Lecture 2 (Part 1)
Gross Domestic Product

2

How do we measure the size of Singapore's economy?

Singapore economy grew 2.2% in Q3, less than expected; full-year growth forecast at 3% to 3.5%

The growth in the third quarter was primarily supported by the finance and insurance, manufacturing and business services industries. ST PHOTO: KUA CHEE SIONG

3

How do we measure the size of Singapore's economy?

Nation's Output

4

Gross Domestic Product (GDP)

5

Lecture Outline

- Measuring GDP using:
  - **Output method**
  - **Expenditure method**
  - **Income method**
- **Real** and **nominal** GDP
- Real GDP and economic well-being

6

Output Method of Measuring GDP

7

What is GDP?

Gross Domestic Product (GDP) is

the market value of

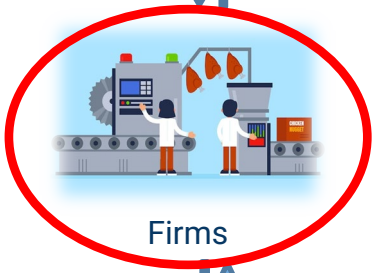
final goods and services

produced in a country in a given period of time.

Factor income (wage, rent, interest, profit)

Resources from households

Households



Firms

Goods and services

Consumption expenditure

What is GDP?

Gross Domestic Product (GDP) is

the market value of

final goods and services

produced in a country in a given period of time.

Market Value

- **Market value** is the selling prices of goods and services in the open market
- Why market value?
  - Market price is a good indication of the benefit buyers receive from the good
  - Allow **aggregation** of large number of goods and services produced in a country
    - Dollar value versus quantity
    - Give higher weighting to more expensive items

Non-Market Goods & Services

- Goods and services not bought and sold in markets, e.g. homemaking activities, are not included in GDP
- Government goods and services although also not sold in the market, e.g. education and defense, are included in GDP
  - Valued at cost, e.g. salaries of teachers and administrators, costs of acquiring and maintaining weapons

Final Goods and Services

- **Final goods and services** are consumed by the ultimate user
  - End products of production
  - **Included** in GDP
- **Intermediate** goods and services are used up in the production of final goods
  - **Not included** in GDP to avoid double counting

Final Goods and Services

- Example



  - Farmer grew and harvest **grain**. Sold $0.50 of grain to a flour mill
  - Flour mill ground the grain into **flour** and sold to a baker for $1.20
  - Baker baked a **baguette** using the flour and sold to Customer for $2.00.
  - Intermediate good? Final good?
  - Total contribution to GDP?

Goods Can Be Final and Intermediate

- For example, milk can be sold as a final product or used as an intermediate good
  - Cartons of milk sold in supermarket
  - Cartons of milk sold to restaurants
  - Count only the final goods

15

Capital Goods

- Examples of **capital goods** include factories, machines, houses
- Used in the production of other goods and services
- But they are not used up during the production process. They are long-lived goods
- Classified as **final goods** for purpose of measuring GDP

Value Added

- Market value of final goods and services can be determined by adding up value added by each firm in the production process
- **Value added** is the market value of the product minus the cost of inputs purchased from other firms

Company	Revenues	Cost of Purchased Inputs	Value Added
Farmer	$0.50	$0.00	$0.50
Flour Mill	$1.20	$0.50	$0.70
Baker	$2.00	$1.20	$0.80
Total			$2.00

17

Produced in a Country in a Period of Time

- "**Domestic**" in GDP means the activity is measured **within a country's borders**
  - Nationality of owners or company is not relevant
  - Use GNP (Gross **National** Product) if we are interested in nationality

Produced in a Country in a Period of Time

- Only include goods and services **newly** produced during a given period
- Does sale of an existing home contribute to GDP?
  - A 20-year-old apartment was sold to a young family for $500,000 this year
  - Seller paid a commission of $10,000 to the housing agent
  - Apartment was not built this year
    - Not included in this year's GDP
  - Commission is payment for the services provided by the agent this year
    - Included in this year's GDP

