Compiling SUTs in Volume Terms

Regional Course on Supply and Use Table

20-24 January 2020

Chiba, Japan

What is deflation?

Why is it important to deflate?

Introduction

- National accounts as basis of yearly economic performance and growth

- Current price data is not reflective of real annual change

- Decomposition of values into price and volume components

Introduction

- Real growth is derived by use of base year price valuations

- Deflating current price data for national accounts in volume terms

- SUT framework can be used to arrive at values at previous year's price

- Double deflation

How are values, prices, and quantities different from each other? How are they related?

What is the difference between quantity and volume?

Price, volume, quantity and quality

- Value of a single product is derived as

$$v = p \times q$$

- For product group,'"volume" instead of "quantity"

- Weighting schemes are used for aggregation

- Value of a product group is given by

$$value\ index = price\ index \times volume\ index$$

Is it important to deflate SUTs in volume terms?

Can you give some ideas on how we could go about in deflating the SUTs?

What are the data requirements in deflating SUTs?

SUT in volume terms

- GDP volume growth from production side and expenditure side but not from income side

- SUT accounting framework ensures consistency of GDP in volume terms from both the production and expenditure approaches

- Most countries use either one of the approaches

SUT in volume terms

- SUT in volume terms as feedback measure for SUT in current price, plausibility of price and volume measures

- Simultaneous balancing

Six Pack Data Framework

Description	Data	Description	Data
t at current prices	525	Price Index	102.9
t at constant prices of t-1	510	Volume Index	102.0
t-1 at current prices	500	Value Index	105.0

What are the candidate deflators that we can use in deflating SUTs?

Can you give an example of deflator and which part of SUT can be deflated using this indicator?
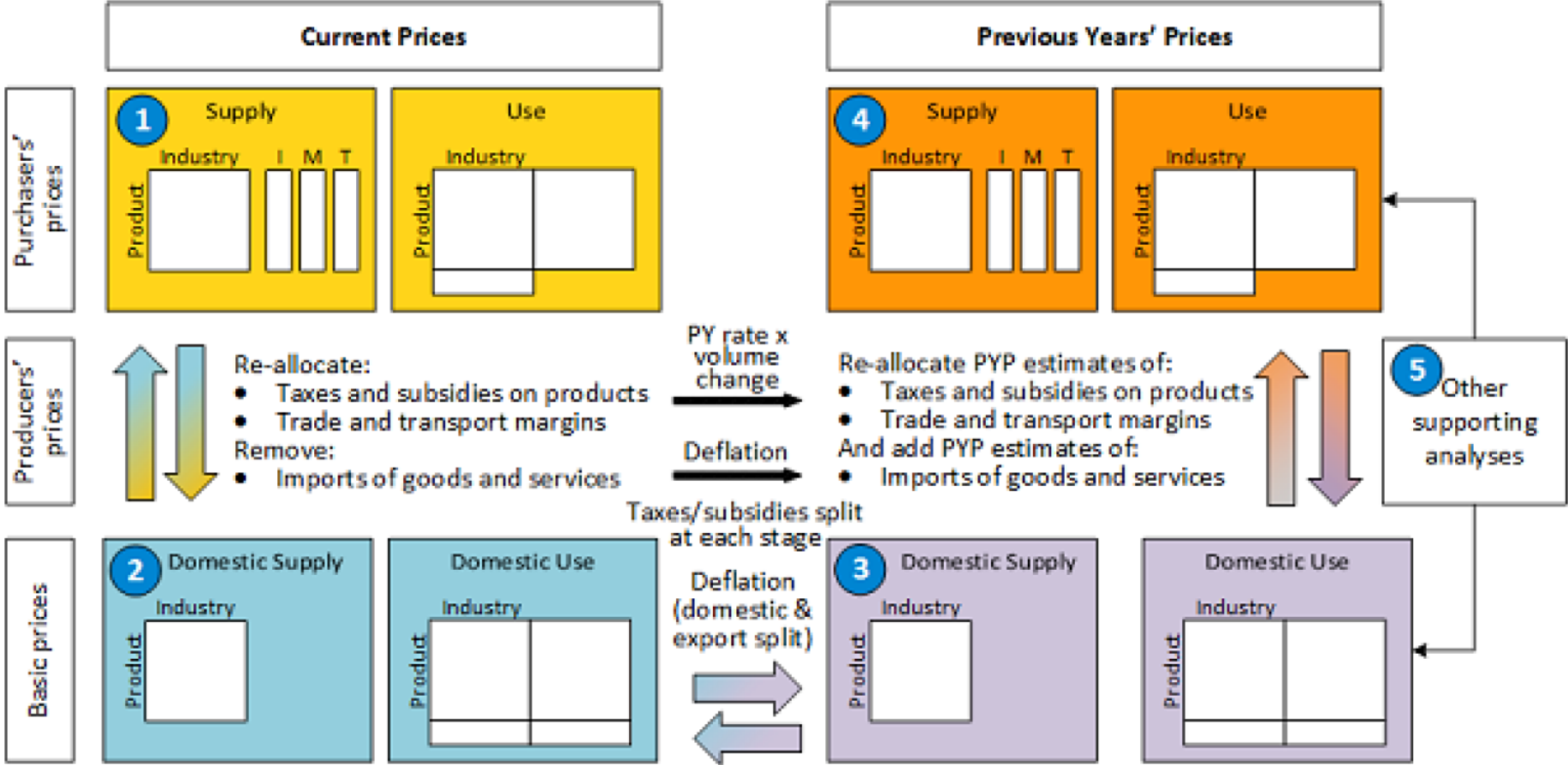
Choice of deflators

