	1.064
JPN	1.069	1.095		1.077	1.092	1.139	1.117	1.133	1.013	1.025
USA	1.091	1.104	1.057		1.007	1.070	1.037	1.053	1.070	1.088
CAN	1.113	1.122	1.070	1.010		1.060	1.056	1.078	1.095	1.109
BRZ	1.112	1.113	1.106	1.053	1.088		1.078	1.095	1.110	1.117
EEC	1.114	1.132	1.104	1.043	1.061	1.099		1.030	1.108	1.114
OWE	1.131	1.154	1.120	1.055	1.081	1.116	1.036		1.127	1.135
OAS	1.043	1.076	1.007	1.086	1.099	1.124	1.116	1.132		1.015
NAS	1.038	1.062	1.005	1.082	1.096	1.101	1.106	1.122	1.009	

Table AT2. **Computation of Bilateral Trade Margins for Food** *(Cont'd)*

Estimated Food Trade Margins Commodity: Meat and Livestock

Ave. Margin 1.099

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.059	1.081	1.124	1.143	1.157	1.145	1.163	1.058	1.064
NWZ	1.056		1.103	1.127	1.152	1.159	1.152	1.174	1.091	1.102
JPN	1.107	1.134		1.115	1.132	1.179	1.157	1.174	1.049	1.061
USA	1.130	1.144	1.095		1.044	1.108	1.074	1.090	1.109	1.127
CAN	1.153	1.162	1.109	1.046		1.098	1.093	1.117	1.134	1.148
BRZ	1.152	1.153	1.146	1.091	1.127		1.117	1.134	1.149	1.157
EEC	1.154	1.172	1.143	1.080	1.099	1.138		1.067	1.148	1.153
OWE	1.172	1.196	1.160	1.093	1.119	1.156	1.073		1.168	1.175
OAS	1.080	1.115	1.043	1.125	1.139	1.164	1.156	1.173		1.051
NAS	1.075	1.100	1.041	1.120	1.135	1.140	1.146	1.162	1.046	

Estimated Food Trade Margins Commodity: Nonedible Crop

Ave. Margin 1.082

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.042	1.064	1.106	1.125	1.139	1.127	1.145	1.042	1.047
NWZ	1.039		1.086	1.110	1.134	1.141	1.134	1.156	1.074	1.085
JPN	1.090	1.116		1.098	1.114	1.161	1.139	1.156	1.033	1.045
USA	1.112	1.126	1.078		1.027	1.091	1.057	1.073	1.092	1.109
CAN	1.135	1.144	1.091	1.030		1.081	1.076	1.099	1.117	1.131
BRZ	1.134	1.135	1.128	1.074	1.110		1.100	1.117	1.132	1.139
EEC	1.137	1.154	1.126	1.064	1.082	1.121		1.050	1.130	1.136
OWE	1.154	1.177	1.142	1.076	1.102	1.138	1.056		1.150	1.157
OAS	1.064	1.098	1.027	1.107	1.121	1.146	1.138	1.155		1.035
NAS	1.058	1.083	1.025	1.103	1.117	1.122	1.128	1.144	1.029	

Estimated Food Trade Margins Commodity: Tropical Crops

Ave. Margin 1.067

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.028	1.049	1.091	1.110	1.124	1.112	1.129	1.027	1.033
NWZ	1.025		1.070	1.094	1.119	1.125	1.119	1.140	1.060	1.070
JPN	1.075	1.101		1.083	1.099	1.145	1.124	1.140	1.019	1.030
USA	1.097	1.110	1.063		1.013	1.076	1.043	1.059	1.076	1.094
CAN	1.119	1.128	1.076	1.015		1.066	1.062	1.084	1.101	1.115
BRZ	1.118	1.119	1.113	1.059	1.094		1.084	1.101	1.116	1.123
EEC	1.121	1.138	1.110	1.049	1.067	1.105		1.036	1.114	1.120
OWE	1.138	1.161	1.126	1.061	1.087	1.123	1.041		1.134	1.141
OAS	1.049	1.082	1.012	1.092	1.105	1.130	1.123	1.139		1.021
NAS	1.043	1.068	1.011	1.088	1.102	1.107	1.113	1.128	1.015	

