TRADE COMPETITIVENESS MAP

Benchmarking national and sectoral trade performance

CONSISTENCY OF TRADE STATISTICS

Trade and Market Intelligence Section

Division of Market Development

International Trade Centre

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NOTES AND DISCLAIMER

This resource offers comprehensive explanations of trade consistency indicators developed by the ITC's Trade and Market Intelligence Section (TMI). This document was prepared by Mr. Kerfalla CONTE, which stemmed from collective efforts among various TMI's team members under the overarching guidance of Mr. Mondher MIMOUNI, the section's Chief.

This publication has not been formally edited by the International Trade Centre. The designations employed and the presentation of material in this paper do not imply the expression of any opinion whatsoever on the part of the International Trade Centre concerning the legal status of any country, territory, city, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Please note that the trade statistics in Trade Competitiveness Map undergo annual updates. These updates may generate varying figures or trends from what is seen in this user guide; however, the principles and applications of Trade Consistency measurements remain the same. Comments and suggestions for amelioration are welcome. Please contact the Trade and Market Intelligence Section at email: marketanalysis@intracen.org

CHAPTER 1 – INTRODUCTION

1.1 Overview

Some sceptics consider trade statistics so unreliable that they simply disregard them as a source of information. This view is not borne out by the experience of ITC. Though trade statistics cannot provide precise information on traded values and quantities, they do indicate orders of magnitude. There are, of course, a few countries and a number of special products for which trade statistics are of little use. Moreover, it is essential to maintain efforts towards further improving the quality of trade statistics. Compared with most other economic data, however, merchandise trade statistics tend to be fairly reliable, as they are by-products of customs control. In contrast to statistics on value added production or savings, they relate to the movement of physical goods that have to pass through a limited number of ports, airports and other border stations, which are monitored by customs authorities.

Notwithstanding the attractiveness of this comprehensive source of information, users of database and applications based on trade statistics should take into account some of the weak points of foreign trade statistics.

Trade data are never complete. Smuggling and non-reporting represent a serious problem in a number of countries. In addition, trade statistics - as any source of information - are not free of mistakes and omissions.

Most countries include imports for re-exports and re-exports in their trade statistics. A low-income country may be an exporter of airplanes simply because its national airline has sold second-hand planes.

According to international conventions for reporting trade statistics, the export value refers to the total or contract value, which may, of course, be very different from local value added. For instance, for many processing activities the local value added remains below 20 per cent of the export value.

Detailed trade statistics are available only for merchandise trade and not for services, although the latter may account for a sizeable share of national exports.

Even at the lowest level of disaggregation, product groups in the trade nomenclatures do not necessarily reflect trade names and often contain a wide spread of different products. Moreover, the product nomenclature is sometimes misleading. The labels of aggregated product groups are often very general and provide at times only limited guidance on the leading items within the group of products concerned.

Exchange rates fluctuations are not always properly recorded in international trade statistics. Values are normally aggregated over the period of one year in local currency and converted into US dollars.

For countries that do not report trade data to the United Nations, ITC uses partner country data, an approach referred to as mirror statistics. Mirror statistics are a second-best solution (better than having no data at all). At the same time, they have a number of shortcomings when compared to the first-best solution of nationally reported data. First and foremost, they do not cover trade with other non-reporting countries. As a result, mirror statistics hardly cover South-South trade. For an assessment of intra-African trade, for instance, mirror statistics are not a suitable source of information. Second, there is the problem of transhipments, which may hide the actual source of supply. Third, mirror statistics invert the reporting standards by valuing exports in CIF terms (i.e. including transport cost and insurance) and imports in FOB terms (excluding these items).

In view of the above shortcomings, trade statistics should never be the sole source of insight but need to be complemented by other sources and in particular cross-checked by product specialists and industry insiders. Overall, ITC's experience suggests that trade statistics represent a very useful source of information and a valid point of departure for strategic market research, if analysed with a healthy mix of scepticism and pragmatism vis-à-vis their strength and shortcomings.

