



Workshop on National Accounts- Improvement in the Production and Dissemination of the System of National Accounts

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Agenda item 6.3.1. Methods and approaches in compiling Value Added by industry in current and constant prices

Introduction

All Member States compile GVA by industry in current and constant prices

MRDS tables: 2.1 and 2.2

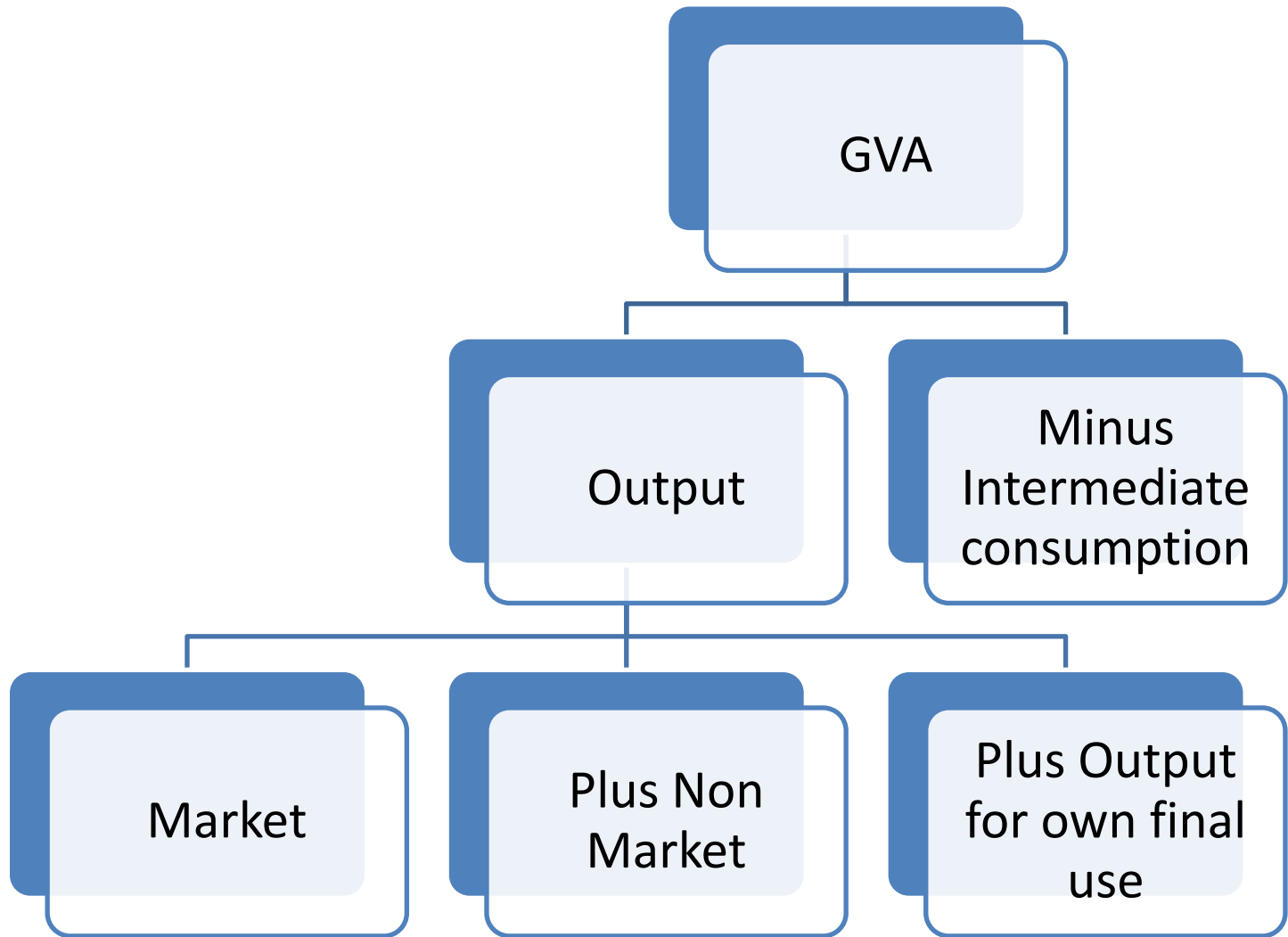
This presentation is to :

