Regional Workshop on External Trade Indices

GCCStat
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«Introduction to External Trade Indices»

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Overview

➢ Introduction

➢ International Guidelines on External Trade Indices

➢ Some important uses of external trade indices

➢ Strengths and Weaknesses

➢ Type of Index and Formula

➢ Main steps for preparation and calculation of trade indices
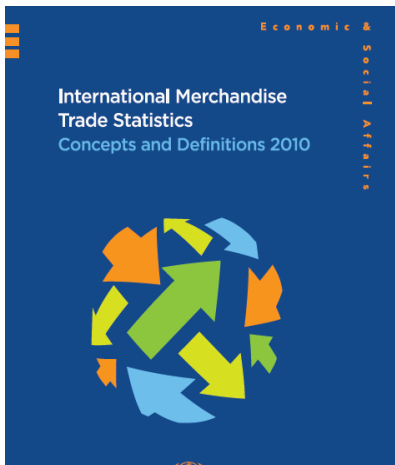
➢ Revision policy

➢ Conclusion

Introduction

External trade indexes are calculated for use as a measurement of price/unit value and quantity changes in External Trade Statistics.

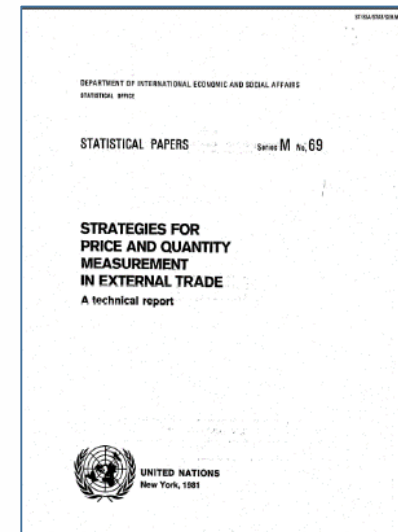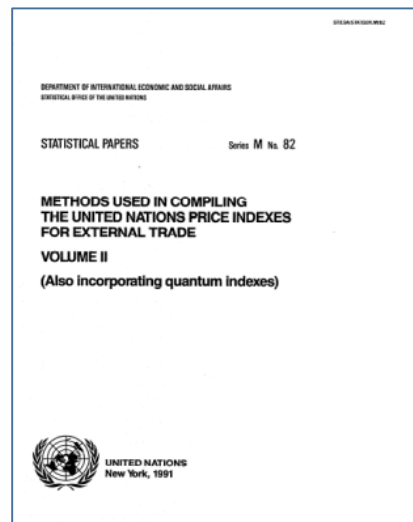Export unit value and volume indices, December 2021 [2015=100]

UNSD

➢International Merchandise Trade Statistics (IMTS): Concepts and Definitions (Rev 3, 2010)

➢Methods used in Compiling the United Nations-Price Indices for External Trade (1991)

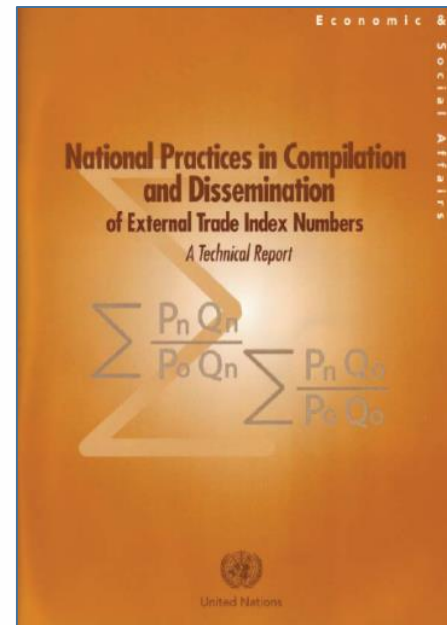➢Strategies for the Measurement of External Trade Indices (1981)

International Merchandise Trade Statistics
Concepts and Definitions 2010

Economic & Social Affairs

IMTS 2010 Compilation Guide

DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS
STATISTICAL OFFICE OF THE UNITED NATIONS

STATISTICAL PAPERS   Series M No. 82

METHODS USED IN COMPILING
THE UNITED NATIONS PRICE INDEXES
FOR EXTERNAL TRADE
VOLUME II
(Also incorporating quantum indexes)