Table AT2. **Computation of Bilateral Trade Margins for Food** *(Cont'd)*

Estimated Food Trade Margins Commodity: Other Food

Ave. Margin 1.085

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.045	1.067	1.109	1.129	1.143	1.130	1.148	1.045	1.050
NWZ	1.042		1.089	1.113	1.138	1.144	1.137	1.159	1.077	1.088
JPN	1.093	1.119		1.101	1.117	1.164	1.143	1.159	1.036	1.048
USA	1.115	1.129	1.081		1.030	1.094	1.060	1.076	1.095	1.112
CAN	1.138	1.147	1.095	1.032		1.084	1.079	1.103	1.120	1.134
BRZ	1.137	1.138	1.131	1.077	1.113		1.103	1.120	1.135	1.142
EEC	1.140	1.158	1.129	1.067	1.085	1.124		1.053	1.133	1.139
OWE	1.157	1.181	1.145	1.079	1.105	1.142	1.059		1.153	1.160
OAS	1.067	1.101	1.029	1.110	1.124	1.149	1.142	1.158		1.038
NAS	1.061	1.086	1.028	1.106	1.120	1.126	1.131	1.147	1.032	

Estimated Food Trade Margins Commodity: Fish and Products

Ave. Margin 1.105

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.065	1.087	1.130	1.149	1.164	1.151	1.169	1.064	1.070
NWZ	1.062		1.109	1.133	1.159	1.165	1.158	1.181	1.097	1.108
JPN	1.113	1.140		1.122	1.138	1.186	1.164	1.180	1.055	1.067
USA	1.136	1.150	1.101		1.049	1.114	1.080	1.096	1.115	1.133
CAN	1.159	1.169	1.115	1.051		1.104	1.099	1.123	1.141	1.155
BRZ	1.158	1.159	1.152	1.097	1.133		1.123	1.140	1.156	1.163
EEC	1.161	1.179	1.149	1.086	1.105	1.145		1.073	1.154	1.160
OWE	1.178	1.202	1.166	1.099	1.125	1.163	1.078		1.174	1.182
OAS	1.086	1.121	1.048	1.131	1.145	1.170	1.163	1.179		1.057
NAS	1.081	1.106	1.047	1.127	1.141	1.146	1.152	1.169	1.051	

Estimated Food Trade Margins Commodity: Tobacco and Alcohol

Ave. Margin 1.045

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.007	1.028	1.068	1.087	1.101	1.089	1.106	1.006	1.012
NWZ	1.004		1.049	1.072	1.096	1.102	1.096	1.117	1.038	1.048
JPN	1.053	1.078		1.061	1.076	1.122	1.101	1.116	0.998	1.009
USA	1.074	1.087	1.041		0.992	1.054	1.021	1.037	1.054	1.071
CAN	1.096	1.105	1.054	0.994		1.044	1.040	1.062	1.079	1.092
BRZ	1.095	1.096	1.090	1.037	1.072		1.062	1.079	1.093	1.100
EEC	1.098	1.115	1.087	1.027	1.045	1.083		1.015	1.091	1.097
OWE	1.114	1.137	1.103	1.039	1.064	1.100	1.020		1.110	1.118
OAS	1.027	1.060	0.992	1.070	1.083	1.107	1.100	1.115		1.000
NAS	1.022	1.046	0.990	1.065	1.079	1.084	1.090	1.105	0.994	

Regional abbreviations: AUS = Australia, NWZ = New Zealand, JPN = Japan, USA = United States, CAN = Canada, BRZ = Brazil, EEC = European Community, OWE = Other Western Europe, OAS = Old Asian NICs, NAS = New Asian NICs

Table AT3. **Commodity Aggregation Scheme for Non-food Trade Margins used in SALTER**