- reconfirm what you already know
- provide guidelines for improvements

Contents

- Overview of concepts and definitions
- Data sources
- Methodologies
- Recommendations for improvement/Lessons learned

GVA



Market output

- Equal to the sum of:
 - The value of goods and services *sold* at economically significant prices;
 - The value of goods or services *bartered* in exchange for other goods, services or assets;
 - The value of goods or services used for *payments in kind*, including compensation in kind;
 - The value of goods or services supplied by one establishment to another belonging to the same market enterprise to be used as intermediate inputs (*intra-enterprise deliveries*)
 - *The value of changes in inventories of finished goods and work-in-progress intended for one or other of the above uses;*
 - The *margins* charged on the supply of goods and services, trade margins, transport margins, margins on the acquisition and disposal of financial assets, etc.

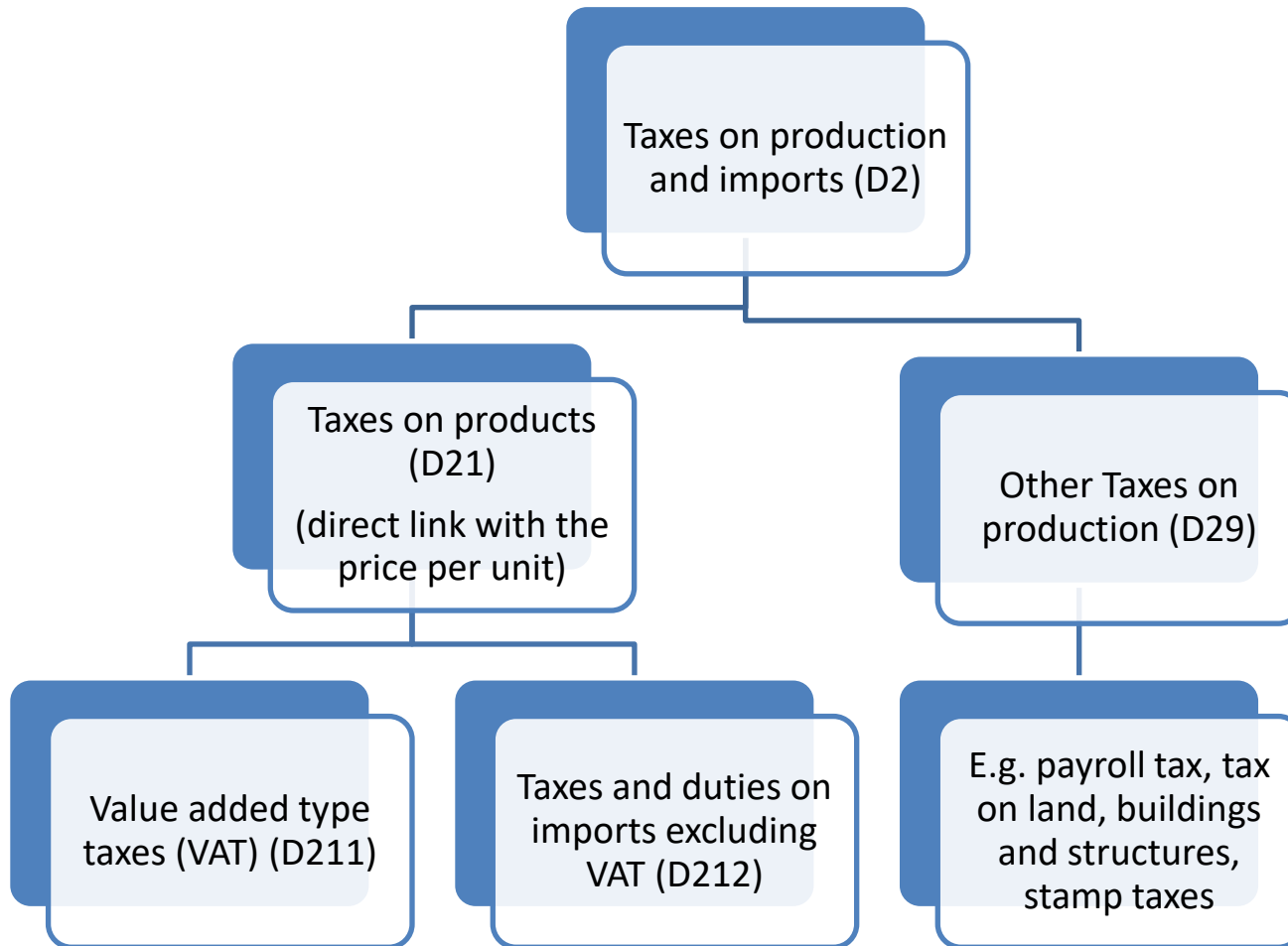
Valuation of output

- Valuation principles :
- SNA 2008 art. 6.53 *Basic prices*
 - *exclude* any taxes on products the producer receives from the purchaser and passes on to government
 - *exclude* any transport charges invoiced separately by the producer
 - *include* any subsidies on products the producer receives from government and uses to lower the prices charged to purchasers.

Producer's prices

- Second best: producers' prices
- Definition:
 - *the amount receivable by the producer from the purchaser for a unit of a good or service produced as output*
 - *minus any value added tax (VAT), or similar deductible tax, invoiced to the purchaser*
 - *minus any transport charges invoiced separately by the producer.*

Classifying Taxes



Classifying subsidies

- **Subsidies (D3)**
 - **Subsidies on products (D31)**
 - Import subsidies (D311)
 - Export subsidies (D312)
 - Other subsidies on products (D319) e.g. *Subsidies to public corporations and quasi corporations to reduce the price per unit of the product*
 - **Other subsidies on production (D39)** e.g. payroll subsidies and subsidies to reduce pollution

