PRASC

Project for the Regional Advancement of Statistics in the Caribbean

Projet régional pour l'avancement de la statistique dans les Caraïbes

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CARIBBEAN NATIONAL ACCOUNT TRAINING PROGRAM

Project for the Advancement of Statistics in the Caribbean Region (PRASC)
National Accounts Training
Session 9 – GDP Production (GDP-P)

January 2018

National Accounts

Gross Domestic Product - Production Approach

National Accounts - Overview

➢Course Objective

- ✓Provide national account compilers with an overview of the production approach to measuring GDP.

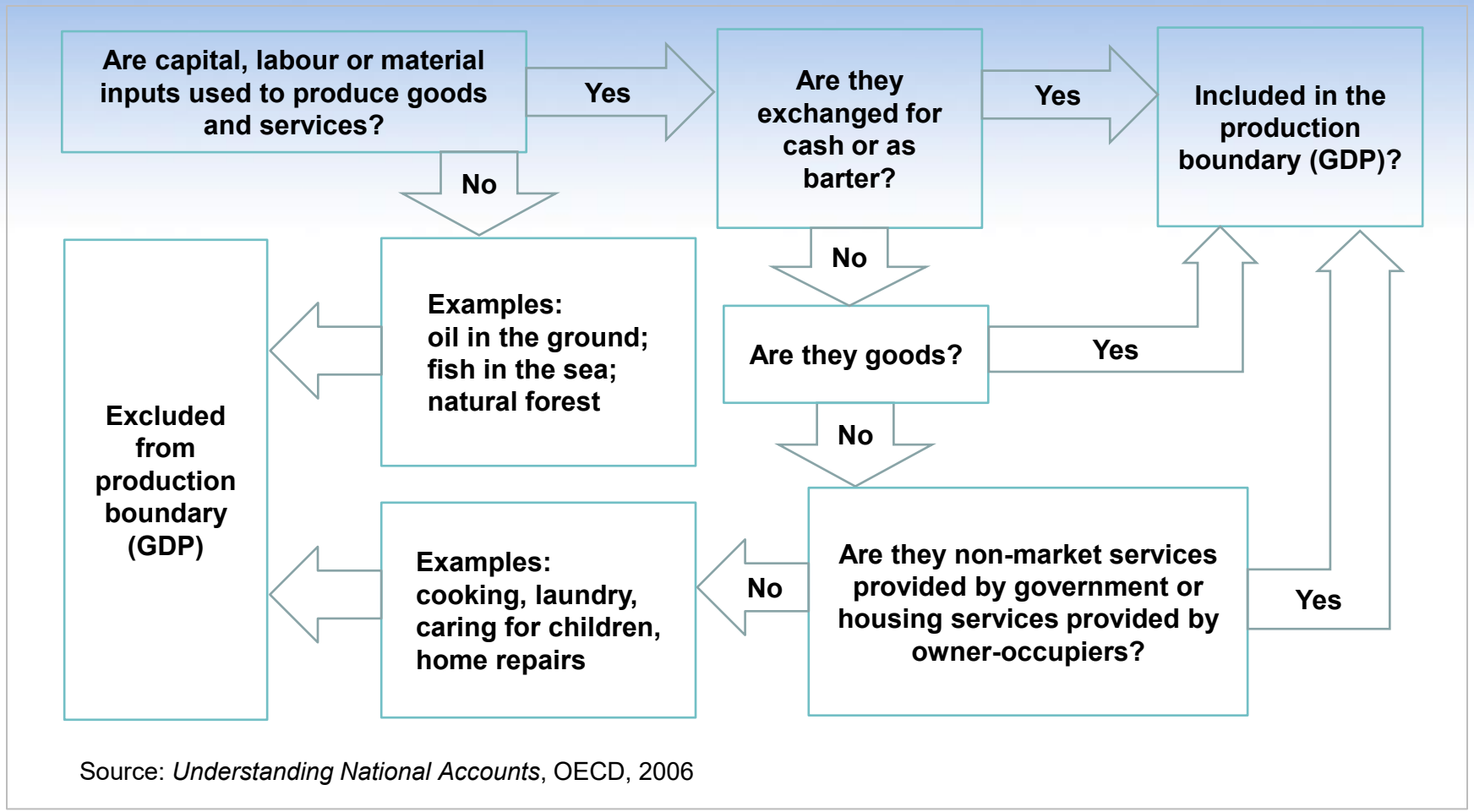
Production

- ***Production is an activity, carried out under the responsibility, control and management of an institutional unit, that uses inputs of labour, capital, and goods and services to produce outputs of products (goods and services).***

$$Y=f(L,K,IC)$$

- ***Output, therefore is the result of production***

Production takes place within a boundary



Source: *Understanding National Accounts*, OECD, 2006

Output

- Output is defined as the goods and services produced by an establishment with the following exceptions:
  - the value of any goods and services used in an activity for which the establishment does not assume the risk of using the products in production, and
  - the value of goods and services produced and consumed by the same establishment except for goods and services used for capital formation (fixed capital or changes in inventories) or own final consumption.

Output – excluding the value of any goods and services used in an activity for which the establishment does not assume the risk of using the products in production

- Assume that an oil refinery processes crude oil it owns—in this case the output will be refined crude petroleum.
- Assume that the oil refinery processes crude oil that is owned by someone else—in this case the output will be a refinery service (the output excludes the value of the good—crude oil in this case—used in an activity for which it does not assume ownership).

Output – excluding the value of goods and services produced and consumed by the same establishment except for goods and services used for capital formation (fixed capital or changes in inventories) or own final consumption.

