

**ON THE LACK OF INTERACTION
OF
WORLD TRADE STATISTICS**

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SUMMARY

External trade data of a given commodity reported by the partner countries usually differ. This paper provides a conceptual framework for the study of the problem, and reviews the extent and the potential sources of inconsistency. A critical examination of the relevant standard international definitions and other recommendations is presented, with particular regard to the trade system and the identification of the partner country.

Trade matrix tables belong to the principal tools of international economic analysis. The choice between export and import matrices is discussed in this context. We argue, that the general preference for the export matrix appears to be unfounded. Although an ideal solution cannot be offered, a corrected import matrix is suggested as the best practical choice for the trade analyst.

I. INTRODUCTION

Discrepancies in the external trade data, as reported by the partner countries, were noticed nearly 60 years ago (Zuckermann, 1920). This was followed by a series of studies by the League of Nations (1935-1938), where inconsistencies in particular trade flows were revealed, examined and a catalo-

gue of the suspected reasons was provided. More recently, Morgenstern (1963) examined the accuracy of trade statistics and finished his study with rather skeptical remarks: "Further investigations of this nature must be undertaken to decide, whether foreign trade statistics can be trusted in proving fine theoretical points and formulating policy.

The first large-scale attempt to reconcile discrepancies in counterpart statistics on a bilateral basis was organized by Canada and the United States (Bureau of Census, 1970) the North American example is not typical, because the two countries are adjacent, there are no language problems, currency version is simple, documentation up-to-date and electronic data processing equipment has been available on both sides for a number of years. Nevertheless, the study revealed substantial inconsistencies in the statistical records. Subsequently, a multilateral reconciliation study was carried out by the United Nations

Statistical Office (1974). Not unexpectedly, substantial, and in some critical areas very large discrepancies were reported for trade flows, which should be identical in principle.

The purpose of this paper is to revisit certain aspects of the problem of inconsistency and to draw some conclusions. Particular attention will be devoted to the presentation of trade statistics in matrix form, used par excellence in international econometric analysis.

II. DEFINITION AND MEASURES OF INCONSISTENCY

Let x_{ij} represent the exports of country i to country j as reported by the exporter, for a fixed commodity k and time period t . The symbol m_{ij} on the other hand, will stand for the imports of country j from country i , as observed on the import side. Theoretically speaking, x_{ij} and m_{ij} represent the same flow of goods: the merchandise trade of commodity k , in time t , with provenance i and destination k . Indeed, the econometrician takes it for granted that exports recorded at the point of departure, associated with a specific destination will duly arrive in the target country in the same period t , and will be declared at the point of entry as imports coming from i . (Vide the model description in Ball (1973), p.23).

Counterpart trade statistics are said to be consistent if $x_{ij} = m_{ij}$; other-

wise the reports are inconsistent. Two simple measures of inconsistency can be proposed: the absolute difference

$$d_{ij} = x_{ij} - m_{ij}$$

(1)

and the ratio

$$r_{ij} = x_{ij} / m_{ij}$$

(2)

Perfect consistency obviously corresponds to $d_{ij} = 0$ and $r_{ij} = 1$.

At higher levels of aggregation inconsistency is relatively small, because deviations with opposite directions tend to cancel. Thus the ratio of total world exports to total imports has been fairly stable during the past years; it varied between 0,95 and 0,97 (UNCTAD 1978, Tables 1.1. and 1.2.) the excess of world imports over exports can be explained by valuation conventions (to be discussed later).

In contrast to the apparent consistency of world totals, desegregated trade flows show a variety of discrepancies. The notorious case of ships and boats (Standard International Trade

Classification 735) is worth mentioning: if the last known destination of exports is a "Flag of convenience", which is quite common, imports are not recorded at all. In 1974 the value of vessels exported was \$12312 million, whereas only \$5254 million imports were reported (U.N.1975, Vol.II, p.698). The discrepancy is nearly one percent of the total world exports in that year. A much heavier loss of ships than the one claimed by the supporters of the mysterious "Bermuda triangle". On the other hand, these are commodity flows featuring a remarkable degree of consistency, such as coffee and cocoa.

Measures for the overall average inconsistency at different levels of aggregation are not available. Partial results were published in the United Nations (Standard International Trade Classification) reconciliation study. The

range of r_{ij} ratios, computed for selected trade flows at SITC three digit level extends from zero to five, standard deviations exceeding 0,3 are normal (U.N.1974, p.11 and charts in the Annex). In view of this, we may conclude that the situation has not improved since the publication of Morgenstern's critical statement quoted above.

III. THE SOURCES OF INCONSISTENCY

It is not proposed to discuss in extensor the potential reasons of inconsistency in this paper.

Discussion will be confined to the main issues relating to international economic analysis.