Estimating Market Output in current prices

- Step 1: Identify market producers (goods and services ***sold*** at economically significant prices) in your SBR
- Determine which establishments to include in the data collection process
 - sample
 - complete count
 - Combination

Estimating market output cp cont'd

- Collect the data using the NAS and/or administrative data source e.g. VAT
- For *most* of the industries market output =
 - turnover or receipts from sales of market producers
 - *plus* changes in inventories of finished goods and work in progress
 - (*plus* taxes minus subsidies on products
 - *minus* any separately invoiced transport charges)

Estimating market output cp cont'd

- For some industries (e.g. agriculture, mining and manufacturing) sales may be derived as $P*Q$

Estimating market output cp cont'd

- Output details by product for SUT and detailed product analysis



Estimating market output cont'd

- Inflate or gross up sample data
- Impute for non response



Estimating market output cont'd

- Specific output calculation for selected industries (Section K: ISIC rev.4)
 - Wholesale and retail trade
 - Financial and insurance activities
 - Central Bank
 - Insurance
- Construction
- Transportation (freight)

The output of wholesaler or retailer identity:

- the value of output = trade margin =
 - the value of sales,
 - **plus** the value of goods purchased for resale *and used for intermediate consumption, compensation of employees (in kind)*,
 - **minus** the value of goods purchased for resale,
 - **plus** the value of additions to inventories of goods for resale,
 - **minus** the value of goods withdrawn from inventories of goods for resale,
 - **minus** the value of recurrent losses due to normal rates of wastage, theft or accidental damage

Wholesale and retail trade cont'd

| Exercise Calculating Output | |
|------------------------------|--------|
| Description | Number |
| Sale of goods | 60000 |
| purchase of goods for resale | 50000 |
| Opening stock | 4000 |
| Closing stock | 5000 |
| Compensation in kind | 300 |
| Output | ?? |