UNITED NATIONS
New York, 1991

DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS
STATISTICAL OFFICE

STATISTICAL PAPERS   Series M No. 69

STRATEGIES FOR
PRICE AND QUANTITY
MEASUREMENT
IN EXTERNAL TRADE
A technical report

UNITED NATIONS
New York, 1981
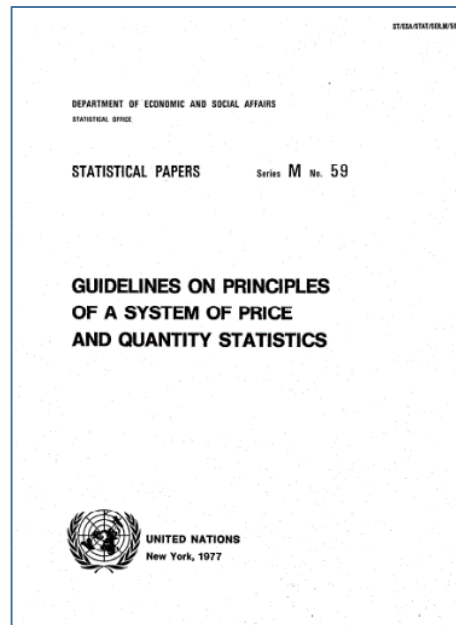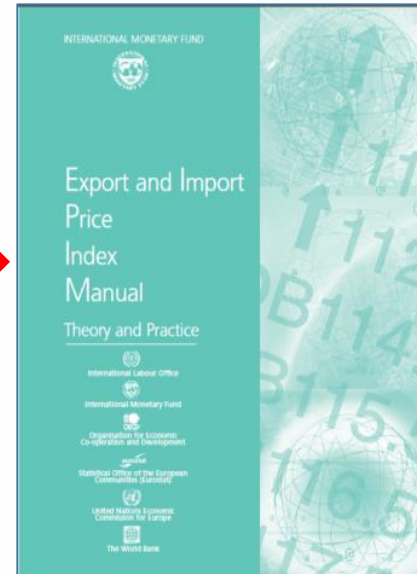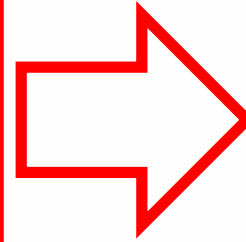
UNSD

➢Guidelines on Principles of a System of Price and Quantity Statistics (1977)

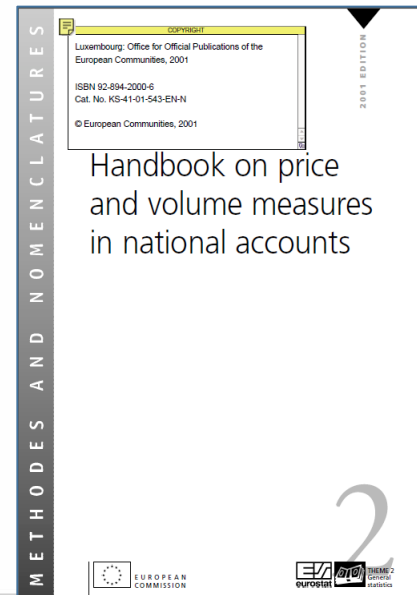➢National Practices in compilation of External Trade indices (2005)

IMF

➤Export and Import Price Index (XMPI) Manual (IMF and others, 2008)

Eurostat

➤Handbook on price and volume measures on national accounts (2001)

International Recommendations

***Need for external trade indices*.** Many users need more information than trade values by country or by commodity, and require information on prices and volumes as well. The information on the development of prices and volumes is generally presented in the form of indices. **It is recommended** that all countries produce and publish volume (quantum) indices and either price or unit value indices for their total imports and exports on a monthly, quarterly and annual basis.

Countries are also encouraged to calculate and publish such indices for commodity groups of particular importance to countries at least **quarterly** and annually.