Perfect consistency is an ideal objective, which can never be achieved in practice. first, there is a time-lag between the declaration of an export transaction and the observation of the corresponding import. As a result, a specific period of time has different coverage in terms of exports and imports. However, this source of inconsistency has special importance for pairs of remote countries only. Moreover, reconciliation of inconsistent records can be achieved by means of a suitable lagging of imports behind export data, for any given trade flow.

The role of customs administration, as a potential source of inconsistency, on the other hand, merits closer attention. As a rule, foreign state statistics are generated by the customs authorities, based on the declarations filed by the exporters and importers for the primary purpose of administrative control and tariff revenue collection. There are notable exceptions: in some countries, statistical data are compiled directly from the trading establishments and the role of customs administration is confined to certify the movement of merchandise through the border.

Unfortunately, export and import transactions do not receive equal attention from the part of customs, authors of the United Nations reconciliation study reached the following conclusions:

"In many countries, few taxes or quantitative controls are applied to exports, with the result, that the interest of customs authorities in the control and documentation of exports is limited...

It may therefore happen more frequently than is normally suspected that a significant number of export transactions are neither documented nor recorded... Moreover, export documentation may suffer from inadequate commodity descriptions and other tabulated information in so far as it is not subject to thorough checking procedures administered by customs authorities" (U.N.1974., p.7).

Indeed the North American reconciliation study-revealed 5,6 per cent under-recording of the total export value on the American side and 1,4 per cent on the Canadian side (Bureau of Census 1970, p.11).

With respect to desegregated trade flows it should be noted, that the level of the commodity breakdown has a certain impact on the size of inconsistency. The finer classification is used the larger discrepancies can be expected (vide U.N. 1974 table 5, p.11). Although both sides may use the same standard classification, perfectly matching interpretation of commodity classes has not been achieved and the probability of different understanding grows with the detail. What is correct commodity identification for one country may be a "misclassifications" for the partner.

The sources of inconsistency, identified so far, affect both quantity and value data. Values, in addition, are affected by the valuation conventions mentioned earlier. The discrepancy between export and import data is due to the treatment of the transportation and insurance costs. Whereas all countries report exports on f.o.b. basis, imports are normally valued c.i.f. consequently, the value of exports and imports could not match even under ideal conditions.

Although the reasons discussed above should not be underestimate, they alone cannot generate the large gaps between export and import data described in the previous section. The principal source of inconstancy appears to be the role of entrepot trade (middleman trade) in commercial transactions. The operations of large enterprises in "free zones", customs bonded store-houses and bonded processing establishments may confuse the mutual identification of partner countries. Frequently the exporter is not aware of the final destination of the merchandise and the importer has a multiple choice in identifying the country of provenance, depending on the precise definition. In a broad sense, the "mysterious disappearance of ships", discussed in the last section, can be explained in terms of entrepot trade: The ocean is a gigantic free zone, where ships are sent by the exporter and they operate in that zone forever.

The importance of this source of inconsistency is stressed in the explanatory notes to the commodity matrix tables in the Yearbook of International Trade Statistics (U.N., 1976).

"Occasionally, large discrepancies may appear, as is the case of the example of Netherlands" exports to the Federal Republic of Germany. The Netherlands claim to have exported 583597 metric tons of commodity yyy to the federal Republic, while the latter indicates having imported only 1976 metric tons from the Netherlands. The reason is, that portion of commodity yyy exported by the Netherlands was previously imported from the U.S.A., France or Argentina. Since the Federal Republic of Germany attributes the provenance of its imports not to the country of last consignment, but to the country of production, its imports are stated as coming from the U.S.A., France or Argentina.

In order to clarify the problems involved in the identification of trading partners under the conditions of entrepot trade, two sets of standard statistical terms and definitions should be considered. I shall do this in the next section.

IV. TRADE SYSTEM AND PARTNER COUNTRY

Whether or not two countries mutually recognize each other as counterparts in a commercial transaction depends mainly on the definition of trade system and the partner country. According to the current international statistic recommendations general trade system and country of consignment should be preferred (U.N., 1970), pp.23-24 and p.62). The combination of these two concepts should, in principle, yield consistent records at the two ends of given trade flow. General trade covers all commercial transactions, including re-exports from free areas and bonded stores, etc. Consignment means the last known destination of exports and the first country from which goods were shipped to the reporting country without any commercial transactions intervening, for imports.

The preferred definitions, however, are far from being generally accepted. According to the latest count, only 70 out of 150 reporting countries use general trade system and 27 out of 151 apply consignment concept for imports. The majority uses a much narrower definition for trade system (special trade) and recognizes the country of origin (production) as the source of imports (U.N., 1977, Annex II and VI).