Wholesale and retail trade cont'd

| Exercise Calculating Output | |
|--|--------|
| Description | Number |
| Sale of goods (incl. payments in kind) | 60000 |
| purchase of goods for resale | 50000 |
| Opening stock | 4000 |
| Closing stock | 5000 |
| Compensation in kind | 300 |
| Output | 11300 |

Financial and insurance activities

Section: K - Financial and insurance activities

- This Section is divided into the following Divisions:
 - [64](#) - Financial service activities, except insurance and pension funding
 - [65](#) - Insurance, reinsurance and pension funding, except compulsory social security
 - [66](#) - Activities auxiliary to financial service and insurance activities
- See further detailed ISIC rev.4

Financial service activities, except insurance and pension funding

- The output of financial intermediaries is basically calculated as the difference between the interest, fees and commissions received and the interest paid
- FISIM plus any fees and commissions

FISIM

- Use one reference rate to calculate FISIM on loans and deposits with resident financial institutions
- Reference rate is a rate between bank interest rates on deposits and loans
- Cannot be calculated as a simple average of rates on loans or deposits
- Residents having loans and deposits with non-resident banks use different reference rates

FISIM –Simple Exercise

Deposits = USD 500 mil

Loans = USD 300 mil

Bank Interest rates on deposits: 6 %

Bank Interest rates on loans 15 %

If the reference rate is 10 %

Calculate FISIM

FISIM –Simple Example

Deposits = USD 500 mil

Loans = USD 300 mil

Bank Interest rates on deposits: 6 %

Bank Interest rates on loans 15 %

If the reference rate is 10 %

Calculate FISIM

FISIM rate on deposit = $10\% - 6\% = 4$ percent

FISIM ON DEPOSIT = $500(0.04) = 20$ mil

FISIM rate on loan = $15\% - 10 = 5$ percent

FISIM ON LOAN = $300(0.05) = 15$ mil

Central Bank

- Services produced by the central bank are identified in three broad groups:
 - financial intermediation
 - monetary policy services and
 - supervisory services - overseeing financial corporations.

Central Bank cont'd

- Financial intermediation services represent market production,
 - individual in nature
 - interest rates charged by the central banks
- Monetary policy services represent non-market production
 - collective in nature,
 - serving the community as a whole
- Supervisory services may be treated as market or non-market services depending on whether explicit fees are charged that are sufficient to cover the costs of providing such services

Central Bank cont'd

- Preferred method: identify separate establishments by type of output
- If impossible : second best method: treat the whole output of the central bank as non-market and estimate as the sum of costs

Insurance

- Types of Insurance
 - Non-life insurance – Automobile, Fire, health, homeowner, personal accident insurance, etc.
 - Life insurance – mainly premature death
 - Re-insurance – insurance between one insurance corporation and another (insurance corporations limit their risk through this)

Non-life insurance output

- Premiums *earned* plus premium supplements less adjusted claims *incurred*
- Adjusted claims may be calculated by modelling past claims or from accounting information

Non-life insurance

Exercise

- An insurance company in country X
 - Receipt of premiums 200 mill.
 - Payment of adjusted claims 202 mill.
 - Premium supplements : 10
- Calculate output

Non life insurance cont'd

- Many insurance companies offer lower premiums if they are paid up front rather than monthly
- This “discount” is made up by the investment income the insurance company earns

Life insurance

- Life insurance is a savings device
- Premiums paid as single lump sum or on a regular basis
- Much larger claim (usually called a benefit for life insurance) is received some time in the future

Life insurance cont.