International Recommend

Price and unit value indices:

➢ **Two kinds of indices** may be produced to reflect prices for imports and exports: **unit value indices** based primarily on customs documents and **export/ import price indices** based on survey data. **Both approaches have strengths and weaknesses.** Although price indices are generally preferred on methodological grounds, in practice countries may not have the resources available to compile that information.

➢ Many countries compile only unit value indices, while others compile and use both, price and unit value indices in a complementary manner.

Some important uses

➢ External trade indices are in general used to eliminate the effects of price changes and obtain trade volume estimates.

➢ National accounts require a decomposition of measures of value into price and quantity for the calculation of its real flows.

➢ Government departments and international agencies use price indices to define, evaluate and resolve trade policy issues.

➢ Moreover, business analysts and economists use international trade indices for analysis and research in respect of such questions as the causes of the real-economy effects that price changes have on trade.

➢XMPIs are compiled by three general methods, largely dependent on the source data used.

    ➢Unit value indices

    ➢Price indices

    ➢Hybrid index

➢United Nations (2007) survey on country practice found that for 88.4% of countries, customs declarations remain the main source of data.

Strategies for the Measurement of External Trade Indices

1. Limited Budget

a) Unit Value Indexes – detailed Customs data – selection of "stable" items -data screening

2. Average Budget

a) Unit Value Indexes – sophisticated data editing

b) Commodity specialists – possible use of a variety of sources to fill the gaps

3. Large Budget

a) sophisticated Unit Values and Price surveys (both or hybrid)

b) Commodity specialists

Which basic data sources do you use in the calculation of the external trade indices?

Answered: 74   Skipped: 23

Category	Value	Percentage
Price surveys	14	18.9%
Unit-value (UV) data	43	58.1%
Combination of prices and...	17	23%
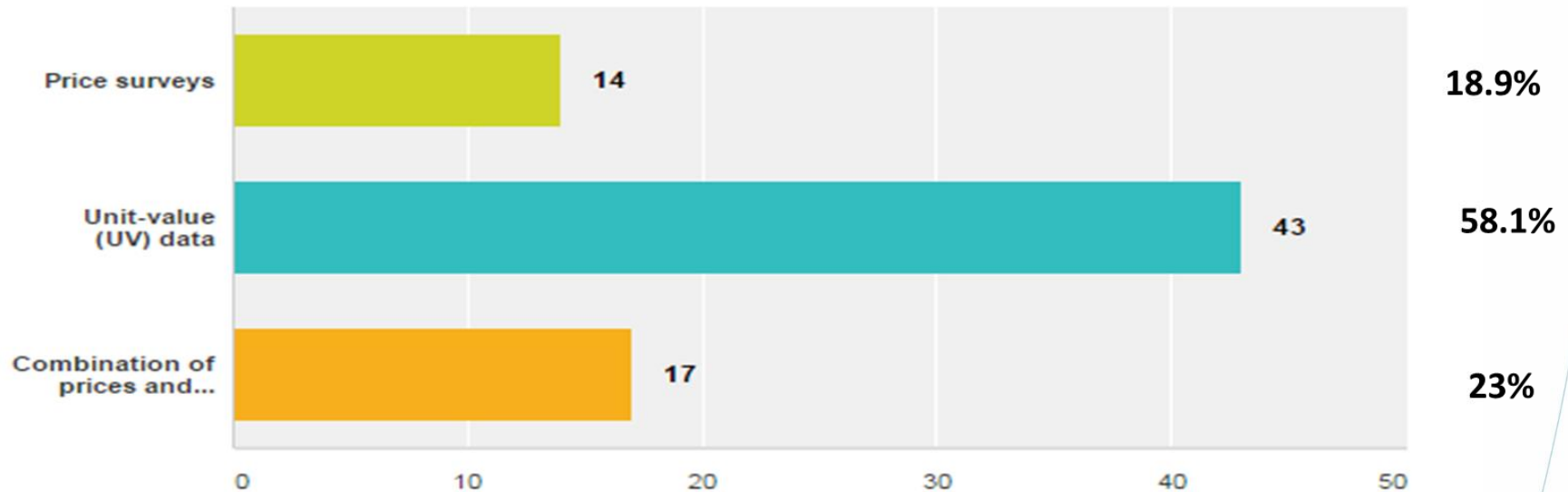
Among the 74 respondents (countries), 43 reported that are currently using Customs sources for Unit value index.