In order to tackle this issue of "unreliability" or inconsistency of trade statistics, ITC have developed two useful sources of information, which complement each other.

1. Technical notes on trade data
2. Indicators on consistency

These sources are both available from ITC's Trade Competitiveness Map sub-site at http://www.intracen.org/menus/countries.htm. While indicators on consistency shows to which extend a country's trade data is consistent with its partner customs declarations (hence providing an assessment of discrepancies), technical notes on trade data tries to explain *why* trade data reported by one country may be not reliable or inconsistent with other sources (including mirror estimates). Both sources of information try to highlight the products and partner countries with potential problems, regarding the analysis or the estimation of trade flows.

1.2 Why use Trade Competitiveness Map

The International Trade Centre UNCTAD/WTO (ITC) has developed from the previous Country Market Analysis Profiles (Country Map) the new Trade Competitiveness Map with the explicit objective of facilitating strategic market research, monitoring national trade performance and, designing and prioritizing the trade development programs of both the business sector and trade support institutions.

Trade Competitiveness Map addresses strategic market research from a country perspective and is available on ITC's Internet Web site http://www.intracen.org. This Map includes a country's Trade Performance Index, National Export Performance and National Import Profile, Trade Statistics, and the Reliability of Trade Statistics.

Although the business community remains an indispensable source for such information, it does not always have readily available or unbiased answers. Some private consultancy firms gather large amounts of market research information, which is available for a substantial fee. There is much information available in the public domain as well, if you know where to find it. However, the information and tools offered by ITC's Trade Competitiveness Map is unique in terms of its coverage, methodological approach, and accessibility.

1.3   Product Nomenclature and Data Sources

1.3.1. Product Nomenclature

The "Consistency of Trade Statistics" module is based on the Harmonized System (HS) 1996 edition (data is arranged in four-digit level).

The Harmonized System, instead, is an international nomenclature for the classification of products published by the World Customs Organization (http://www.wcoomd.org). It allows participating countries to classify traded goods on a common basis for customs purposes. At the international level, the Harmonized System (HS) for classifying goods is a six-digit code system. The HS comprises approximately 5,300 article/product descriptions that appear as headings and subheadings, arranged in 99 chapters, grouped in 21 sections. The six digits can be broken down into three parts. The first two digits (HS-2) identify the chapter the goods are classified in, e.g. 09 = Coffee, Tea, Maté and Spices. The next two digits (HS-4) identify groupings within that chapter, e.g. 09.02 = Tea, whether or not flavoured. The next two digits (HS-6) are even more specific, e.g. 09.02.10 Green tea (not fermented)... Up to the HS-6 digit level, all countries classify products in the same way (a few exceptions exist where some countries apply old versions of the HS).

Beyond the six-digit level, the classification becomes national. Countries are free to introduce national distinctions for tariffs by adding more digits to make the HS classification of products even more specific. This greater level of specificity is referred to as the national tariff line level. For example Canada adds another two digits to its exports and imports to classify them in greater depth and the code 09023010 is the code for black tea, packaged as tea bags**.**

1.3.2. Sources of information

Different sources of information are contained in Trade Competitiveness Map. First, Trade Competitiveness Map is based on the world's largest database of trade

statistics, COMTRADE, maintained by the United Nations Statistics Division (UNSD) - http://unstats.un.org/unsd/comtrade. COMTRADE covers more than 90% of world trade or around 160 countries. Competitiveness Trade Map is able to present data for an even larger number of countries and territories (around 180) by using both reported and mirror statistics.

Reported data and mirrors statistics

Annual data is available not only for countries that report their own trade data, but also for the primarily low-income countries that do not report national trade statistics to COMTRADE.

