

# External Trade Indices

**PRESENTED AT THE TRAINING COURSE ON  
'INTERNATIONAL TRADE STATISTICS'  
KARACHI, PAKISTAN  
9 – 11 OCTOBER 2017**



# IMTS 2010

## External trade indices

11.1. *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, on a monthly, quarterly and annual basis, both volume (quantum) indices and either price or unit-value indices for their total imports and exports. **Countries are also encouraged** to calculate and publish such indices for commodity groups of particular importance to countries at least quarterly and annually.

11.2. *Price and unit value indices.* Two kinds of indices may be produced to reflect prices for imports and exports: unit-value indices that are based primarily on customs documents and export/import price indices that are 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.

# OUTLINE

- Objective
- Base Year
- Data Source
- Concept and Definition
- Compilation of External Trade Indices
- Selection of Basket
- Coverage and Weight
- Methodologi
- Computational Procedures and Examples
- Seasonal Adjustment
- Rebase
- Dissemination

# INTRODUCTION

- ◉ *External trade indices (ETI) measure changes in the levels of unit values and volumes of Malaysia's imports and exports.*
- ◉ *The index numbers, which reflect the percentage rise or fall of unit value and volume levels were first constructed with 1970 as the base year (1970=100) and then base year 1999=100 and 2005=100 subsequently.*
- ◉ *Currently the indices are rebased to 2010=100, commencing from reference month January 2016.*

# INTRODUCTION

## **UNIT VALUE INDEX**

- ◉ *Price changes in external merchandise trade are reflected by changes in unit value indices of external merchandise trade which are compiled based on unit value.*

## **VOLUME INDEX**

- ◉ *Changes in volume of external merchandise trade are derived from changes in external merchandise trade value with the effect of price changes that has been discounted. Trends in the quantity component are illustrated by this index, which expresses the relationship between the value of a given set of unit values for the current period and the value for the base period.*

## **TERMS OF TRADE**

- ◉ *The export and import unit value indices can be used to measure the Malaysia's terms of trade. The terms of trade index is calculated based on the ratio of unit value index of exports to the unit value index of imports.*

# OBJECTIVE

- ① *2.1 The external trade unit value and volume indices are key economic indicators which have a variety of applications and uses.*
- ① *2.2 The following are the main uses of these indices:*
  - ① *2.2.1 They provide a measure of the extent to which changes in the values of exports and imports are due to changes in price/unit value levels and the extent to which value changes are accounted for by volume changes.*
  - ① *2.2.2 They enable policy makers to assess the effects of price change in exports with those in imports (which is referred to as terms of trade) for commodities.*
  - ① *2.2.3 They can be utilized for making projections to ascertain likely future changes in prices, output and so on. These comparisons and projections facilitate decision making at company, industry and government level.*
  - ① *2.2.4 They also measure the changes in the real value of Malaysian imports or exports over time using the deflation method.*

## BASE YEAR OF ETI

- i. Base Year = 1970  
(data series up to 1987)
- ii. Base Year = 1999  
(data series from 1999 to 2009)
- iii. Base Year = 2005  
(data series from 2005 to 2015)
- iv. Base Year = 2010  
(data series from 2010 to current)

## DATA SOURCE

*Data used in calculating the export and import unit value and volume indices is derived from Malaysia external trade data which is in turn mainly processed from import and export customs declaration forms*







# Receipts from Customs

MONTH	<i>Hardcopy</i>	<i>Electronic</i>	<i>Total</i>	<i>%</i>
Nov 2015	5,698	3,280,489	3,286,187	99.83
Dec 2015	3,123	3,451,166	3,454,289	99.91
Jan 2016	3,214	3,206,001	3,209,215	99.90
Feb 2016	2,665	2,770,529	2,773,194	99.90

**Nota:**

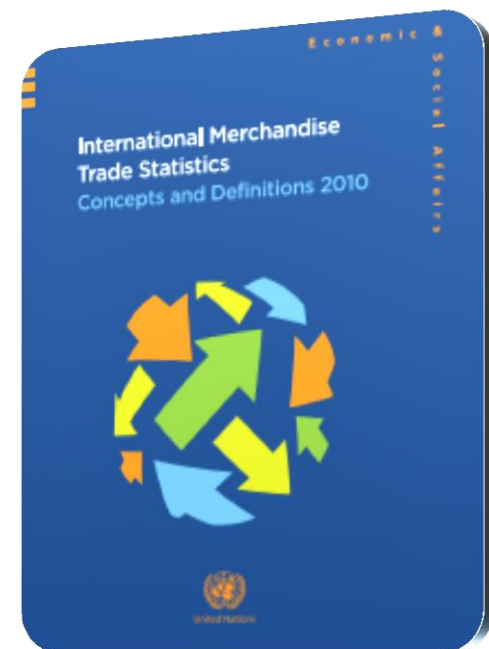
**2005**

- Electronic – 70%
- Hardcopy – 30% (600,000 forms)

# CONCEPT AND DEFINITION

## *International Merchandise Trade Statistics (IMTS)*

From Januari 2012, compilation of IMTS is based on the manual IMTS 2010.