External Trade Indices in GCC(*)

➤ Only two GCC countries regularly calculate Trade indices, one quarterly, other annual.

➤ In 3 GCC under development for 3 years but no results.

➤ One GCC plans to calculate.

(*) Based on mission results conducted in 2019 October

Dissemination details

What is the detail of output used for the
dissemination of external trade indices?
Please check all applicable answers.

Answered: 74   Skipped: 23

Category	Value
Total trade	52
HS at the 2-digit leve...	22
HS at the 4-digit leve...	13
HS at the 6-digit leve...	7
SITC at the 1-digit leve...	25
SITC at the 2-digit leve...	14
SITC at the 3-digit leve...	7
Manufactured Goods Exports	14
Fuel Imports	16
Other	42
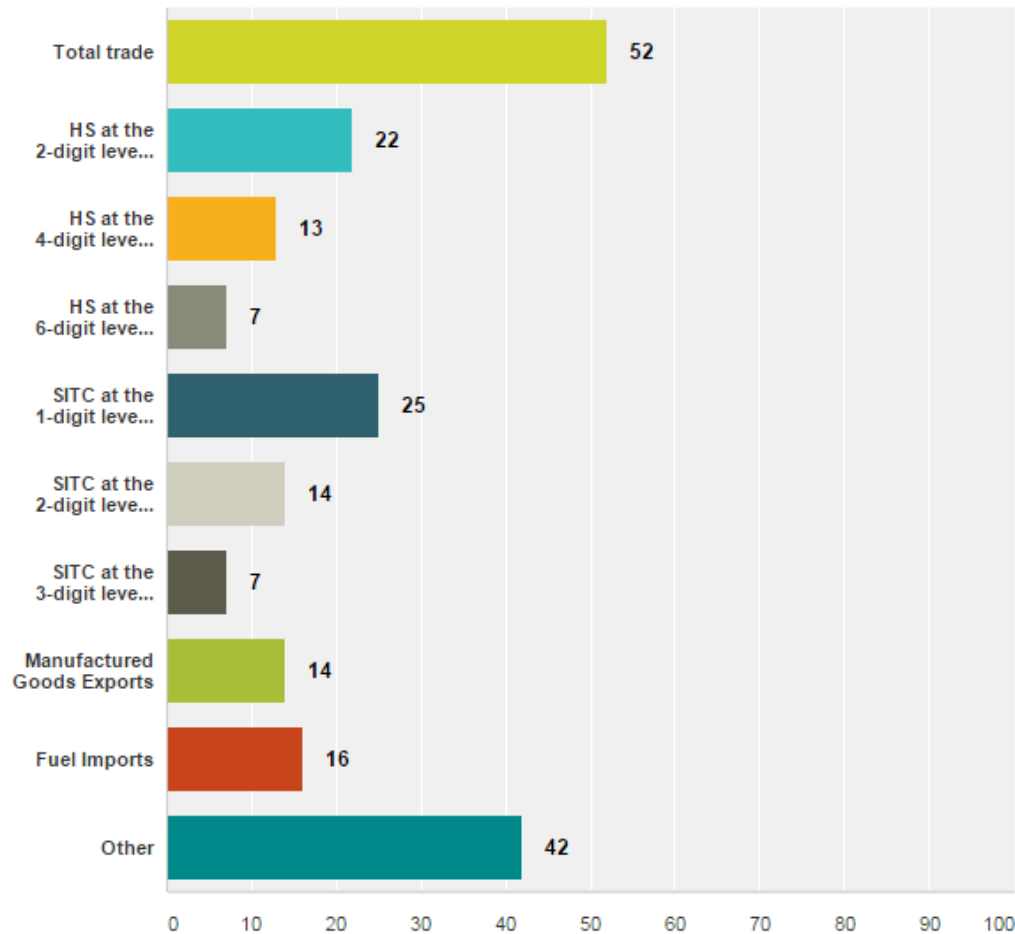
Compilation challenges