When a country's export data is not available, this study uses mirror statistics, i.e. amounts reported by the importing rather than exporting country. This approach has the advantage of covering the numerous non-reporting countries. At the same time, mirror statistics have some shortcomings which need to be taken into account. Firstly, contrary to international convention, these export data are expressed in C.I.F. terms, i.e. cost, insurance and freight are included. As a general rule, C.I.F. values tend to be about 10% higher than the free-on-board (F.O.B) values normally used for exports. Secondly, mirror statistics only capture those exports of non-reporting countries that are imports of the reporting countries. As a result, a major share of trade among developing countries is excluded.

1.4   Access to the tool

Thanks to financial contributions from World Bank and ITC's Global Trust Fund, ITC has been able to provide free access to its market analysis tools to users in developing countries.

ITC is delighted to be able to respond to the growing demand for online access to its trade intelligence tools.

Users in developing countries and economies in transition, can register to ITC market analysis online tools through a common registration portal at https://mas-admintools.intracen.org/accounts/Registration.aspx

For users in developed countries, the tools are available on a subscription basis. You may want to first register online for a one-week free trial to familiarise yourself with the tools. Please visit our web page for more information on subscription option and fees at https://mas-admintools.intracen.org/Accounts/OptionsFees.aspx

CHAPTER 2 – HOW TO USE

2.1 How to enter the database

Figure 1. Trade Competitiveness Map homepage

Typing the URL address https://tradecompetitivenessmap.intracen.org into your Internet Address bar you will access to the Competitiveness Trade Map homepage. Hereinafter the screen shots will always be of the generic English version of the tool.

CHAPTER 3 – CONSISTENCY OF TRADE STATISTICS

3.1 Purpose

As opposed to most economic data, such as production or consumption, there are usually two records for merchandise trade data, since transactions are both recorded by the customs offices in the exporting and the importing countries.

Hence, it is instructive to analyse the discrepancies between a country's export statistics and the corresponding import statistics of its partner country (mirror estimate). An approximate match of trade statistics and their mirror statistics is a good sign of data reliability. Import figures should be slightly higher than export figures, as they include freight and insurance costs, although these costs obviously vary between products. An average difference of about 10% between import and export figures is the norm.

There are many reasons to have discrepancies, described in *box 1*. However, in the context of high discrepancies, the trade analyst should question himself which data source is the best, if any. Consequently, the next step would be to look at information on the collection of trade data in the country under analysis. Looking at ITC's technical notes on trade data or at the United Nations Statistics Division website (http://www.un.org/depts/unsd) could help him at this respect. The UNSD website contains very useful information on good practice in official statistics, methods and classification. It also contains information on national reporting practices in international merchandise trade statistics for around 140 countries.

Box 1: <u>Sources of discrepancies</u>

There are, of course, many reasons for discrepancies. For a complete description, see "*Inconsistency between the reported imported and reported exports of trading partners: An overview of the reasons for discrepancy*". Revised note by WTO, Task Force on International Trade statistics, Washington, March 1999. The different reasons can be regrouped as follows:

1. **Coverage and time of recording** , of which:

   a. Goods to be included or not (returned goods, vessels, emergency aid, military goods)

   b. Classification as goods or services (e.g. software)

   c. Statistical threshold values (e.g. intra-EU trade)

   d. Confidentiality (usually at the 6 digit level of the HS)

   e. Simplification

   f. Time lag in compilation (the time lag between the shipment and the arrival in the country of destination)

   g. Reference period (July-June or January-December)

   h. Illegal and unrecorded trade (ex: cut flowers in Uganda)

2. **Trade system** (General/Special Trade Systems)

3. **Commodity classification** (same goods under different headings)

4. **Valuation**, of which

   a. CIF / FOB

   b. Currency conversions

5. **Quantity measurement (gross-net, units)**

6. **Partner country (transit trade or re-exports)**

7. **Errors and estimations**

The statistical territory in the General Trade System is broader than in the Special Trade System, since it includes both warehouses, commercial and industrial free zones, whereas in the strict version of the Special Trade System, the statistical territory is limited to the free circulation area of the country. Around 2/3 of the

countries use the General Trade System.