## ETI

*Export & Import Prices Index Manual, 2009* by International Monetary Fund

# COMPILATION OF ETS

- ⦿ *In the index calculations, the individual tariff are grouped according to the Standard International Trade Classification*
- ⦿ *Import indices use 'cost, insurance and freight' (c.i.f.) values, while export indices are calculated using 'free on board' (f.o.b.) values.*
- ⦿ *The indices relate to:*
  - Unit value indices of exports*
  - Volume indices of exports*
  - Unit value indices of imports*
  - Volume indices of imports*
  - Terms of trade indices*
- ⦿ *These indices are compiled for each calendar month while the annual indices are computed from the monthly series.*
- ⦿ *The indices are disseminated at the 1-digit SITC section*

# COMMODITY CLASSIFICATION

- 2005=100: SITC rev.3
- 2010=100: SITC rev.4, SITC rev.4 (updated)

Section 0 FOOD

Section 1 BEVERAGES AND TOBACCO

Section 2 CRUDE MATERIALS, INEDIBLE

Section 3 MINERAL FUELS, LUBRICANTS, ETC.

Section 4 ANIMAL AND VEGETABLE OILS AND FATS

Section 5 CHEMICALS

Section 6 MANUFACTURED GOODS

Section 7 MACHINERY & TRANSPORT EQUIPMENT

Section 8 MISCELLANEOUS MANUFACTURED ARTICLES

Section 9 MISCELLANEOUS TRANSACTIONS AND COMMODITIES

# SELECTION OF BASKET

- Selection at 9 -Digit
  
- At least 80% of total value of exports/imports is selected for every Section
  
- Exclusion:
  - Aircraft
  - General Code
  - Codes which have less than 7 transactions for the year and of which the values are not significant

# COVERAGE

## BY VALUE

TRADE TYPE	%		DIFFERENCE
	2010	2005	
IMPORTS	84%	88%	4%
EXPORTS	84%	91%	7%

## BY CODE

TRADE TYPE	CODE		DIFFERENCE
	2010	2005	
IMPORTS	1257	1941	684
EKSPORTS	742	1191	449

# NO OF CODES SELECTED

2005=100 & 2010=100

## EXPORTS

SECTION	DESCRIPTION	WEIGHT		DIFF	CODE		DIFF	% SHARE		DIFF
		2010	2005		2010	2005		2010	2005	
0	FOOD	2.8	2	0.8	105	150	45	83%	90%	7%
1	BEVERAGES AND TOBACCO	0.4	0.3	0.1	18	19	1	85%	89%	4%
2	CRUDE MATERIALS, INEDIBLE	3	2.6	0.4	48	68	20	84%	89%	5%
3	MINERAL FUELS, LUBRICANTS, ETC.	16.4	13.3	3.1	6	10	4	86%	89%	4%
4	ANIMAL AND VEGETABLE OILS AND FATS	8.3	4.8	3.5	5	15	10	82%	94%	12%
5	CHEMICALS	6.3	5.4	0.9	118	200	82	84%	83%	1%
6	MANUFACTURED GOODS	8.6	7	1.6	236	350	114	82%	86%	4%
7	MACHINERY & TRANSPORT EQUIPMENT	44.1	55.7	-11.6	91	201	110	85%	93%	8%
8	MISCELLANEOUS MANUFACTURED ARTICLES	9.6	8.4	1.2	108	173	65	84%	89%	5%
9	MISCELLANEOUS TRANSACTIONS AND COMMODITIES	0.5	0.4	0.1	7	5	-2	86%	84%	-2%
<b>TOTAL</b>		<b>100</b>	<b>100</b>	<b>0.1</b>	<b>742</b>	<b>1,191</b>	<b>451</b>	<b>84%</b>	<b>91%</b>	<b>7%</b>