Expenditure Method of Measuring GDP

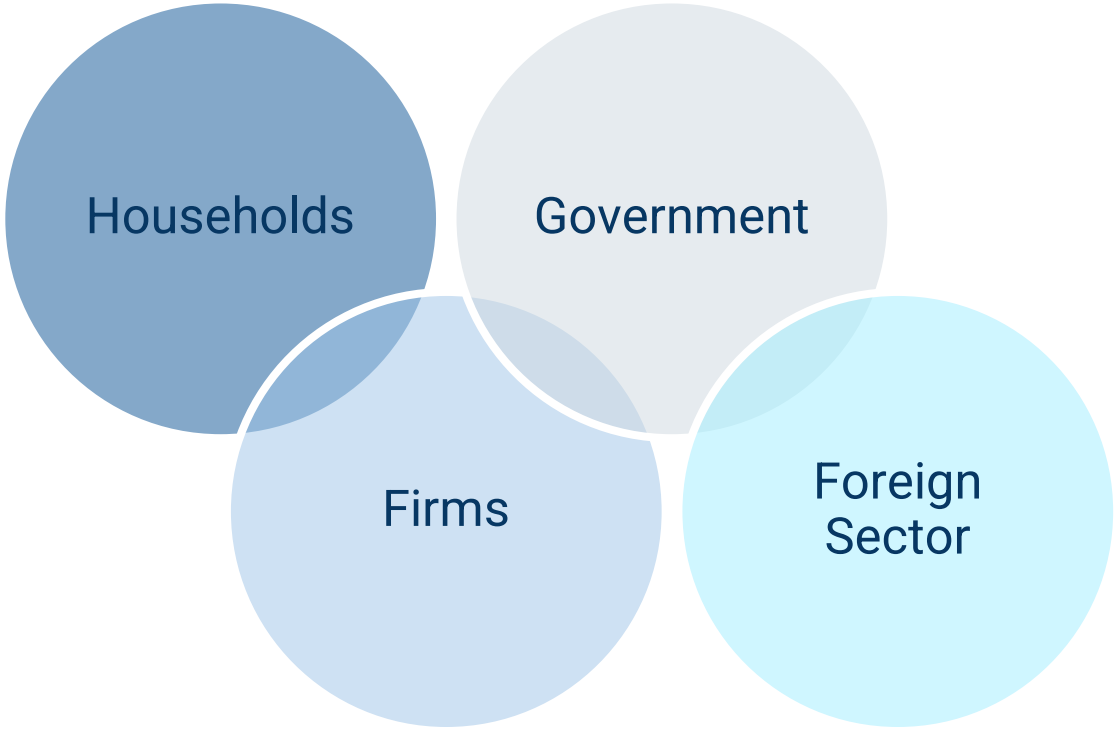
Output  Expenditure

Output

Expenditure

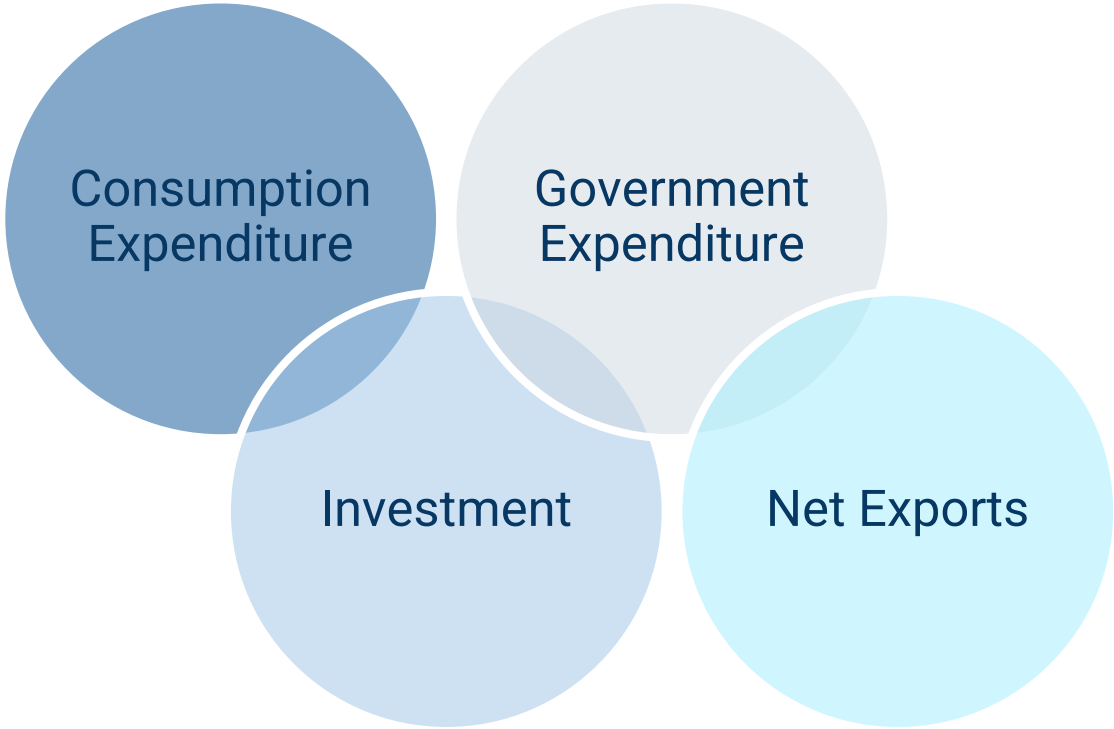
How do we add up expenditure of all the final goods and services?

Four Categories of Users



24

Four Categories of Expenditure



Four Categories of Expenditure

- Expenditure method for measuring GDP:

$$Y = C + I + G + NX$$

Y	Gross Domestic Product or output
C	Consumption Expenditure
I	Investment
G	Government Expenditure
NX	Net Exports

US GDP, 2019 (billions of dollars)

Consumption		**14,562.7**
Durable Goods	1,526.8	
Non-durable Goods	2,978.1	
Services	10,057.7	
Investment		**3,743.9**
Business Fixed Investment	2,878.1	
Residential	797.5	
Inventory	68.3	
Government Purchases		**3,753.0**
Net Exports		**– 631.9**
Exports	2,504.3	
Imports	3,136.1	
GDP		**21,427.7**

Consumption Expenditure

- **Consumption expenditure** is spending by households for goods and services
- Consumer **durables** are long-lived goods
  - Cars, furniture, appliances
- Consumer **non-durables** are shorter-lived goods
  - Food, clothing
- **Services**
  - Education, taxi rides, haircuts

Investment

- **Investment** is spending by firms on final goods and services
- **Business fixed investment** is purchases of new capital goods
  - Machinery, factories, office buildings
- **Residential investment** is construction of new homes and apartment buildings
- **Inventory investment** is addition of unsold goods to company's inventories
  - These goods are produced but not yet sold
  - This entry can be positive or negative

Investment

- You invested $5000 in stock of Tesla. Is this included in the computation of “investment expenditure”?
- No
- **Financial investment**: purchases of stocks, bonds, and other financial assets
  - Transfers ownership
  - Usually does not correspond to any increase in physical capital or production capacity
- **Economic investment**: the increase in the capital goods used to produce other goods

Government Expenditure

- **Government expenditure** are final goods and services purchased by government
  - Fighter jets, office supplies, teaching in primary school
- Excludes **transfer payments**
  - Transfer payments are made by government, but the government receives no goods or services
  - E.g. CDC vouchers, Workfare Income Supplement
  - No purchases of final goods and services involved in transfer payments
  - Spending by recipients is included in GDP
- Excludes **interest** paid on government debt