- The premium paid is invested
 - premium supplements
 - allocated to actuarial reserves to be able to pay out the larger claims/benefits

Life insurance output

- Do not need to adjust claims/benefits
- $\text{Output} = \text{premiums earned} + \text{premium supplements} - \text{benefits due} - \text{increase (+decrease) in actuarial provisions for life insurance}$
- Only individuals have life insurance so all service charge payable as final consumption expenditure of households

Reinsurance

- Output of reinsurance
= actual premiums earned less commissions payable
plus premium supplements less both adjusted claims
incurred and profit sharing
- Insurance companies insure themselves against
unexpected disasters

Activities auxiliary to financial service and insurance activities

- The output of these enterprises is equal to the fees and commissions earned.

Output for own final use

- Equal to the sum of the value of:
 - **goods** produced by an unincorporated enterprise and consumed by the same household;
 - **services** provided to households by paid domestic staff;
 - **imputed services** of owner-occupied dwellings;
 - **fixed assets** produced by an establishment that are retained within the same enterprise for use in future production (own-account gross fixed capital formation)
 - **changes in inventories** of finished goods and work-in-progress intended for one or other of the above uses;
 - (In exceptional cases: output for own intermediate use e.g use of part of the crop for seed in agriculture)

Valuation of output for own final use

- Preferred valuation : basic prices at which the goods and services could be sold if offered for sale on the market
- Second best procedure : the sum of their costs of production

Owner-occupied dwellings

- Only household service within the production boundary
- Dwellings are treated as capital formation owned by households
- Persons who own dwellings (in which they live) treated as owners of unincorporated enterprises that produce housing services
- These housing services are consumed by the household to which the owner belongs

Owner-occupied dwellings

- Value of output = value of rental
- If majority of houses are rented, the assumption is that the market rental stratified by size, quality, type, location, etc. is a good proxy
- Market rental is not a good proxy when:
 - less than 25 per cent of all dwellings in the country are actually rented;
 - more than half of the rented dwellings are occupied by foreigners paying high rents or by government or other employees paying low rents; and
 - rented dwellings are not evenly distributed over all parts of the country
- Alternative: user cost approach

Owner-occupied dwellings

- Alternative – user cost approach
- estimating each of the costs that owners of dwellings would need to take into account to determine a market rent if they would decide to rent their dwelling
- Sum of :
 - Intermediate consumption (P2).
 - Other taxes on production (D29).
 - Consumption of fixed capital (K1).
 - Net operating surplus (B2).
- Net B2 estimated using current market value of the stock of owner occupied dwellings (excluding land) based on a rate of return

Regional approach

- Owner occupied dwellings: the number of owner occupied dwellings multiplied by the imputed rental.
- The market rental of certain types of houses (e.g. with more than 3 bedrooms) is used as proxy for the imputed rental
- Few countries conduct an quarterly rental survey for updating the price; others extrapolate using CPI
- Results of SLC used to move the stock of dwellings from the census.

Intermediate consumption

Estimation of intermediate consumption

- Intermediate consumption:
 - the value of the goods and services consumed as inputs by a process of production,
 - *minus* the changes in inventories of materials and supplies to be used as inputs in the production process

Coverage cont'd

- Intermediate consumption does **NOT** include:
 - Expenditures on valuables
 - Consumption of fixed capital.

Valuation of intermediate inputs

- Valuation : purchaser's price at the time the product enters the process of production:
 - The basic price received by the producer of the good or service;
 - *plus* any transportation costs paid separately by the purchaser
 - *plus* the cumulative trade margin on a good that passes through the chain of wholesale or retail distribution;
 - *Plus* Any non-deductible tax less any subsidy on the product

GDP production approach

- GVA by industry at **basic prices** = output at basic prices – IC at purchasers' prices
- GVA by industry at **producers' prices** = output at producers' prices – IC at purchasers' prices
- Total economy
 - GDP = sum of GVA by industry at **basic prices** + all (taxes – subsidies) on products
 - GDP = sum of GVA by industry at **producers' prices** + (taxes – subsidies) on imports + non-deductible VAT

Volume measures of GVA

Calculating GVA in constant prices

Why constant prices?