# NO OF CODES SELECTED 2005=100 & 2010=100

## IMPORTS

SECTION	DESCRIPTION	WEIGHT		DIFF	CODE		DIFF	% SHARE		DIFF
		2010	2005		2010	2005		2010	2005	
		0	FOOD	5.8	4.3	1.5	110	349	239	85%
1	BEVERAGES AND TOBACCO	0.5	0.4	0.1	18	32	14	85%	93%	8%
2	CRUDE MATERIALS, INEDIBLE	3.8	2.5	1.3	53	167	114	85%	88%	3%
3	MINERAL FUELS, LUBRICANTS, ETC.	10.3	8.6	1.7	10	14	4	86%	91%	5%
4	ANIMAL AND VEGETABLE OILS AND FATS	1.4	0.4	1	6	34	28	87%	80%	7%
5	CHEMICALS	9.2	7.8	1.4	286	358	72	85%	86%	1%
6	MANUFACTURED GOODS	12.7	10.7	2	351	464	113	85%	85%	0%
7	MACHINERY & TRANSPORT EQUIPMENT	48.7	58.6	-9.9	219	270	51	82%	88%	6%
8	MISCELLANEOUS MANUFACTURED ARTICLES	6.2	5.3	0.9	200	251	51	85%	87%	2%
9	MISCELLANEOUS TRANSACTIONS AND COMMODITIES	1.5	1.3	0.2	4	2	2	86%	86%	0%
<b>TOTAL</b>		<b>100</b>	<b>100</b>	<b>0.2</b>	<b>1,257</b>	<b>1,941</b>	<b>684</b>	<b>84%</b>	<b>87%</b>	<b>3%</b>

# WEIGHT

*The weights used in this type of index are values. The data used to derive the weights are the values of Malaysia imports and exports of Merchandise during 2010. Weights are allocated in accordance with these values at 1-digit SITC level.*

$$\text{WEIGHT} = \frac{\text{VALUE OF SELECTED BY SECTION}}{\text{TOTAL EXPORTS/IMPORTS}} \times 100$$

EXAMPLE :

$$\begin{aligned} \text{WEIGHT FOR SECTION 0 IMPORTS} &= \frac{25,609,111,987}{526,516,056,770} \times 100 \\ &= 5.820 \sim 5.8 \end{aligned}$$

## **Process Mapping**

Process Mapping is undertaken to align Harmonised System (HS) / Asean Harmonised Tariff Nomenclature (AHTN) 2007 with HS/AHTN2012.

Among the changes:

### **i.Re-code (One-to-one)**

One HS/AHTN code will change to 1 new code but the description is still maintained

### **ii.Merge (Many-to-one)**

This occur when 2 or more codes are merged to become 1 code

### **iii.Split (One-to-many)**

One HS/AHTN code is split to at least 2 or more codes

# METHODOLOGY

## Treatment of Outliers

- *Weighted average at basic heading 5-digit SITC or a suitable level (4-digit, 3-digit, 2-digit).*
- For Section 3, 4 & 9 Index is compiled by profiling the country at 9-digit SITC

# COMPUTATIONAL PROCEDURE

The procedure used to derive Unit Value Index is as follows :

- i) Compute unit values for each selected SITC commodity item;
- ii) Compute unit value relatives;
- iii) Compute value weights;
- iv) Multiply each relative by the corresponding weight;
- v) Total the product;
- vi) Divide these totals by the sum of the weights.

## COMPUTATIONAL PROCEDURE – unit value index

**The weighted arithmetic mean of relative unit value index, in which the weights are equal to base-period values, is equivalent to Laspeyres unit value index:**

$$P^L = \frac{\sum (P_n / P_o) P_o Q_o}{\sum P_o Q_o} \times 100$$

$P^L$  = Laspeyres unit value index;

$P_n$  = *Commodity* unit values in the given period

$P_o$  = *Commodity* unit values in the given period

$P_o Q_o$  = *Baseyear weights*

# EXAMPLE 1

## CALCULATION OF UNIT VALUE INDEX FOR 1 SECTION

SITC	Weight	value Jan 2011	Quantity Jan 2011	Unit value Jan 2011
971013000	56.37	285,033,915	2,236.1	127,469
971031000	11.88	52,640,988	549.2	95,857
971012000	19.13	147,066,310	1,094.0	134,430
971010010	12.62	159,284,813	1,244.3	128,008

The average unit value for 2010 is as follows:

971013000 = 108,631 , 971031000 = 91,257 , 971012000 = 115,190 , 971010010 = 102,122

Price Relative for Jan 2011:

$$971013000 = \frac{127,469}{108,631} \times 100 = 117.3 , \quad 971031000 = \frac{95,857}{91,257} \times 100 = 105.0$$

$$971012000 = \frac{134,430}{115,190} \times 100 = 116.7 , \quad 971010010 = \frac{128,008}{102,122} \times 100 = 125.3$$

$$\text{Unit value index sec. 9} = \frac{((117.3 \times 56.37) + (105.0 \times 11.88) + (116.7 \times 19.13) + (125.3 \times 12.62))}{(56.37 + 11.88 + 19.13 + 12.62)} = 116.77$$