Net Exports

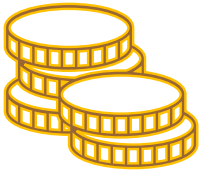
- **Net exports** equal exports minus imports (X – M)
- **Exports** are goods and services produced domestically and sold abroad
- **Imports** are purchases of goods and services produced abroad
  - Imports can be consumption, investment, or government spending
- Y = C + I + G + X - M

Income Method of Measuring GDP

Output  Income

Output

Income

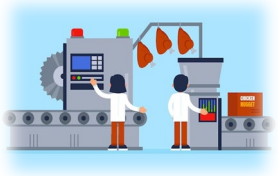


Factor income (wage, rent, interest, profit)

Resources from households

Households

When a good is sold, its proceeds are distributed to workers or business owners



Firms

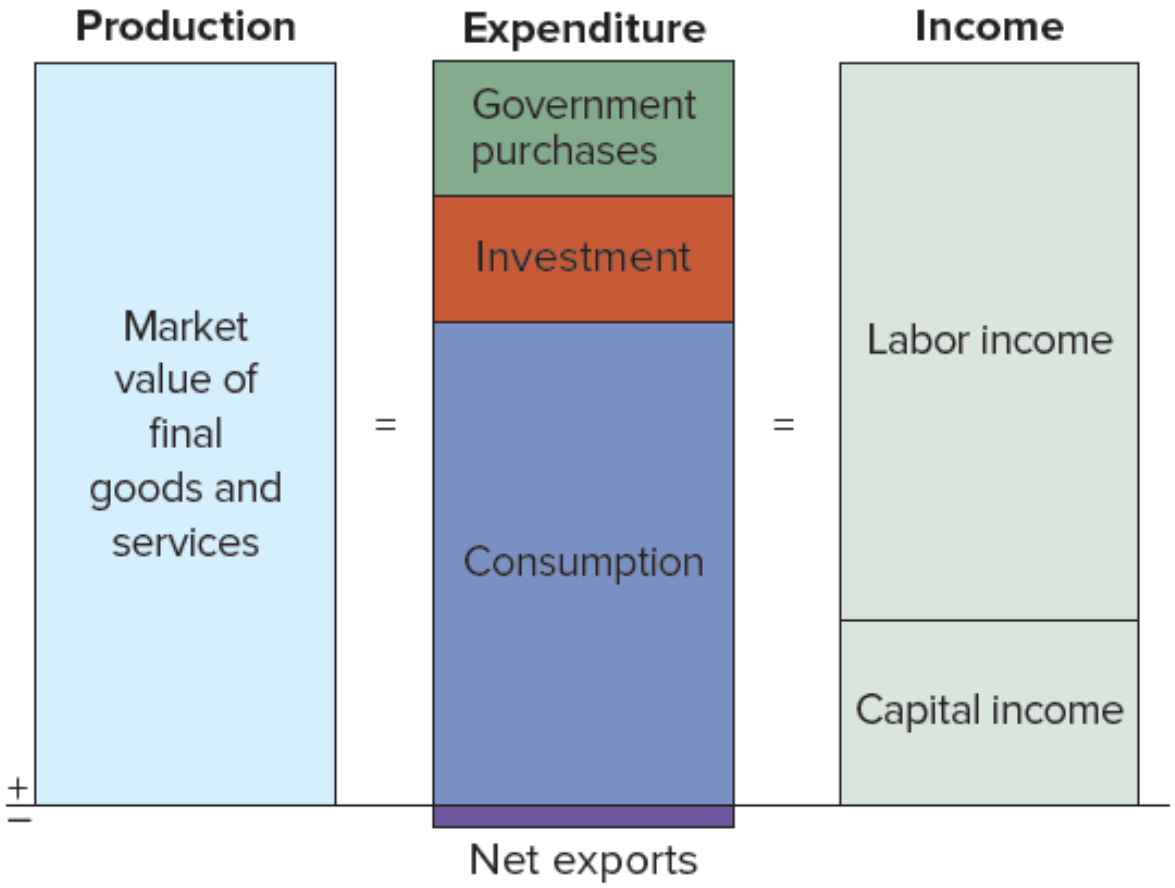
Goods and services

Consumption expenditure

Income Approach to GDP

- GDP = labour income + capital income
- Labour income is wages, salaries, benefits, and incomes of the self-employed
- Capital income pays for physical capital and intangibles
  - Profits, rent, interest, royalties