In this context, it is often difficult to assess the origin and the final destination for goods that transit through one or even more countries. For example, many goods transit through Hong-Kong, Panama, Dubai (Emirates) or the Netherlands. Consequently, the Netherlands appear in the statistical databases as an exporter of bananas to other EU countries, while it is clear that there is no local production.

Another famous case is Hong Kong, which functions as a major "international marketing centre" for China, re-exporting Chinese production with an average margin of around 30%. Chinese producers are often not aware of the final destination of the products.

3.2 "Consistency of Trade Statistics" Main Menu

Figure 2 shows the interface of "Consistency of Trade Statistics" module. It is composed of three drop-down menus that permit to select object (exports, imports or both), Country/Industry and year you want to analyse, and the "options" links (settings, Country metadata, technical notes, export data function). Figure 3, instead, shows the "Consistency of Trade Statistics" home page.

Figure 2. Consistency of Trade Statistics interface

Before starting, the user has to choose what type of analysis he wants to realize. As for all modules of Trade Competitiveness Map, also with this is it possible to analyse and compare at the same time one specific industry for all countries (Industry mode) or all industries of one single Country (Country mode). In order to choose the mode, the user just clicks on the relative button as shown in the figure below

After choosing a mode of analysis, it is possible to consider the single domestic industry (single country) going from 2-digit level analysis to the 4-digit one simply clicking on the ⊞ button at the beginning of every rows of the results table.

In the "Country mode", clicking on the first ⊞ button near one industry it will open 4-digit results by that industry, while clicking on the second ⊞ button it will open results by partner countries for the industry selected.

	Industry	
⊞	00 All industries	⊞
⊞	84 Boilers, machinery; nuclear reactors, etc	⊞
⊞	87 Vehicles other than railway, tramway	⊞

4-digit results for the respective industry　　　　　**results by partner countries for the respective industry**
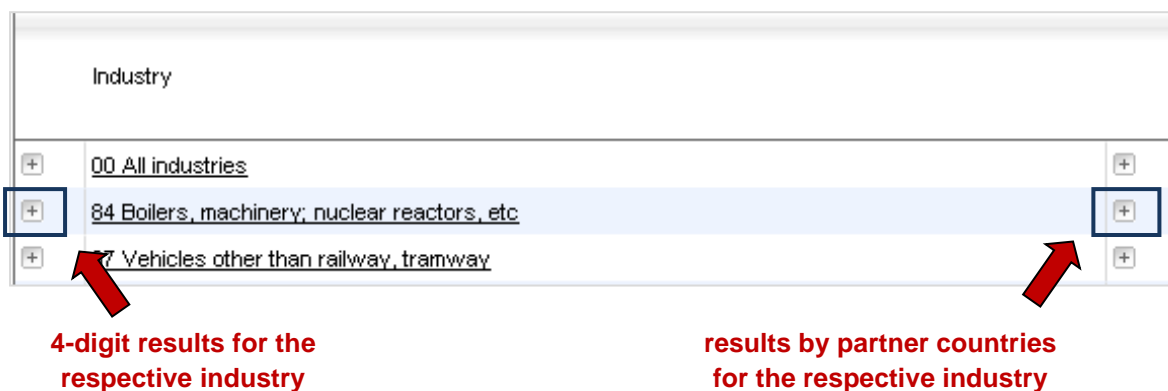
In the "Industry mode", clicking on the first ⊞ button near one country it will open 4-digit results by that industry for the country in exam, while clicking on the second ⊞ button it will open results by partner countries for the industry selected.