Constant prices

- Removing effects of changes in price levels in the GDP
- How?
 - Basically three methods :
 - extrapolation by volume index
 - deflation by a corresponding price index
 - Revaluation method

GVA in constant prices

- GVA in constant prices =
- output in constant prices
- minus intermediate consumption in constant prices

Output in constant prices

- Different types of output
- Focus : Market Output and output for own final use
- Deflation of the output in current prices by :
 - PPIs : several countries have PPIs for manufacturing
 - Model and specification prices e.g. in construction
 - Hourly rates (price charged per hour) e.g. for service industries
 - Product specific CPIs for e.g. personal services (no distribution margin, no change in tax or subsidy rates, and households consume most of the output)
 - Unit value indices for e.g. imported consumption goods
 - Input prices should be avoided (C-method)
 - Special case : BMPI used for deflating construction output derived from commodity flow approach

Output in constant prices

- Direct deflation of GVA should be avoided



Volume Measures of Market Output and output for own final use

- Extrapolation of the base year value by output volume indicators
 - Indicators should be collected at a detailed level for homogeneous products
 - Representative for all output
- Quantity revaluation – usually agricultural output

Examples of volume indicators

| Industry | Volume indicator |
|----------------|---------------------------|
| Accommodation | Number of bed nights |
| Electricity | Kwh produced |
| Water | Quantity of M3 |
| Land transport | Passenger km or miles |
| Agriculture | Physical quantity indices |
| Mining | Physical quantity indices |

Volume Measures of intermediate consumption

- Deflation of the current price value by a corresponding input price index on a detailed product level
- Extrapolation by the base year value by a volume index of output
 - Separate deflation of domestically produced and imported products
 - To be avoided – deflation of intermediate consumption at aggregated level, with no product detail

Volume measures of GVA

- $\text{GVA in constant prices} = \text{Output in constant prices} - \text{intermediate consumption in constant prices}$
- Preferred method : Double indicator method
- Second best: single indicator method

Volume measures of GVA

- SNA recommends moving from fixed base year to previous year prices and chain-linking
 - Use Fisher volume and price indices
 - Alternatively, use Laspeyres volume and Paasche price indices

Laspeyres

Index numbers

Weighted composite index numbers

- Laspeyres approach

- The base period values will be assigned as weights to the items in the basket

- *Laspeyres price index*

$$P_L = \frac{\sum p_n q_0}{\sum p_0 q_0} \times 100$$

Price index:
weight is the quantity
in the base period

- *Laspeyres quantity index*

$$Q_L = \frac{\sum q_n p_0}{\sum q_0 p_0} \times 100$$

Quantity index:
weight is the price
in the base period

Paasche

Index numbers

Weighted composite index numbers

- Paasche approach

- The consumed current period values will be assigned as weights to the items in the basket

- *Paasche price index*

$$P_P = \frac{\sum p_n q_n}{\sum p_0 q_n} \times 100$$

Price index:
weight is the quantity
in the current period

- *Paasche quantity index*

$$Q_P = \frac{\sum q_n p_n}{\sum q_0 p_n} \times 100$$

Quantity index:
weight is the price
in the current period

Fisher

- Geometric mean of Paasche and Laspeyres

$$F = \sqrt{\frac{\sum_{j=1}^N P_{j,0} q_{j,t}}{\sum_{j=1}^N P_{j,0} q_{j,0}} \times \frac{\sum_{j=1}^N P_{j,t} q_{j,t}}{\sum_{j=1}^N P_{j,t} q_{j,0}}}$$

Summary of Member States practices

- Main finding : all Member States use the single indicator method for most of the industries
- Some countries do attempt the use of the double deflation method for selected industries
- Fixed base year (no chaining)

Summary of Member States practices

- Most countries use single extrapolation methods
- Limited number of countries compile PPIs and these relate mainly to mining and manufacturing
- Other types of prices available such as CPI and UVIs are widely used.

The end

Thank you for your attention