Answer Choices	Responses	
Heterogeneity of products classified in same commodity code	54.05%	40
Frequent changes of products	47.30%	35
High volatility in time series of unit values	37.84%	28
Limited availability (or reliability) of quantity data	27.03%	20
Other	25.68%	19
Unavailability of trade values for specific products	18.92%	14
Lack of timeliness in reception of customs data	17.57%	13
High cost of survey operation	16.22%	12
Lack of a representative basket of products	14.86%	11
Difficulties with the survey frame	12.16%	9
Low response rate	8.11%	6
Total Respondents: 74		

Advantages of unit values

➢In most countries, unit value indices have been used more widely.

➢Low cost: Basic data already available, administrative data

➢Exhaustive coverage; it covers relatively a larger proportion of commodities than price indices

➢Easy to apply all formulae (Laspeyres, Paasche, Fisher, etc)

➢Easy to apply fixed or chained base year approach

➢Chained indices can be easily adopted in unit value indices. To change the weight regularly requires burdens of work force and time in price indices

Problems with unit values

➢ Main issues: Lack of detail and heterogeneity of items at the lowest level of the product classification

➢ One of the defects of unit value indices is that they lack the quality change adjustment in commodities

➢ HS Changes

➢ Misreporting of values (e.g., transfer pricing not detected by Customs)

➢ Misreporting of quantities (outliers or missing quantities)

➢ Consignments with mixed products

➢ Sensitivity to outlier detection process

Changes in HS;

HS2017	HS2022
845690	845640 845650 845660

HS2022	HS2017
401180	401162 401163 401193 401194

➢ Conversion table from HS2017 to HS2022 *(based on your national product classification)*
➢ Check the measurement units of corresponding commodities

Changes in HS;

Correlation of AHTN 2017 to AHTN 2022					Correlation of AHTN 2022 to AHTN 2017			
AHTN 2017		AHTN 2022			AHTN 2022		AHTN 2017	
3002.13.00		3002.13.00			3001.90.00		3001.90.00	
		ex 3822.11.00			3002.12.10		3002.12.10	
		ex 3822.12.00			3002.12.90		3002.12.90	
		ex 3822.19.00			3002.13.00		ex 3002.13.00	
3002.14.00		3002.14.00			3002.14.00		ex 3002.14.00	
		ex 3822.11.00			3002.15.00		ex 3002.15.00	
		ex 3822.12.00			-		3002.19.00	
		ex 3822.19.00			3002.41.10		3002.20.10	
3002.15.00		3002.15.00			3002.41.20		3002.20.20	
		ex 3822.11.00			3002.41.90		3002.20.90	
		ex 3822.12.00			3002.42.00		3002.30.00	
		ex 3822.19.00			3002.49.00		ex 3002.90.00	

Advantages of price surveys

➢ <u>Precise definition of products</u>, like CPI and PPI products

➢ Quality changes can be taken into consideration

➢ Low volatility, more stable than UVIs

Problems with price surveys

➢ Sampling frame must ensure a good coverage and representativeness (traders, products)

➢ Size of sample (traders, items) and sampling errors

➢ Definition of the value (eg. for exports: FOB value, basic price, invoice value…)

➢ Price of purchase (imports) often more difficult to collect than price of sale (export)

➢ Higher volatility of import flows

➢ Estimation of weights issue for weights

➢ Resource and cost

Type of Index and Formula

➢Laspeyres

➢Paasche

➢Fisher – Superlative index

➢Unit Value/Price

➢Volume (quantum, quantity)

➢Terms of Trade

➢Relation Price and Volume Index

$$P_{UV} = \left(\frac{\sum_{m=1}^{M} p_m^t q_m^t}{\sum_{m=1}^{M} q_m^t} \right) \Bigg/ \left(\frac{\sum_{n=1}^{N} p_n^0 q_n^0}{\sum_{n=1}^{N} q_n^0} \right)$$

Type of Index and Formula

Results of National Practices in compilation of External Trade indices (2005)