	Rank	Country	
⊞	0	France	⊞
⊞	1	Canada	⊞
⊞	2	Germany	⊞
⊞	3	Australia	⊞

4-digit results for selected country　　　　　**results by partner countries for selected country**
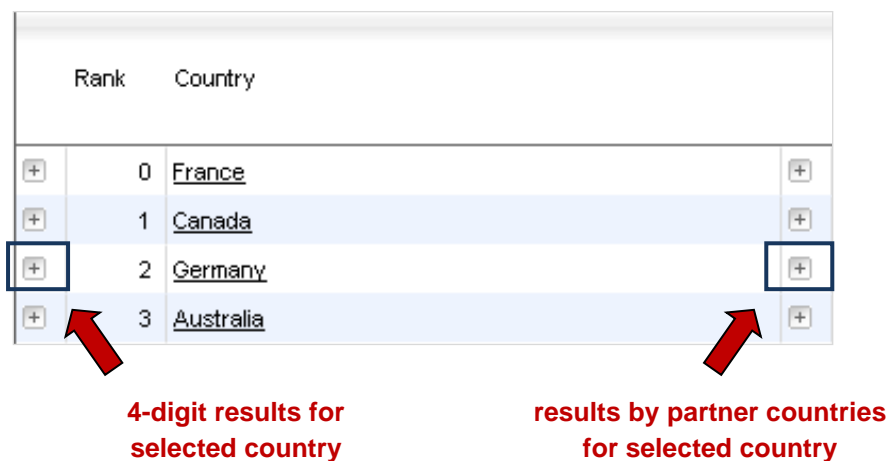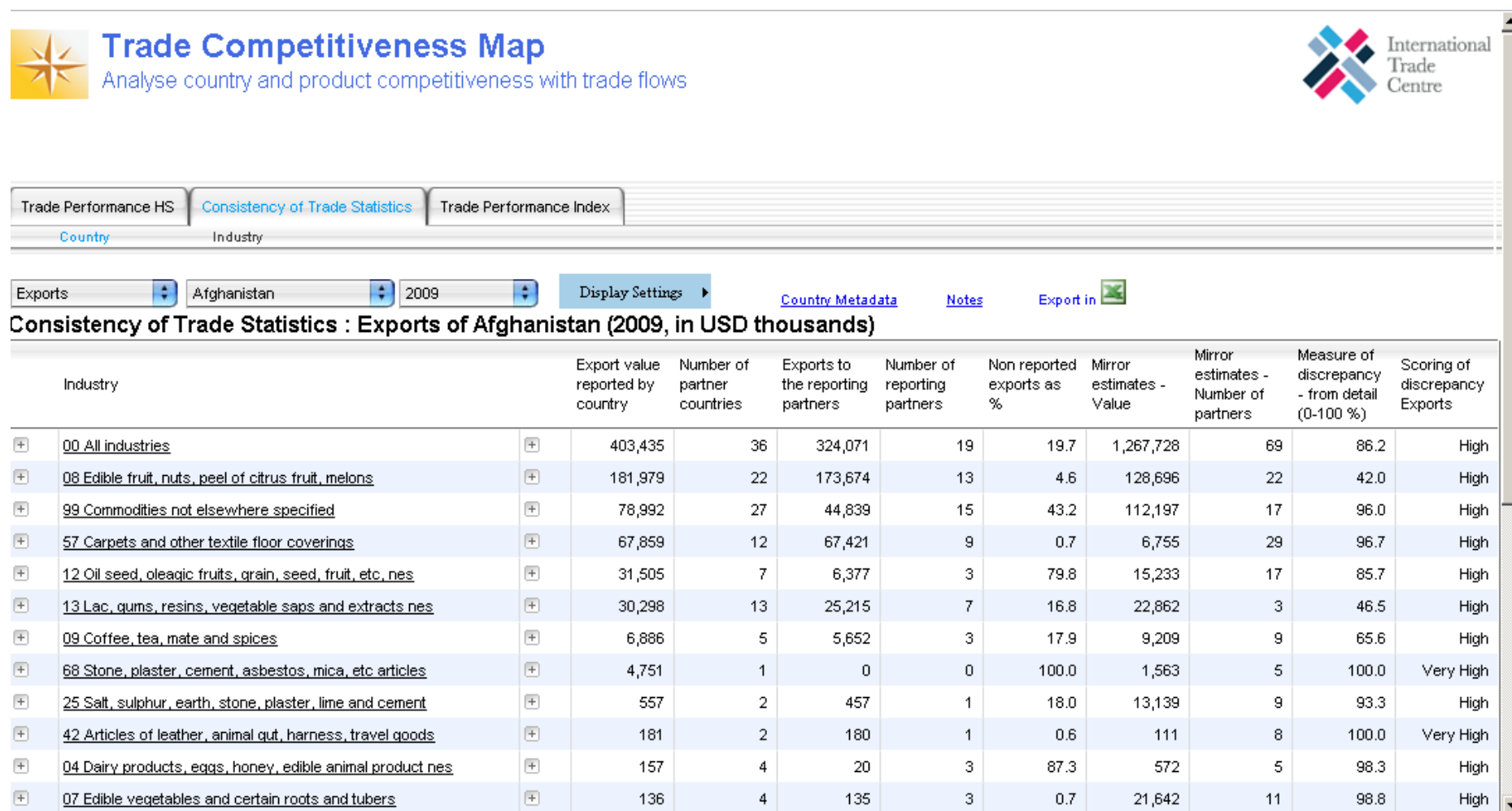
Figure 3. Consistency of Trade Statistics homepage