1. Basic intermediate
2. Finished capital goods
3. Forestry products
4. High tech
5. Intermediate manufactures
6. Light industry
7. Mining and resources

Table AT4. **Computation of Bilateral Trade Margins for Non-food**

Distance (Thousands of Miles)

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		2.1	4.2	8.2	9.6	10	13.5	13.5	2.5	2.5
NWZ	2.1		5.5	8.6	10	8.8	15	15	3.7	3.7
JPN	4.2	5.5		6.8	6.8	12	14	14	2	2
USA	8.2	8.6	6.8		1.8	6.1	5	5	8	8
CAN	9.6	10	6.8	1.8		7.5	6	6	8	8
BRZ	10	8.8	12	6.1	7.5		10	10	11	11
EEC	13.5	15	14	5	5.6	10		4.3	13.5	13.5
OWE	13.5	15	14	5	6	10	4.3		13.5	13.5
OAS	2.5	3.7	2	8	8	11	13.5	13.5		1.5
NAS	2.5	3.7	2	8	8	11	13.5	13.5	1.5	

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Basic intermediate

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	105246	137235	76337	4310	739	221994	5411	71523	40298
NWZ	51119	0	20510	4905	316	51	2453	75	9019	2680
JPN	194417	74107	0	2041850	149730	67667	522867	103515	1088049	350456
USA	173961	28234	586824	0	1641254	176271	1989994	244717	293266	72214
CAN	52623	13897	91392	3816006	0	31052	764234	34272	34563	18991
BRZ	2410	159	32553	88273	5299	0	82698	11840	6442	812
EEC	316971	97074	401855	3388901	445852	207632	0	4316359	426209	172403
OWE	84603	7660	107642	586502	70378	65432	5702305	0	69718	34925
OAS	25980	6834	137683	398860	33554	2024	136284	32546	0	154470
NAS	11046	1284	179443	265843	10332	13	227073	11482	87285	0
MEAN	53089	14249	122491	362378	33607	23846	271629	42209	86082	33273

Estimated Non-food Trade Margins Commodity: Basic intermediate

Ave. Margin 1.107

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.078	1.104	1.153	1.242	1.296	1.149	1.254	1.096	1.111
NWZ	1.096		1.168	1.232	1.322	1.372	1.283	1.392	1.170	1.204
JPN	1.095	1.134		1.059	1.126	1.176	1.128	1.172	1.018	1.046
USA	1.131	1.182	1.090		1.004	1.116	1.045	1.098	1.116	1.153
CAN	1.171	1.210	1.139	0.984		1.173	1.078	1.159	1.173	1.190
BRZ	1.261	1.336	1.198	1.134	1.222		1.161	1.215	1.237	1.299
EEC	1.140	1.177	1.135	1.032	1.088	1.136		1.020	1.132	1.156
OWE	1.175	1.249	1.171	1.076	1.139	1.167	1.013		1.181	1.200
OAS	1.122	1.178	1.069	1.108	1.174	1.271	1.162	1.202		1.053
NAS	1.145	1.225	1.062	1.119	1.207	1.431	1.149	1.232	1.067	

Table AT4. **Computation of Bilateral Trade Margins for Non-food** *(Cont'd)*

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Finished capital goods

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	91378	5919	35211	2714	660	35520	1530	22903	20469
NWZ	15087	0	251	2339	257	14	3797	161	1575	766
JPN	405836	72346	0	3256158	259611	116038	1965488	448135	1130067	512354
USA	849841	121266	1296891	0	8364247	484628	5895228	925078	760222	210101
CAN	58502	14566	22940	5700284	0	31110	223677	39365	12882	9024
BRZ	2069	1458	27354	49330	3405	0	46121	1997	3170	1117
EEC	891573	268980	712626	5942241	819315	501779	0	6781402	762589	438754
OWE	94621	19955	138924	746826	147575	69222	3688645	0	114947	39749
OAS	14974	12587	36254	162274	8698	1440	146367	21803	0	677339
NAS	6302	780	4792	4617	317	90	9893	148	47279	0
MEAN	75765	36307	41486	240218	37059	25349	188569	30619	62910	34660