The Three Faces of GDP



Real and Nominal GDP

Calculating GDP of MacroLand

Calculating GDP of MacroLand

	# Baguette	Price of Baguette	# of laptops	Price of laptop
2017	10,000	$2	100	$1000

- GDP in 2017 = (10,000 x $2) + (100 x $1000) = $120,000

Calculating GDP of MacroLand

	# Baguette	Price of Baguette	# of laptops	Price of laptop
2017	10,000	$2	100	$1000
2021	20,000	$3	200	$1200

- GDP in 2017 = (10,000 x $2) + (100 x $1000) = $120,000
- GDP in 2021 = (20,000 x $3) + (200 x $1200) = $300,000
- Only twice as many baguette and laptops were produced in 2021; market value of output grew faster than the physical volume of output

Adjusting for Price Changes

- GDP changes over time because
  - Prices change AND
  - Quantity of output changes
- To find out how much output has grown, we need to exclude the effect of price changes (i.e. adjust for inflation)
  - Use only changes in quantity in the computation
  - Hold prices constant

Real GDP and Nominal GDP

- **Real GDP** values output in the current year using the prices from the base year
  - The **base year** is a reference year that changes infrequently
  - Real GDP measures the physical volume of production
- **Nominal GDP** values output in the current year using prices from the current year
  - Nominal GDP is the current dollar value of production

Calculating Real GDP for 2021

	# Baguette	Price of Baguette	# of laptops	Price of laptop
2017	10,000	$2	100	$1000
2021	20,000	$3	200	$1200

- Using 2017 as the base year
- Nominal GDP is $120,000 in 2017, and $300,000 in 2021
- Calculate real GDP using current year quantities and base year prices
  - Real GDP in 2021 is (20,000 x $2) + (200 x $1000) = $240,000
  - Real GDP doubled between 2017 and 2021

Observations on Real and Nominal GDP

- Usually, nominal and real GDP increase each year
- Nominal GDP can go up and real GDP go down
  - Fewer goods and services produced AND
  - Prices increase faster than output decreased
- Nominal GDP will be smaller than real GDP if the prices in the current year are less than in the base year
  - Usually true for years before the base year
- Real GDP could rise and nominal GDP fall, but this is rare
  - Prices are falling faster than output is increasing

Real GDP and Economic Well-being

Real GDP and Economic Well-Being

- Real GDP is a flawed measure of well-being
  - It values only market transactions
    - Omits non-traded activities such as household production and volunteer services
    - Non-market activities are important in developing countries
  - It omits underground economy (unreported transactions)
    - Illegal activities, e.g. organised crime
    - Unreported cash payment of temporary/part time workers

Real GDP and Economic Well-Being

- Real GDP is a flawed measure of well-being
  - It omits value of leisure
  - It omits environmental quality and resource depletion
    - Expansion of manufacturing activities could lead to severe decline in air and water quality
  - It omits quality of life
    - Crime rates, traffic congestion, Open space, etc.
  - It does not capture the effects of income inequality

GDP as a Welfare Measure

- Maximizing GDP will not necessarily maximize national well-being
- But, GDP per capita is positively associated with several measures of well-being
  - **Material standard of living**: availability of more goods and services
  - **Health and life expectancy**
    - Residents of industrialized countries fare better than residents of developing countries in a range of health measures
  - **Education**
    - Literacy and school enrolment rates are higher in high-income countries

THANKS!

Any questions?

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