CHAPTER 4 – CONSISTENCY INDICATORS

How reliable are your country's trade statistics?

What are the special characteristics in the way a country reports its trade statistics that you should know?

4.1   Methodology

Trade statistics are a unique source of detailed, product-specific information on global markets, primarily because they are generated as a by-product of customs procedures. Yet, the reliability of trade data is far from perfect and users of trade data need to be aware of the shortcomings of the country- and product-specific data they analyze.

In support of users of trade data, ITC has established a facility that compares the two observations typically available for each trade flow, namely the data of both the exporting and importing country. This section covers all countries reporting trade data to the UNSD COMTRADE database. For each of these countries, it provides four pages covering exports by leading products and exports by leading partner countries, as well as imports by leading products and imports by leading partner countries. Products are defined at the HS 2/HS 4-digit level.

It is worth mentioning the exclusion of a few reporting countries because these territories are characterised by a large share of re-exports and their inclusion in the sample would have generated additional noise of a systematic nature.

4.2   Description of the indicators

As mentioned in the previous paragraph consistency indicators are calculated at the 2/4-digit level of the HS for almost all countries reporting data to the UNSD COMTRADE database.

For each country four tables have been built that analyse both imports and exports by partner country and by major product.

The different indicators are briefly defined as follows:

- **EXPORT VALUE REPORTED BY COUNTRY**

  Exports to the sample countries, as reported by the Country under review.

- **NUMBER OF PARTNER COUNTRIES**

  Number of active importing countries (values > 0), according to Country's statistics.

- **EXPORTS TO THE REPORTING PARTNERS**

  Exports to countries that report their imports.

- **NUMBER OF REPORTING PARTNERS**

  Number of active partner countries that report their imports.

- **NON REPORTED EXPORTS AS %**

  Exports (as percentage) to the sample countries that do not report data (values reconstructed by mirror estimates).

- **MIRROR ESTIMATES – VALUE**

  Sum of the imports of the sample countries from the Country in exam (mirror estimate)

- **MIRROR ESTIMATES - NUMBER OF PARTNERS**

  Estimated number of active importing countries (values > 0)

- **MEASURE OF DISCREPANCY - FROM DETAIL**

  Discrepancy defined as average of the relative deviation[1].

- **SCORING OF DISCREPANCY**

  Measures the magnitude of discrepancy (Very Low, Low, Average, High, Very High)

Examples

Table 1 provides an example of consistency indicators for Pakistani exports.

It is easy to see that the situation in Pakistan is not negative. Considering all exporting industries, the score of discrepancy is medium but there are some industries that are performing very well and some others very critical.

For example data consistency for textile related industries ("cotton", "Other made textile articles, sets, worn clothing etc") is very good while for others, like the "Mineral fuels, oils, distillation products" one, the performance is very negative.

Table 2 instead provides an example of consistency indicators for the "Products of animal origin, nes" industry.