The reason for this rather unusual neglect of the international statistical guidelines concerns the domain of trade policy and it is beyond the scope of the present paper. (Definitions and documents, e.g. "certificate of origin") are normally governed by national customs legislation). As far as we are concerned, the fact remains that consistency of the counterpart trade data cannot be achieved under the existing conditions, as demonstrated by the quotation from the Yearbook of International Trade Statistics, cited in the previous section. Substantial improvement of this situation is not likely to happen in the near future. In the long run, trade statistics could be compiled on the basis of multiple concepts, satisfying thereby any kind of information demand.

In the meantime, however users must deal with imperfect data. They are entitled to request practical guidance from the statistical profession concerning the choice between available figures. A particular important case will be discussed in the last section.

IV. EXPORT MATRIX VERSUS IMPORT MATRIX

Let $X = [x_{ij}]$

represent the square matrix of the export data defined in section I, and similarly

$M = [m_{ij}]$

the matrix of imports. The dimensions of (3) and (4) depend on the territorial breakdown, i and j indicate individual countries, the matrices are large and the main diagonal is vacant. If, on the other hand, countries are grouped in regions or otherwise, the matrices are reduced and main diagonals show the intra-trade within groups and regions.

Trade matrix tables belong to the principal tools of the international economic analyst; theoretical models of the international economic relations are formulated and results verified with reference to trade matrices. Surprisingly, however, the choice between X and M is hardly ever discussed. As far as I am informed the only exception is a rather evasive statement by Leonard (1953):

" Whether for a given purpose an analyst would elect to use export returns (f.o.b. basis) or import returns (c.i.f) would depend upon the particular aspect of the problem in which he was interested and upon the availability of

data. The trade returns of the less developed countries are typically delayed and less precise than those of the more highly developed countries; hence it may be necessary, for a given time period, to rely for import and export statistics of an underdeveloped country upon the export or import statistics of the developed countries with which they trade".

"Filling the gaps[^] in a given trade matrix by using counterpart data is an obvious reaction of the trade statistician to such problems. The real question, however, is this: which matrix should be recommended to the econometrician, provided both X and M are available and they are equally complete (or incomplete)? In other words, which concept is closer to the theoretical trade flow between i and j, defined for the purpose of model building.

Although the alternatives stated above have never been thoroughly discussed, it appears that the export matrix has now priority. Statistical publications of the international organizations offer, as a rule, export matrix tables. They are available e.g. in the special tables printed in the June and December issues of the U.N. Monthly Bulletin of Statistics in the "World Trade by Commodity Classes and Regions" series published regularly in the U.N. Statistical Yearbook and in volume I of the Yearbook of International Trade Statistics. A more detailed export matrix: "Network of world exports by selected commodity classes and regions of origin and destination" is available in the Annex of the 1976 (and earlier) issues of the UNCTAD Handbook of Int. Trade and Dev. Statistics. Import matrix tables are less frequently published; a combination of the export and import matrices is printed in Volume II of the Yearbook of International Trade Statistics under the title "Commodity Matrix Tables".

Users seem to have accepted the supply without further examination: the export matrix is the preferred tool of the economist. It has been used for parameter estimation and verification purposes by most producers of international economic models (Vide Ball, op.cit., Linnemann (1966), Nagy (1977)).

I propose to argue that the preference for the export matrix is subject to discussion and data producers should offer at least an equally balanced choice between X and M. The rationale of this proposition can be put in the form of arguments for and against both alternatives.

(a) Arguments in favor of X (against M)

- (i) Valuation conventions: export data are free of transportati

on and insurance charges (f.o.b), thus comparable across trade flows.

(ii) Disappearance of ships in the import matrix. (They are present, although falsely allocated in the export matrix.)

(b) Arguments in favor of M (against X)

(i) Under-recording of exports by the customs authorities.

(ii) Better commodity identification of imports due to closer inspection.

(iii) Uncertain destination of exports under the conditions created by entrepot trade. The origin of imports is far more reliable information than the destination of exports, because it is easier to establish what happened in the past than to forecast what would happen in the future.

(iv) Moreover, the "country of production" concept, used by the majority of countries, to compile import statistics, is closer to the meaning of a trade flow, as defined by econometrician, than the vague concept of "last known destination" applied for exports.

In view of the above, I believe the import matrix is as good as the export one, if not better. The best solution, however, would be a corrected import matrix with the following changes: first, imports valued f.o.b throughout the table, second the "missing ships" taken from the export matrix, but allocated to a dummy importer (unknown destination). These changes are technically, with the understanding of course, that f.o.b.c.i.f conversion coefficients are estimated, wherever imports f.o.b is not directly available.

Perfect trade matrix tables, are, alas, non-existent. Nevertheless, I submit, that the corrected import matrix, suggested above, would better correspond to user's demand, than any other alternative published at present.

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