# EXAMPLE 2

The following is the unit value by section and total for Jan-Mar 2015:

SECTION	WEIGHT	JAN 2015	FEB	MAC
0	5.82	117.42	118.31	118.75
1	0.46	103.22	103.20	102.77
2	3.77	100.22	100.70	100.56
3	10.29	94.76	87.32	94.11
4	1.43	96.92	101.67	107.26
5	9.20	101.30	101.15	101.09
6	12.67	102.40	102.16	102.20
7	48.73	109.36	109.70	109.70
8	6.19	105.33	105.72	106.03
9	1.46	127.83	133.56	127.82
<b>IMPORT</b>	<b>100.00</b>	<b>106.17</b>	<b>105.77</b>	<b>106.51</b>

Unit Value Index Imports (Jan 2015) =

$$= ((117.42 \times 5.82) + (103.22 \times 0.46) + (100.22 \times 3.77) + (94.76 \times 10.29) + (96.92 \times 1.43) + (101.30 \times 9.20) + (102.40 \times 12.67) + (109.36 \times 48.73) + (105.33 \times 6.19) + (127.83 \times 1.46)) / 100$$

$$= 106.17$$

$$= \frac{\sum (\text{UV Index Section } i) \times (\text{Weight sec } i)}{\sum \text{Total Weight}}, \quad \text{where } i = 0, 1, \dots, 9$$

# CALCULATION OF VOLUME INDEX

Volume indices for exports and imports are derived indirectly by deflating indices of values of exports and imports with the corresponding export and import unit value indices. In this case, the resulting indirect volume index will be Paasche volume index.

$$Q^P = \frac{V}{P^L} \times 100$$

$Q^P$  = *Volume Index*

$P^L$  = Laspeyres Unit Value Index

$V$  = Total Value

# EXAMPLE

The following is the unit value index by section for imports for Jan 2015:

SECTION	WEIGHT	Unit Value Index	Value Index	Volume Index
0	5.82	117.42	149.77	127.55
1	0.46	103.22	181.08	175.43
2	3.77	100.22	120.47	120.20
3	10.29	94.76	125.43	132.37
4	1.43	96.92	97.05	100.14
5	9.20	101.30	133.65	131.93
6	12.67	102.40	157.61	153.91
7	48.73	109.36	110.43	100.98
8	6.19	105.33	134.51	127.70
9	1.46	127.83	111.71	87.39
<b>IMPORT</b>	<b>100.00</b>	<b>106.17</b>	<b>124.11</b>	<b>116.9</b>

$$\text{Volume Index Section 0} = \frac{149.77}{117.42} \times 100$$

$$= 127.55$$

## Compute Terms of Trade

*The export and import unit value indices can be used to measure the Malaysia's terms of trade. The terms of trade index is calculated based on the ratio of unit value index of exports to the unit value index of imports. It represents the cost of a given volume of imports in terms of exports.*

$$\text{Terms of Trade} = \frac{\text{Unit Value Index of Exports}}{\text{Unit Value Index of Imports}}$$