- Suppose a manufacturing firm has a large accounting department within it's organization. The accounting department provides accounting services to the rest of the manufacturing firm. The accounting services would not be included in the output of the manufacturing firm. The accounting services represent a service produced by the enterprise and consumed by that same enterprise.

- Assume now that a manufacturing firm has an extensive research and development department. The research and development department provides product development services for the rest of the manufacturing firm. Since research and development is considered capital formation this activity would be included as part of the output of the manufacturing firm.

Output – within the national accounts there are three types of output.

1. **Market output**
   - Market output consists of output intended for sale at economically significant prices. Economically significant prices are prices that have a significant effect on the amounts that producers are willing to supply and on the amounts purchasers wish to buy.

2. **Output for own final use**
   - Output for own final use consists of products retained by the producer for his own use as final consumption or capital formation.

3. **Non-market output**
   - Non-market output consists of goods and individual or collective services produced by non-profit institutions serving households (NPISHs) or government that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole. Applies only to general government and NPISHs—households and corporations only produce market output or output for own final use.

Measuring market output

Market output =

+ Sales
+ Own consumption for final use
- Change in inventory

Measuring Market Output - Example

Measuring the market output of manufacturers

- Manufacturer:
  - Sales = 1,000
  - Opening inventory – finished goods = 100
  - Closing inventory – finished goods = 500
  - Opening inventory – goods in progress = 100
  - Closing inventory – goods in progress = 50
  - Build a storage facility valued at $500
- Output =

Measuring Market Output - Special cases

- Measuring output is not always straight-forward. Consider the following producers:
  - Retailers and wholesalers
  - Banks
  - Insurance companies
- Do you think estimates of their sales, plus change in inventories, plus own account production is an appropriate measure of their output?