It is easy to see that the situation is quite different from country to country. Some countries are performing very well and some others very bad but there seems not to be a geographical discriminating.

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[1] For details on calculation of the measures of discrepancy, see the following sections.

Table 1. Example - Pakistan

Industry	Export value reported by country	Number of partner countries	Exports to the reporting partners	Number of reporting partners	Non reported exports as %	Mirror estimates - Value	Mirror estimates - Number of partners	Measure of discrepancy - from detail	Scoring of discrepancy
	A		B			C		(0-100 %)	
00 - All industries	17,554,246	190	12,013,996	90	31.6	12,846,910	96	21.7	Average
52 - Cotton	3,203,790	145	2,258,495	83	29.5	2,430,989	84	13.2	Low
63 - Other made textile articles, sets, worn clothing etc	2,917,506	149	2,384,377	80	18.3	2,539,670	90	8.1	Very Low
10 - Cereals	1,823,218	122	678,232	65	62.8	572,797	66	22.5	Average
61 - Articles of apparel, accessories, knit or crochet	1,680,740	142	1,495,268	82	11	1,559,166	89	6.8	Very Low
62 - Articles of apparel, accessories, not knit or crochet	1,206,460	142	1,011,625	79	16.2	1,300,748	91	15.3	Low
27 - Mineral fuels, oils, distillation products, etc	714,571	18	457,255	9	36	103,593	17	81.3	High

Table 2. Example - "Products of animal origin, nes" industry

Country	Export value reported by country	Number of partner countries	Exports to the reporting partners	Number of reporting partners	Non reported exports as %	Mirror estimates - Value	Mirror estimates - Number of partners	Measure of discrepancy - from detail	Scoring of discrepancy Exports

								(0-100 %)	
China	1,217,600	101	786,820	67	35.4	872,946	69	20.6	Average
Germany	700,309	114	500,062	72	28.6	437,070	67	15.2	Low
Brazil	391,108	91	339,604	49	13.2	224,852	45	48.3	High
France	221,525	95	176,484	62	20.3	140,468	61	18.7	Low
New Zealand	217,771	77	183,195	49	15.9	117,065	51	41.5	High
Canada	173,175	101	152,357	65	12	142,092	65	9.4	Very Low
Taipei Chinese	125,100	42	44,337	27	64.6	53,216	31	19.6	Low
United Kingdom	104,838	79	73,320	52	30.1	71,395	54	26.8	Average

4.3 Meaning and calculation of discrepancy measures

In order to determine the reliability of trade statistics, three different measures of discrepancy are calculated: simple, relative and from detail. However, to simplify the use of the application, it will only show the "discrepancy from detail" because it provides more information than the others two indicators and allows the user to identify the critical areas on which the analysis should be directed.

The meaning and calculation of the different various measures of discrepancy are briefly defined as follows:

- **Simple measure of discrepancy**

Defined as the difference between *mirror estimates* and *exports to the reporting partners.* It takes value between -∞ and +∞. A positive (negative) value means that estimated exports are higher (lower) than recorded imports from partners countries.

The more the value of this indicator is far from zero, the less reliable will be the statistic and the user should investigate the possible causes of that.

- **Relative measure of discrepancy**

Defined as the ratio between *simple discrepancy* and the sum of *mirror estimates* and *exports to the reporting partners*:

$$\mathbf{d} = \frac{(C - B)}{(B + C)}$$

The value of this indicator varies between -100% (C=0, B≠0) and 100% (B=0, C≠0). If B (mirror estimates) is twice bigger than C (reported data) then the discrepancy = -33.3% (for example, (C- 2C)/(C+2C)). Since import statistics include freight and insurance costs, we usually can expect a positive value (closed to 5%).

This indicator is calculated for all products at the 6-digit level of Harmonized System and single results are merged with a simple average.

The final value provides an overall picture on the reliability of trade statistics but it is less indicative than the discrepancy from detail's one: the simple discrepancy is divided for country's total trade and this, in some case, may compensate strongly different values (partner countries' performance) with the consequence that the final result is underestimated.