# EXAMPLE – TERMS OF TRADE

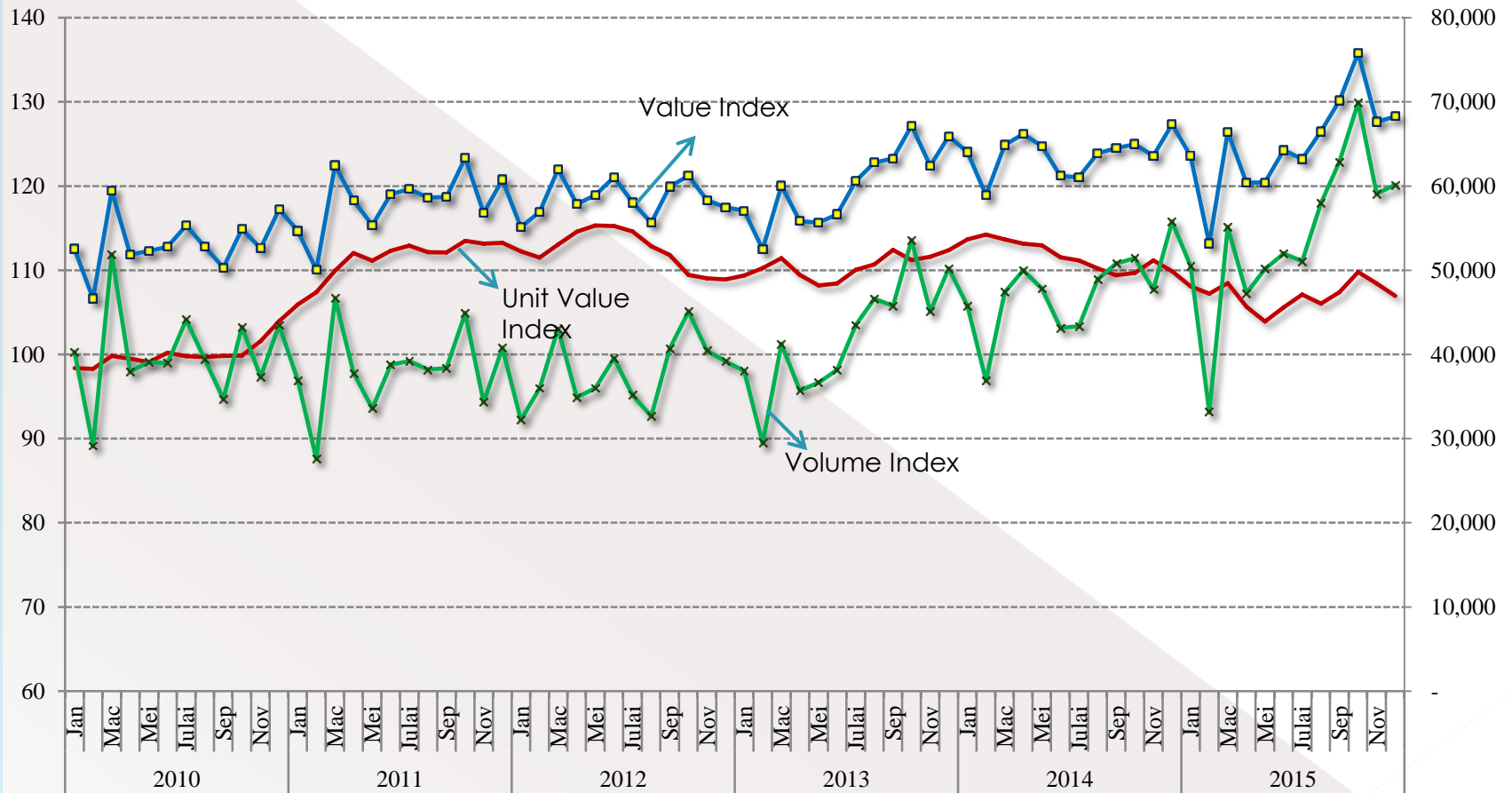
Index Unit Value			
SECTION	(IUV) Import	IUV Export	Terms of Trade
0	117.42	119.72	101.96
1	103.22	104.07	100.82
2	100.22	77.83	77.66
3	94.76	116.62	123.07
4	96.92	93.74	96.72
5	101.30	120.29	118.74
6	102.40	99.32	97.00
7	109.36	107.08	97.91
8	105.33	114.29	108.50
9	127.83	159.18	124.53
<b>IMPORT</b>	<b>106.17</b>	<b>108.12</b>	<b>101.83</b>

$$\begin{aligned} \text{Terms of Trade Section 0} &= \frac{119.72}{117.42} \times 100 \\ &= 101.96 \end{aligned}$$