Unit Value index only -   75%

Price Index only -   17%

Both UV and Price -   8%

Annual only -   16%

Annual and Quarterly -   34%

Annual, Quarterly, Monthly - 50%

SITC -   45%

HS -   19%

BEC -   16%

ISIC -   20%

Type of Index and Formula

Laspeyres Price Index $Lp = \dfrac{\Sigma p_t q_0}{\Sigma p_0 q_0}\; x100$

Paasche Price Index $Pp = \dfrac{\Sigma p_t q_t}{\Sigma p_0 q_t}\; x100$

Fisher Ideal Index $= \sqrt{Laspeyres\ Index\ x\ Paasche\ Index}$

where:
   Lp Laspeyres price, Pp Paasche price index.
   p_t is the current price.
   q_t is the current quantity.
   p_0 is the price in the base period.
   q_0 is the quantity used in the base period.
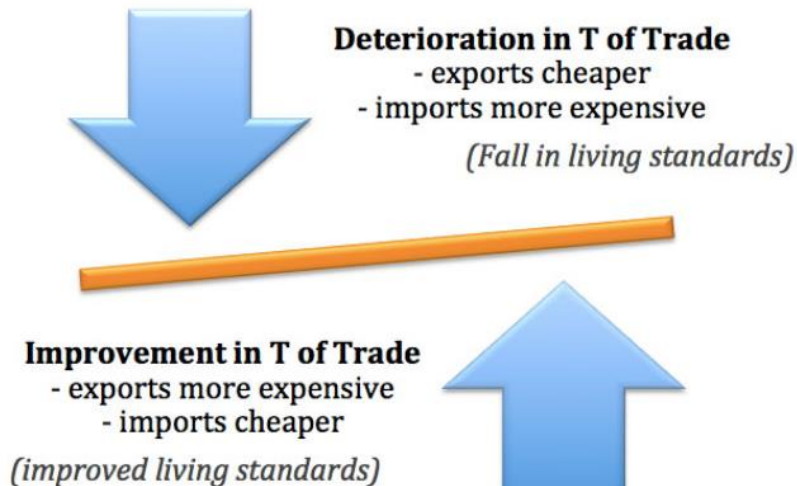
Type of Index and Formula

$$\text{Value Index} = \frac{\Sigma p_t q_t}{\Sigma p_0 q_0} \, x100$$

Value Index = L_p x P_q = L_q x P_p = F_p x F_q

Volume index = Value Index / UV or Price Index

Terms Of Trade = Exp UV Ind / Imp UV Ind x100

**Deterioration in T of Trade**
- exports cheaper
- imports more expensive

(Fall in living standards)

the ratio of an index of a country's export prices to an index of its import prices.

Improvement in T of Trade
- exports more expensive
- imports cheaper

(improved living standards)

Fixed Base vs Chained

2016 Basket

A B C

D E

2017 > 2018 > 2019 - - - > 2021

Base year is 2016 and commodities A, B, C, D, E in 2016 basket are used for calculation of indices for 2017 and afterward.