Measuring Market Output - Special cases

Measuring the market output of retailers and wholesalers

- Their output is measured by the total value of the trade margins realized on the goods they purchase for resale (i.e. , there output is a service and not a good).
- the value of output of retailers and wholesalers =

  \+ the value of sales,

  \+ *the value of goods purchased for resale and used for* intermediate consumption, compensation of employees, etc.,

  \- *the value of goods purchased for resale,*

  \+ *the value of additions to inventories of goods for* resale*,*

  \- *the value of goods withdrawn from inventories of* goods for resale*,*

  \- *the value of recurrent losses due to normal rates of* wastage, theft or accidental damage

Measuring Market Output - Special cases

Market output of retailers and wholesalers

- Sales = $1000
- Purchase of goods for resale = $400
- Opening inventory goods purchased for resale = $200
- Closing inventory goods purchased for resale = $100
- Output =

Measuring Market Output - Special cases

Measuring the market output of financial corporations

- Financial services may be paid for explicitly or implicitly. Some transactions in financial assets may involve both explicit and implicit charges. Four main ways in which financial services are provided and charged for may be considered:
  - Financial services provided in return for explicit charges;
  - Financial services provided in association with interest charges on loans and deposits;
  - Financial services associated with the acquisition and disposal of financial assets and liabilities in financial markets;
  - Financial services associated with insurance and pension schemes.

Measuring Market Output - Special cases

Financial Intermediation Service Indirectly Measured (**FISIM**)

- One traditional way in which financial services are provided is by means of financial intermediation.
- This is understood to refer to the process whereby a financial institution such as a bank accepts deposits from units wishing to receive interest on funds for which the unit has no immediate use and lends them to other units whose funds are insufficient to meet their needs.
- The bank thus provides a mechanism to allow the first unit to lend to the second.
- Each of the two parties pays a fee to the bank for the service provided, the unit lending funds by accepting a rate of interest lower than that paid by the borrower, the difference being the combined fees implicitly charged by the bank to the depositor and to the borrower. *(2008 SNA P6.163)*

Measuring Market Output - Special cases

Financial Intermediation Service Indirectly Measured (**FISIM**)

- In order to measure financial intermediation the SNA has developed the concept of the reference rate.
- The reference rate can be thought of as the rate of interest a lender is willing to accept and a borrower is willing to pay if they met on the street and on a “handshake” agreed to lend and borrow funds from each other.
- It is also often referred to as the risk free interest rate. This is why things such as government bond rates are often used as a proxy for the reference rate.

Measuring Market Output - Special cases

Financial Intermediation Service Indirectly Measured (**FISIM**)

- Individual A deposits $1000 on the bank and the bank pays Individual A 1% interest annually.
- The bank loans the $1000 to Individual B and charges Individual B 3% interest annually.
- Assume the reference rate is 2% - (the rate Individual A would charge Individual B if they met on the street and agreed to lend and borrow with each other).
  - Deposit FISIM =
  - Loan FISIM =

Measuring Market Output - Special cases

Financial Intermediation Service Indirectly Measured (**FISIM**)

- The output of the bank is the sum of deposit FISIM ($10) and loan FISIM ($10) or $20—it is the value of the intermediation service the bank is providing as the intermediary between the lender (Individual A) and the borrower (Individual B).

- The $10 represents the implicit charge by the bank to the depositor for finding the lender and the $20 represents the implicit charge by the bank to the lender for finding the depositor.

Measuring Market Output - Special cases

Measuring the market output of non-life insurance companies

- The basic method for measuring non-life insurance output is the following:
  - total premiums earned,
  - plus premium supplements,
  - less adjusted claims incurred.

Measuring Market Output - Special cases

Measuring the market output of non-life insurance companies

- Under a non-life insurance policy (home insurance), the insurance company accepts a premium from a client and holds it until a claim is made or the period of the insurance expires.
- In the meantime, the insurance company invests the premium and the property income is an extra source of funds from which to meet any claim due.
- The property income represents income foregone by the client and so is treated as an implicit supplement to the actual premium.
- The insurance company sets the level of the actual premiums to be such that the sum of the actual premiums plus the property income earned on them, less the expected claim, will leave a margin that the insurance company can retain; this margin represents the output of the insurance company.

Measuring Market Output - Special cases

Measuring the market output of non-life insurance companies

- You pay a $1000 annual premium on your home insurance.
- The insurance company invests this and earns 5% interest or $50 (referred to in the SNA as the premium supplement)
- The expected claim is $800.