- **Measure of discrepancy from detail**

Defined as the average of the relative deviations, the indicator is calculated as follows:

$$d' = \frac{\sum_{i=1}^{n} \frac{|C_i - B_i|}{(B_i + C_i)}}{n}$$

B_i are country under review exports to country C, C_i are country's *i* imports from country under review and n is the number of partners countries.

The value of this indicator varies between 0% and 100%. The lower the value of **d'**, the lower the size of the discrepancies and then, the higher the degree of consistency. For example, a value of 10% indicates a stronger level of consistency of trade statistics than a value of 20%.

This indicator is calculated for each trade partner and for all sectors at the 4-digit/2-digit level of Harmonized System. Then single results are merged with a simple average.

The final value provides a more precise picture on trade statistics' reliability than the relative discrepancy's one: the simple discrepancy is calculated for bilateral relations and divided for bilateral trade and this, eliminating the problem of underestimation, gives an accurate final result.

Basically high values of this index indicate problems with specific countries and, once identified these countries, the user could direct the analysis to find possible causes of these situations.

4.4 The Scoring Process

In order to make more immediate the understanding of discrepancy level, a qualitative index is calculated: "Scoring of Discrepancy". The scoring process behind this indicator is defined as follows:

if Indicator < **0.1** then Scoring =**5**; Very Low;

else if Indicator < **0.2** then Scoring =**4**; Low;

else if Indicator < **0.3** then Scoring =**3**; Average or Medium;

else if Indicator < **0.4** then Scoring =**2**; High;

else if **0.4** < Indicator ≤ **1** then Scoring =**1**; Very High;

Possible reasons for trade statistics discrepancy

There can be multiple sources of discrepancy of trade statistics and the main ones are the following: related to differences in the recording system, to registration errors, and to the exchange rate effect.

- Differences in the recording system: these are due to various factors such as inclusion or exclusion of particular commodities, timing (time of recording), including valuation (Imports CIF, Exports FOB)[2].

- Registrations errors: these are problems related to treatment of low-value transactions, unregistered cross-border trade (for example Africa informal trade), missing or incomplete information (commodity classification), quantity measurement and partner country, moreover the intentionally incorrect reporting to avoid tariffs and quotas. Some countries do not registered below a threshold (JPN, CAN, AUS, etc)

- The "Exchange Rate" effect: this effect consists in a distortion in the estimation of exports due to an unexpected change in the currency exchange rate that causes significant changes in the trade flows.

- Geographic Coverage: problems could occur if a country include (or not) some geographical area in the count of trade statistic. For example United States includes trade with Puerto Rico and the U.S. Virgin Islands in its merchandise

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[2] See Box 2.

trade statistics. In contrast, Mexico treats them as separate trading partners. Similar problems occur with China and its administrative provinces (Hong Kong, Taipei, Macau etc).

- Non-filing of exports: single national export regulations may require the reporting of all export transactions valued over a certain value. Some companies, however, do not submit all the required declarations, especially companies exporting out of foreign trade zones.

- Low value transactions: some countries do not include transactions valued below a certain value in their export trade statistics while others record Instead all trade transactions, regardless of value.

Box 2. <u>What CIF and FOB mean?</u>

FOB (free on board) means the seller's obligation to deliver is fulfilled when the goods have passed over the ship's rail at the named port of shipment. Then the buyer has to bear all costs and risks of loss or of damage to goods from that named point.

CIF (Cost including insurance and freight) means the seller must pay the costs and freight necessary to bring the goods to named port of destination but the risk of loss of or or damage to the goods, as well as any additional costs due to events occurring after the time the goods have been delivered on board vessel, is transferred from the seller to the buyer when the goods pass the ship's rail in the port of shipment. In addition, the seller has to procure marine insurance against the buyer's risk of lost of damage to goods during the carriage. The seller contracts for insurance and pays the insurance premium.