Fixed Base vs Chained
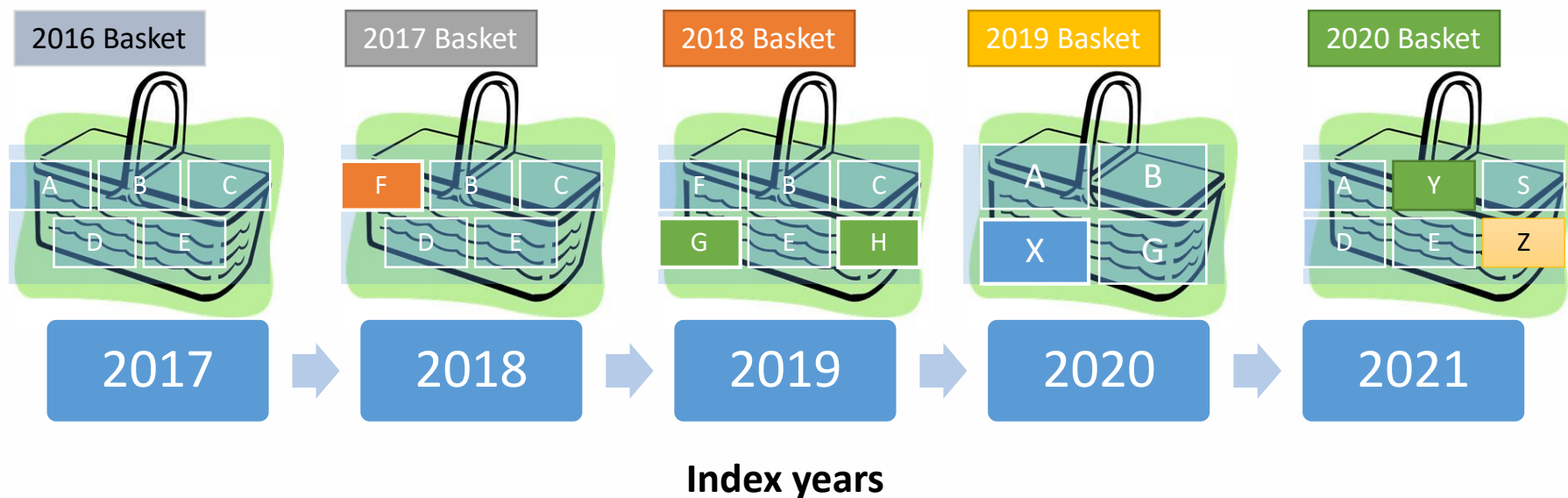
2016 basket is used for 2017 calculation, 2018 basket is used for 2019 calculation, …………, 2020 basket is used for 2021 calculation.

Calculation of ETI

Main preparation steps

➢Discuss with National Accounts and other users

➢Decide classification(s) and its detail, periodicity, base year, type of base year (fixed-base or chain) and formula

➢Analyze at least three-four years data including base year

➢Develop credibility range for outlier detection

➢Prepare conversion tables HS_Old to HS_New and vise versa (HS2017 to HS2022 - HS2022 to HS2017)

➢Prepare classification tables with its correlation tables

➢Commodity selection for Basket – if chain index, every year it should be done – develop a commodity selection methodology

Calculation of ETI

Main index calculation steps

➢Data preparation: extract transaction level data from trade database into Index database table,

➢Convert HS codes, if necessary (e.g. from HS2012 to HS2017)

➢Detection of outliers & automatic correction for certain transactions, if necessary

➢Impute missing unit values

➢Calculation of elementary indices and upper level aggregations

➢Linking indices (if chained index)

➢Calculation of value indices

➢Derived quantum indices from value and unit value indices

➢Dissemination of indices,

➢Revise indices once a year (at least)

Basket Selection

➢ More detailed level commodity description (GCC 8 or more)

➢ Threshold for total value of commodities (select important commodities, e.g. X% in total exp. or imp.)

➢ Commodity should be available at least 8 months (>=3 for quarterly) in a year

➢ Homogeneity test: ClossnessPercentage ≥ 60

> ➢ **CP= ((Mean- Standard deviation)/Mean)*100)**

or apply another method for homogeneity

➢ Coverage ≥ 75% (representative ratios) and number of commodity satisfactory under sectors/sub-sectors

Revision Policy

➢External trade indices which are calculated using provisional trade data

➢Indices should be revised with a view to reflect updated trade data at least once a year

> A hybrid index **combines both unit value data and directly collected price data** in one single index (uses unit values as far as possible and directly collected price data are used where unit value data are not suitable).

> > Unit value indices used for relatively homogeneous products such as primary commodities and semi-manufactured goods

> > Price indices used for heterogeneous products such as machinery

National Statistical Offices should receive individual records including traders details from Customs

Conclusion

Type of index

➢ True **price indices** are strongly recommended wherever feasible

➢ As a second best, **hybrid indices** are recommended with unit values calculated for fairly homogeneous commodities and true price indices for heterogeneous commodities

➢ Unit value index, if items not possible above

But, practically all customs declarations are nowadays captured electronically. This implies that customs data are verified, available in detail and available to the statisticians in a very timely manner.

Any question?

Thank you for your attention!

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