Downwards Adjusted Trade Flow Values for Finished Capital Goods (Thousands of US dollars)

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS										
NWZ										
JPN	100000						75000	75000	30000	30000
USA	100000		100000		75000		100000	100000	100000	
CAN				100000						
BRZ										
EEC								100000		
OWE							100000			
OAS										
NAS										

Estimated Non-food Trade Margins Commodity: Finished capital goods

Ave. Margin 1.016

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		0.992	1.032	1.025	1.055	1.071	1.034	1.067	1.009	1.010
NWZ	1.010		1.070	1.054	1.081	1.110	1.059	1.093	1.044	1.051
JPN	1.003	1.011		1.011	1.002	1.020	1.027	1.009	1.003	1.003
USA	1.015	1.014	1.011		0.992	0.994	1.006	1.006	1.014	1.007
CAN	1.023	1.038	1.027	0.950		1.025	1.001	1.019	1.035	1.039
BRZ	1.058	1.060	1.035	1.017	1.048		1.026	1.059	1.056	1.067
EEC	1.001	1.015	1.004	0.966	0.987	1.002		1.004	1.003	1.008
OWE	1.024	1.042	1.021	0.986	1.005	1.022	1.004		1.022	1.033
OAS	1.014	1.022	1.001	1.009	1.039	1.064	1.019	1.039		0.967
NAS	1.022	1.051	1.021	1.046	1.074	1.094	1.047	1.092	0.993	

Table AT4. **Computation of Bilateral Trade Margins for Non-food** *(Cont'd)*

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Forestry products

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	2108	397	403	26	0	4339	185	705	413
NWZ	29133	0	44530	454	63	0	294	21	4547	625
JPN	279	86	0	1710	461	29	12156	2758	9918	339
USA	33397	2796	695609	0	179017	6568	496885	21543	81585	6151
CAN	40422	1384	246819	1905189	0	1044	525653	9723	14103	2775
BRZ	526	64	3046	20507	995	0	69984	5308	1374	1610
EEC	1225	137	5824	7868	350	2082	0	113683	2294	862
OWE	12039	701	12212	21242	885	3742	2305236	0	4967	1994
OAS	6152	356	39646	6638	806	23	29225	128	0	4678
NAS	23855	351	345013	11219	1327	0	115257	1541	171558	0
MEAN	6402	575	30110	10382	1084	1926	57197	4926	10853	1482

Estimated Non-food Trade Margins Commodity: Forestry products

Ave. Margin 1.203

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.178	1.245	1.276	1.346	1.000	1.248	1.318	1.208	1.220
NWZ	1.126		1.159	1.276	1.328	1.000	1.313	1.374	1.188	1.229
JPN	1.252	1.291		1.236	1.264	1.355	1.228	1.260	1.145	1.213
USA	1.183	1.237	1.115		1.085	1.203	1.108	1.170	1.164	1.217
CAN	1.186	1.259	1.135	1.042		1.251	1.115	1.194	1.199	1.233
BRZ	1.280	1.321	1.250	1.179	1.252		1.177	1.230	1.263	1.260
EEC	1.276	1.330	1.244	1.190	1.261	1.250		1.130	1.262	1.284
OWE	1.227	1.293	1.228	1.170	1.244	1.237	1.073		1.245	1.265
OAS	1.164	1.241	1.118	1.215	1.260	1.356	1.208	1.326		1.147
NAS	1.137	1.241	1.077	1.204	1.249	1.000	1.180	1.271	1.078	