# EXPORT INDEX

Indeks

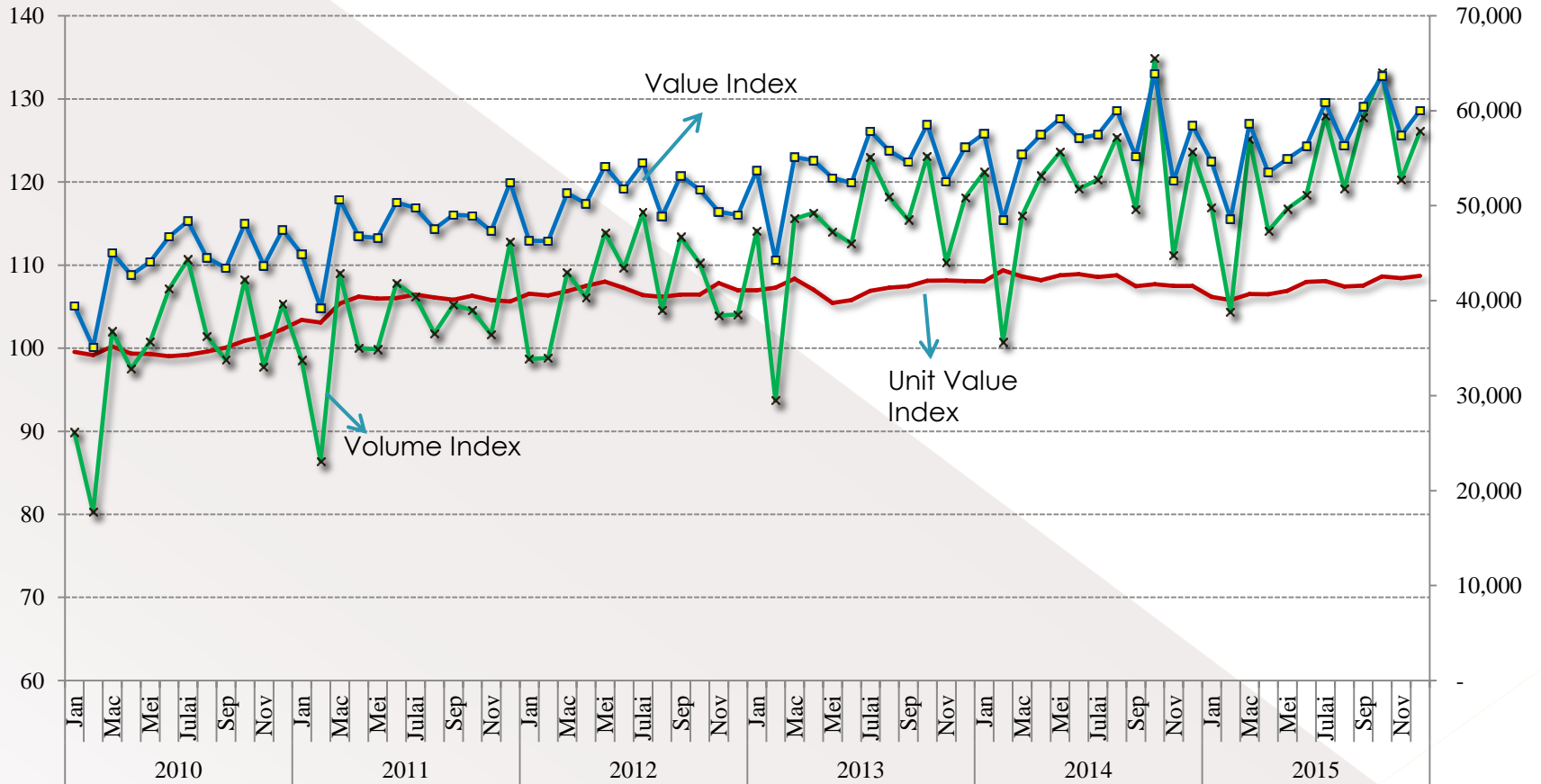
RM Juta



# IUV IMPORT

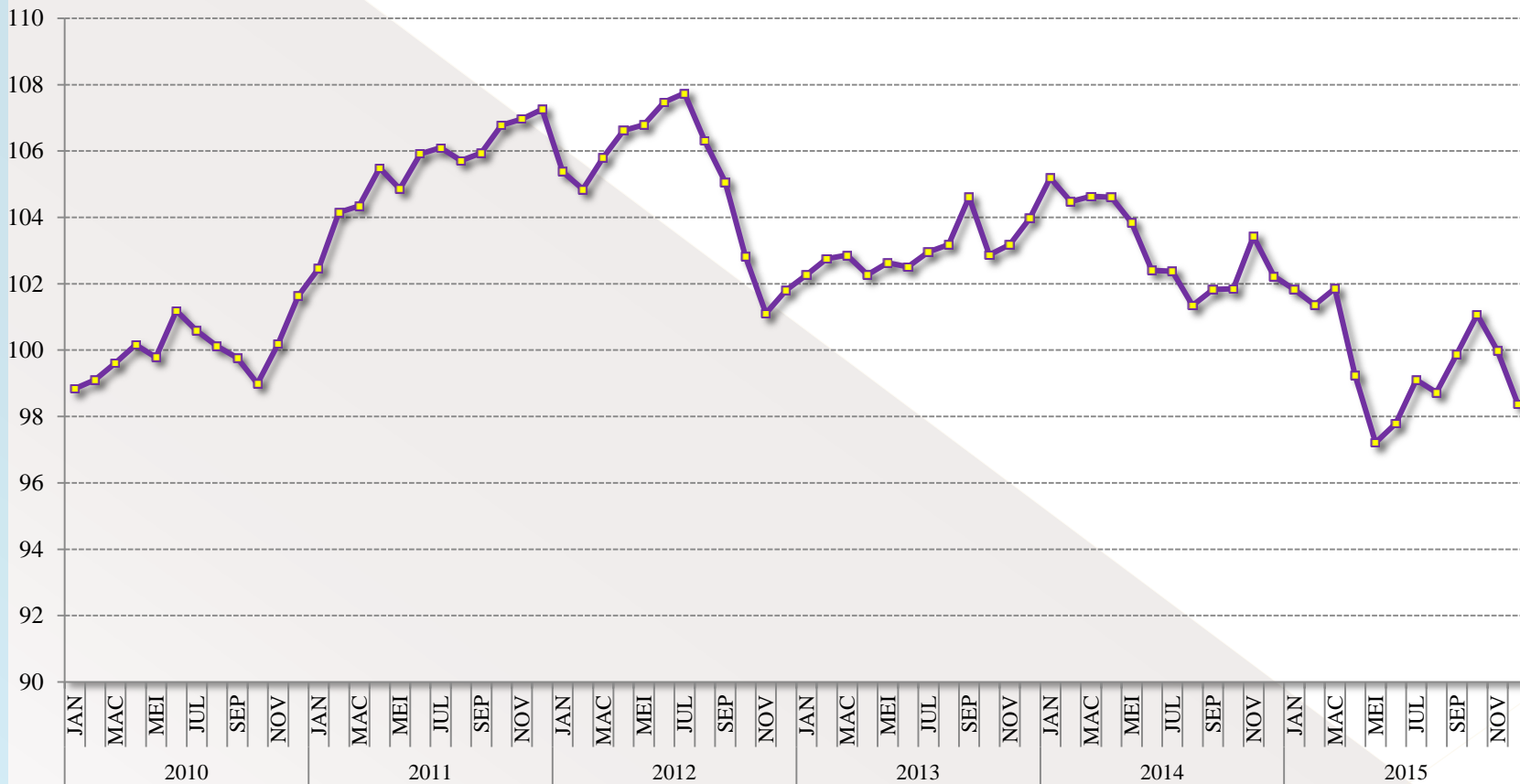
Indeks

RM Juta



# TERMS OF TRADE

Indeks



# SEASONAL ADJUSTMENT

Time-series data are very useful for economists, policy & decision makers and time-series analysts to identify the important features of economic series such as direction, turning point and consistency between other economic indicators. Sometimes this feature is difficult to observe because of seasonal movements. Thus, if the seasonal effect can be removed, the behaviour of the series would be better viewed. The estimation and removal of the seasonal effects is called seasonal adjustment.