- Low level of aggregation (granular)
- Relate directly to the variable being measured
- Sufficient stratification
- Sufficient and detailed matching
- Sufficient representative
- User-specific

Deflation Approach

H-Approach

- Step 1: Derive SUT at basic prices

  - Domestic Supply (given)

  - Imports vector (given)

  - Imports Use Table (derived)

  - Domestic Use Table (derived)

H-Approach

- Step 2: Deflate Domestic Supply, Domestic Use Table and Imports Use Table using appropriate deflators.

- Step 3: Deflate the valuation matrices using appropriate methods

- Step 4: Check for plausibility of estimates (e.g., implicit price indices vs. observed price indices) and adjust, if necessary.

H- Approach

- Step 5: Compile SUT at purchasers' prices in previous year's prices

- Step 6: Adjust current price SUT accordingly

Types of deflators

- Supply Table at basic prices

- Use Table at basic prices

- GVA by industry

- Valuation matrices

Deflators for Supply Table at basic prices

- Producers' price indices (PPIs)/Exports price indices

- Other indices:

    - Unit value indices

    - Consumer price indices

   -Tariff indices

    - Input prices (Non-market production)

Imports of goods and services

- Import price indices

- Unit value indices

Use Table at basic prices

- Domestic Use Table

  - Producers' price indices (see also IPPI)

- Imports Use Table

  - Imports price indices/unit value indices

Valuation Matrices

- Trade Margin

 - trade margin in volume terms as product of volume trade in the previous year and some rates related to turnover trade index and rate of trade of the underlying product

$$TR_{t,t-1} = TR_{t-1,t-1} \times k_t$$

- Transport Margin

 - similar to trade margin compilation

 -alternatively, price indices of transport industries output

Example

2016				
Year 0				
	Sales at basic prices	Trade margin	Sales at purchasers' price	Trade margin rate
Oranges	100	30	130	0.23
Apple	100	100	200	0.50
Total	200	130	330	

2017				
Year t				
	Sales at basic prices	Trade margin	Sales at purchaser price	Trade margin rate
Oranges	110	35	145	0.24
Apple	60	15	75	0.20
Total	170	50	220	

Price index (Year 0 = 100)	
Oranges	103.7
Apple	60.7

Example

Constant prices, year 0 prices			
Year t			
Sales at basic prices	**Trade margin**	**Sales at purchaser price**	**Trade margin rate**
108	32	140	0.23
62	62	124	0.50
169	94	263	

- Deflate sales at purchaser price
(145/103.7)*100 = 140
- Deflate trade margin using previous years rates
(140*0.23)=32
- Obtain sales at basic price residually

Valuation matrices

- Taxes and subsidies on products

    - volume terms are derived by applying a rate related to volume change on the tax/subsidies on products of t-1 in the prices of t-1

$$T_{t,t-1} = T_{t-1,t-1} \times k_t$$

Use Table at purchasers' prices

- Use Table at basic prices combined with valuation matrices in volume terms

Alternatively:
- IC by industries
  - Intermediate consumption price indices (ICPI) if compiled by NSO
  - CPI of products
- Exports of goods and services
  - Export price indices
  - Unit value indices
  - PPIs for services
- Household final consumption expenditure
  - CPIs