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: High tech

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	66817	11959	34032	1167	251	26878	2797	24229	14360
NWZ	14925	0	573	1955	185	5	3870	187	1056	907
JPN	220195	40770	0	2610347	196931	94183	1218388	246174	1189258	235063
USA	311700	48048	1046154	0	2020234	321339	3823624	558583	683807	178366
CAN	18691	5752	23178	920258	0	7086	225085	19692	27208	4321
BRZ	850	101	10887	60055	1026	0	29309	3761	2455	940
EEC	472197	134878	571310	2113830	373367	369427	0	3880152	543238	237838
OWE	89236	14966	169886	493790	85498	97684	2698074	0	185072	41356
OAS	22412	3045	89521	810094	37237	2645	298363	33270	0	215193
NAS	1875	365	4718	109458	3890	814	29832	3603	63248	0
MEAN	36883	11715	50218	302885	34218	17933	185948	37690	64638	27015

Table AT4. **Computation of Bilateral Trade Margins for Non-food** *(Cont'd)*

Estimated Non-food Trade Margins Commodity: High tech

Ave. Margin 1.099

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.032	1.095	1.121	1.180	1.205	1.155	1.188	1.055	1.062
NWZ	1.052		1.155	1.165	1.210	1.258	1.190	1.237	1.122	1.124
JPN	1.055	1.094		1.050	1.085	1.129	1.103	1.125	0.992	1.013
USA	1.090	1.119	1.062		0.980	1.072	1.028	1.053	1.077	1.096
CAN	1.139	1.159	1.115	0.990		1.138	1.076	1.109	1.122	1.149
BRZ	1.187	1.211	1.161	1.095	1.166		1.135	1.165	1.177	1.192
EEC	1.114	1.138	1.113	1.035	1.065	1.099		1.019	1.112	1.123
OWE	1.137	1.170	1.130	1.055	1.089	1.118	1.024		1.127	1.149
OAS	1.056	1.107	1.025	1.075	1.118	1.176	1.120	1.152		0.998
NAS	1.090	1.137	1.064	1.103	1.150	1.194	1.153	1.185	1.014	

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Intermediate manufactures

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	32169	3810	11435	2204	159	16648	1129	14611	7774
NWZ	13255	0	383	1979	346	56	1863	79	1208	502
JPN	103836	20003	0	1615403	130355	22886	614156	127964	341036	78813
USA	133138	21211	237433	0	1129991	41807	934264	163810	120148	28691
CAN	12966	2564	5773	409452	0	852	54631	7948	2606	2382
BRZ	670	155	408	11228	822	0	7899	700	261	103
EEC	223900	57528	180811	1482551	236852	63695	0	2125032	165250	76027
OWE	20277	3297	30872	239817	36018	6215	1287815	0	21697	7656
OAS	59785	6494	80768	918916	63472	988	377433	41240	0	88057
NAS	1848	162	3402	7294	442	103	8628	1527	21743	0
MEAN	22959	5410	12771	95085	15013	5186	71296	14207	17878	8718

Estimated Non-food Trade Margins Commodity: Intermediate manufactures

Ave. Margin 1.093

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.051	1.078	1.104	1.110	1.112	1.124	1.124	1.058	1.058
NWZ	1.051		1.088	1.106	1.112	1.107	1.128	1.128	1.073	1.073
JPN	1.078	1.088		1.097	1.097	1.119	1.126	1.126	1.049	1.049
USA	1.104	1.106	1.097		1.045	1.092	1.084	1.084	1.103	1.103
CAN	1.110	1.112	1.097	1.045		1.100	1.092	1.092	1.103	1.103
BRZ	1.112	1.107	1.119	1.092	1.100		1.112	1.112	1.116	1.116
EEC	1.124	1.128	1.126	1.084	1.089	1.112		1.079	1.124	1.124
OWE	1.124	1.128	1.126	1.084	1.092	1.112	1.079		1.124	1.124
OAS	1.058	1.073	1.049	1.103	1.103	1.116	1.124	1.124		1.038
NAS	1.058	1.073	1.049	1.103	1.103	1.116	1.124	1.124	1.038	