*Seasonal adjustment is a process to identify and to remove the regular within-a-year seasonal pattern, which may also include the influences of moving holidays and working/trading days effect in each period. The ultimate objective of the process is to highlight the underlying trends and short-term movements in the series.*

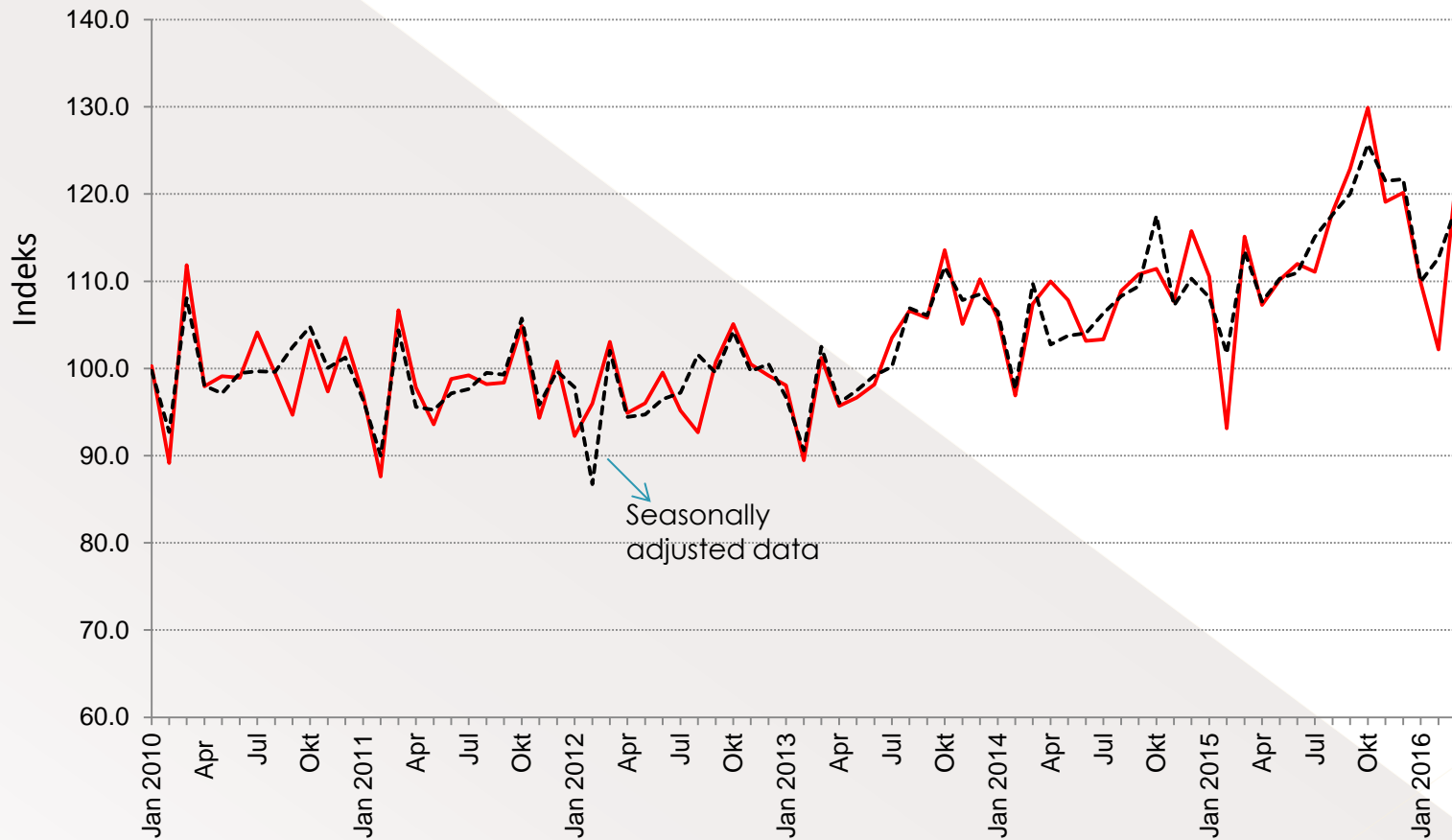
*In Malaysia, most of the time series data are affected by seasonal effects. Hence, to eliminate the seasonal effect as well as to seasonally adjust the Malaysian economic time series data, a standard seasonal adjustment package, X-12 ARIMA was used by Department of Statistics, Malaysia.*