GVA by industry

- Double deflation: GVA in volume terms is derived as the residual of deflated output and deflated intermediate consumption

- Compensation of employees: Labor or wage cost index

- Other taxes and subsidies on production: Quantity indicators (e.g., stock of real property, tons of emitted pollutants)

- Gross operating surplus: Residual of GVA minus compensation and minus other taxes/subsidies

Country practice on deflators

- Canada
- European Union

European Union

Components	Goods	Services
Output	Agriculture, fishery price index PPI Constrcuction cost index (CCI)	CPI Ave. wage index
Input	Agriculture, fishery price index PPI Constrcuction cost index (CCI)	CPI Ave. wage index Adjusted CPI for COICOP groups Weighted CPI of COICOP groups
Imports	Unit value index (UVI)	Harmonized index of consumer prices (HICP)
Exports	PPI-exports	CPI
HFCE	CPI	CPI
Government expenditure	Output price indices	Output price indices
GFCF	UVI Output price indices	CCI Output price indices
Changes in inventory	Implicit price indices (mainly PPI)	
Taxes/subsidies on products	Product value at constant price of year t is multiplied by tax ratio of the product at current	
Margins	Same logic as in taxes/subsidies deflation	
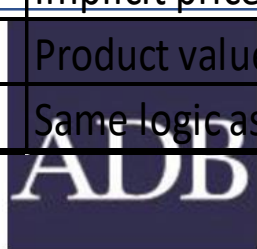
Canada

	Supply		=	Demand									
	Output	+	Imports	=	Inputs	+	Exports	+	GFCF	+	HHFCe	+	GFCe

Goods

	Output	Imports	Inputs	Exports	GFCF	HHFCe	GFCe
Agriculture products	Unit Value	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Forest products	Unit Value	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Fish	Unit Value	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Oil and gas	Volume projector	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Minerals	Unit Value/Volume Projector	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Manufactured goods	IPPI	ITD Imports	Net Supply IPI	Output Prices/MXP	MEPI/IPI	IPI	IPI

Services

	Output	Imports	Inputs	Exports	GFCF	HHFCe	GFCe
Agriculture services	FIPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Forestry services	Input Cost IPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Mining and quarrying services	Input Cost IPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Residential Construction	NEAD Input Cost/API/NHPI	ITD Imports	Net Supply IPI	Output Prices	NHPI,API,ICP	IPI	IPI
Non-Residential Construction	NEAD Input Cost	ITD Imports	Net Supply IPI	Output Prices	NRBMPI, ICP	IPI	IPI
Utilities	Volume projector	Volume projector	Volume projector	Volume projector	Volume projector	Specific Prices	IPI
Manufacturing services	Input Cost	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Wholesaling services	SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Retail services	SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Transportation services	Volume Projector/SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Print publishing products	IPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Motion picture, broadcasting services	CPI-Based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Telecommunications services	Volume Projector/SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Internet, computer related services	Volume Projector/SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Finance and insurance services	Volume Projector	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Real estate services	Volume Projector/SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Professional and technical services	AWE/SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Administrative and support services	AWE,SPPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Waste management services	AWE	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Education services	CPI/Hours worked-based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Health care services	CPI/Hours worked based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Social assistance services	CPI-Based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Arts, entertainment and recreation services	CPI-Based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Accommodation services	TASPI	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Meal and beverage services	CPI-Based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Repair and maintenance services	AWE	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Personal services	AWE/CPI excluding taxes	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI
Public administration services	Hours worked-based	ITD Imports	Net Supply IPI	Output Prices	MEPI/IPI	IPI	IPI

Exercise

Consider the fictitious 3x3 SUT provided. Valuation matrices, Imports Use Table, and Domestic Use Table have already been derived. By appropriate choice of deflators in your country, do the following:

- Deflate Supply Table at basic prices
- Deflate Domestic Use Table
- Deflate Imports Use Table
- Deflate TTMs
- Deflate TLS
- Deflate GVA

- Must the SUT in current prices be necessarily balanced before deflating it?

- Do we get a balanced SUT in volume terms if we start with a balanced SUT in current prices?

- Are all deflators used in deriving SUT in volume terms necessarily available?