Table AT4. **Computation of Bilateral Trade Margins for Non-food** *(Cont'd)*

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Light industry

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	20900	1144	4285	933	54	11061	433	5360	1906
NWZ	25758	0	966	3303	710	0	4850	179	2721	673
JPN	140913	31944	0	690450	88438	2201	230727	44756	695366	92544
USA	61329	15305	65077	0	474163	12420	487410	81441	89950	9197
CAN	10329	3556	2956	228862	0	349	58038	13393	3961	758
BRZ	2419	357	11317	100566	5772	0	49177	9259	2362	314
EEC	188614	51484	253824	1698203	323542	14629	0	2913704	195652	24651
OWE	15365	2854	29551	119514	27003	1687	1258779	0	18662	2603
OAS	134427	37045	234779	1788876	177829	1040	1231712	198268	0	127270
NAS	6227	2198	7597	33612	5412	6	39331	5479	44694	0
MEAN	29405	8463	17264	120944	24897	1810	102279	22041	24489	6249

Estimated Non-food Trade Margins Commodity: Light industry

Ave. Margin 1.033

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033
NWZ	1.033		1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033
JPN	1.033	1.033		1.033	1.033	1.033	1.033	1.033	1.033	1.033
USA	1.033	1.033	1.033		1.033	1.033	1.033	1.033	1.033	1.033
CAN	1.033	1.033	1.033	1.033		1.033	1.033	1.033	1.033	1.033
BRZ	1.033	1.033	1.033	1.033	1.033		1.033	1.033	1.033	1.033
EEC	1.033	1.033	1.033	1.033	1.033	1.033		1.033	1.033	1.033
OWE	1.033	1.033	1.033	1.033	1.033	1.033	1.033		1.033	1.033
OAS	1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033		1.033
NAS	1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033	

Bias-free Trade Flow Values (Thousands of US dollars) Commodity: Mining and resources

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS	0	60083	1027439	79210	10118	2891	300379	7746	71442	19973
NWZ	2421	0	9550	31	0	0	781	20	1131	53
JPN	5612	440	0	16701	761	1387	16392	384	69303	10433
USA	39779	15500	1230669	0	900969	136301	1568476	136337	187260	20644
CAN	26396	8282	540031	3262952	0	19509	733518	145785	39197	7522
BRZ	114	317	129625	118777	10366	0	298097	20374	6075	2152
EEC	16897	5527	56316	638575	51871	19309	0	2046200	27622	16175
OWE	479	223	5564	21526	1359	377	1627870	0	580	654
OAS	80669	26159	343618	133795	141	3211	89894	4425	0	262237
NAS	8275	1541	269266	43598	523	1329	21239	1158	235775	0
MEAN	7660	4969	148475	83975	12873	6592	137582	34344	34404	11051

Table AT4. **Computation of Bilateral Trade Margins for Non-food** *(Cont'd)*

Estimated Non-food Trade Margins Commodity: Mining and resources

Ave. Margin 1.220

	AUS	NWZ	JPN	USA	CAN	BRZ	EEC	OWE	OAS	NAS
AUS		1.100	1.155	1.253	1.289	1.304	1.304	1.334	1.117	1.126
NWZ	1.122		1.221	1.323	1.000	1.000	1.368	1.400	1.192	1.215
JPN	1.194	1.246		1.242	1.267	1.334	1.333	1.365	1.093	1.107
USA	1.258	1.272	1.209		1.065	1.213	1.171	1.190	1.243	1.260
CAN	1.281	1.296	1.215	1.056		1.253	1.198	1.211	1.255	1.269
BRZ	1.331	1.307	1.296	1.214	1.258		1.266	1.288	1.310	1.319
EEC	1.328	1.351	1.322	1.178	1.210	1.289		1.152	1.324	1.328
OWE	1.358	1.379	1.342	1.204	1.247	1.321	1.154		1.357	1.356
OAS	1.116	1.168	1.082	1.245	1.301	1.315	1.314	1.339		1.054
NAS	1.133	1.189	1.084	1.254	1.290	1.323	1.326	1.351	1.055	

Regional abbreviations: AUS = Australia, NWZ = New Zealand, JPN = Japan, USA = United States, CAN = Canada, BRZ = Brazil, EEC = European Community, OWE = Other Western Europe, OAS = Old Asian NICs, NAS = New Asian NICs