*Malaysian economic time series data are often affected by major religious festivals such as Eid-ul Fitr of the Muslims, Chinese New Year of the Chinese and Deepavali of the Indians. These 38 festivals' dates are fixed according to the lunar year but vary according to the Gregorian calendar.*

*Therefore, to estimate and remove moving holiday effect from time-series data, a procedure was developed, namely Seasonal Adjustment for Malaysia (SEAM). The SEAM method is used to remove seasonal effect for Malaysia's external trade indices data. The seasonal adjustment is only carried out on monthly export and import volume indices. The seasonally adjusted series data for the preceding three years are revised each year when the figures for complete 12 months become available.*

# SEASONAL ADJUSTMENT

## EXPORTT VOLUME INDEX



# REBASE ETI

Rebase is needed because of the following factors:

- i. Change in product classification
- ii. New products in the market
- iii. Reflect the structure

2010 is chosen because

- Its a normal year
- Consistency with other index produced by the Dept eg. PPI dan IPP
- Also in line with National Accounts base year

# DISSEMINATION

## MONTHLY

The screenshot shows the official portal of the Department of Statistics Malaysia. The header includes the department's name and logo, along with navigation links for Login, Registration, and Web Assist. The main navigation bar lists Home, About Us, Statistics, Publications, Methods & Classifications, FAQs, Data Request, and Contact Us. The date and time are displayed as Friday, 06 May 2016 | 29 Rejab 1437 H.

The 'Publications' section is active, showing a list of publication types: Printed, Free Download (highlighted), Journals, and Newsletter. The 'Free Download' section provides instructions on how to access publications and offers a link to register an account.

Three book covers are displayed: 'IMBANGAN PEMBAYARAN / BALANCE OF PAYMENTS SUKU KEDUA | SECOND QUARTER 2015', '2015 KEMAJUAN DALAM NEGERI KASAR / DOMESTIC GROSS VALUE ADDED PRODUCT', and 'INDEKS PERDAGANGAN LUAR NEGERI / EXTERNAL TRADE INDICES'. The word 'Softcopy' is overlaid on the first two covers.

The footer contains sections for 'Need Help?' (Feedback, Web Assist, FAQs), 'Certified With MS ISO 9001 : 2008' (with logos for Net, SIRIM, and STANDARD), 'Public Poll' (with a question 'How do you know about us?' and radio button options for Census or Survey, Internet, and Need to know basis), and 'Contact Us' (with address, phone, and fax numbers).



## Hardcopy

# *WAY FORWARD*



1. Profiling by country and company

2. Updating Basket every 2 years

спасибо  
danke 謝謝  
ngiyabonga  
teşekkür ederim  
dank je  
gracias tapadh leat  
hvala maururu  
moichackeram  
dziękuje  
thank you  
go raibh maith agat  
obrigado sagolun sukriya kop khun krap  
arigatō takk dakujem  
merci  
terima kasih  
ευχαριστώ  
감사합니다