- The output (or value of the service provided by) of the insurance company is:

Measuring output for own final consumption

- Output for own final use should be valued at the basic prices at which the goods and services could be sold if offered for sale on the market.
- In order to value them in this way, goods or services of the same kind must actually be bought and sold in sufficient quantities on the market to enable reliable market prices to be calculated for use for valuation purposes.
- The expression “on the market” means the price that would prevail between a willing buyer and willing seller at the time and place that the goods and services are produced.

Measuring output for own final consumption

- Assume a farmer butchers a cow and consumes the beef (100 kg) – how would this output be valued in the CSNA given the following:
  - Value of the cow = $3000
  - Value of butcher services = $500
  - Average value of beef at the local grocery store = $10 per kg.
- Option A = $3000 + $500
- Option B = $10,000
- Option C = $10,000 + $3000 + $500 = $13,500

Measuring output for own final use – capital formation

- The value of own production of capital goods is deemed to be equal to the sum of the costs of production: that is, as the sum of:
  - Intermediate consumption;
  - Compensation of employees;
  - Consumption of fixed capital;
  - Other taxes (less subsidies) on production.
- By convention, no net return to capital is recorded on own-account production of capital goods.
- This means that the cost of a structure built on own-account is valued different than the cost of a structure purchased from another enterprise as the purchased structure will include a return to the owner.

Measuring non-market output

- The value of the non-market output provided without charge to households is estimated as the sum of costs of production, as follows:

  + Intermediate consumption
  + Compensation of employees
  + Consumption of fixed capital
  + Other taxes (less subsidies) on production

➢ Only governments and non-profit institutions serving households produce non-market output.

Intermediate consumption

Intermediate consumption

- Intermediate consumption consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital.

Intermediate consumption

- Intermediate consumption is not always easy to define.
- Sometimes it is difficult to distinguish between intermediate consumption and compensation of employees
  - All the following are treated as intermediate consumption:
    - Tools and equipment used at work; protective clothing, uniforms; barracks, dormitories, etc., travel and hotel services while on business, changing facilities, washrooms, etc., medical facilities

Intermediate consumption

- Sometimes it is difficult to distinguish between intermediate consumption and fixed capital formation
  - Small tools – flexibility
  - Maintenance and repairs
    - “Small” or regular are intermediate consumption
    - Large or such as to extend an asset’s life or improve it s performance are capital formation
  - Mineral exploration and evaluation – always capital
  - Military weapons systems

Intermediate consumption

- Intermediate consumption is recorded when the good enters the production process as distinct from the time it was acquired from the producer.

- Intermediate consumption is valued at the price the producer would pay when the goods enter the production process. This is referred to as the purchaser price which includes such things as an transportation costs the purchaser incurred in receipt of the good as well as any non-deductible tax on the product.

Gross value added

Gross value added

- Gross value added is the first “balancing item” in the SNA sequence of accounts
- Gross value added represents the difference between Output and intermediate consumption.
- Gross value added can be calculated by sector or by industry.

Gross value added

	Mining	Manufacturing	Services	Total
Output	10,000	7,000	15,000	32,000
Less: intermediate consumption	4,000	3,000	9,000	16,000
Equals: gross value added	6,000	4,000	6,000	16,000
IO ratio	0.40	0.43	0.60	0.50

- All that work for three numbers! – but you have some very powerful analytics!

Gross value added

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- As we will see later, the production account can be expanded into an input-output table which is a powerful analytical tool.
- Input-output tables can be used to answer questions such as "*What is the impact of increased business investment in industry X on gross domestic product, output and employment?*"

National Accounts – GDP-P

➢Key takeaways

✓GDP-P = Output less intermediate consumption.

✓When calculating output there are a number of special cases the national accounts compiler needs to be aware of (e.g. margin output, FISIM, Output for own final use).

✓National Account compilers need access to detailed information in order to properly calculate GDP-P.

National Accounts – GDP-P

➢Activity

✓What are the data sources in your country that would permit you to develop an estimate of GDP-P?