Macroeconomic Principles ECON204

Key Macroeconomic Variables

1. GDP
2. Unemployment
3. Inflation

Aggregate Output

National income and **product accounts** are an accounting system used to measure aggregate economic activity.

The measure of aggregate output in the national income accounts is **gross domestic product**, or GDP.

Constructing GDP:
An example of an economy with only 2 firms:

- Firm 1 produces steel, employing workers and using machines to produce the steel. It sells the steel for $100 to Firm 2, which produces cars. Firm 1 pays its workers $80, leaving $20 in profit to the firm.
- Firm 2 buys the steel and uses it, together with workers and machines, to produce cars. Revenues from car sales are $200. Of the $200, $100 goes to pay for steel and $70 goes to workers in the firm, leaving $30 in profit to the firm

Steel company (Firm 1)		Car company (Firm 2)		
Revenues from sales	$100	Revenues from sales		$200
Expenses	$80	Expenses		$170
Wages	$80	Wages	$70	
		Steel purchases	$100	
Profit	$20	Profit		$30

GDP= $200

Three Ways of Defining GDP

1. GDP is the value of the **final** goods and services produced in the economy during a given period.

    # final good →used for final consumption.

    # intermediate good → used to produce another good.

2. GDP is the sum of **value added** in a given period.

    - Value added = value of a firm's production less the value of intermediate goods used in production.

3. GDP is the **sum of the incomes** in the economy during a given period.

In our example, final goods consumption = $200; value added of 2 firms =100+100 =$200; incomes earned from the car company are wages + profit of 70+30 = $100, and from the steel company 80+20 = $100, giving total incomes of $200.

Nominal and Real GDP

Nominal GDP is the sum of the quantities of final goods produced times their current price. Nominal GDP increases over time because:

- The production of most goods increases over time.
- The prices of most goods also increase over time.

Real GDP is constructed as the sum of the quantities of final goods times *constant* (rather than *current*) prices.

Example:
Consider a one good (car) economy in 2009-11.
Nominal GDP = quantity x price
Real GDP = quantity x price (2010)

Year	Quantity of cars	Price of cars	Nominal GDP	Real GDP (in 2010 dollars)
2009	10	$20 000	$200 000	$240 000
2010	12	$24 000	$288 000	$288 000
2011	13	$26 000	$338 000	$312 000

Nominal GDP is also called **dollar GDP** or **GDP in current dollars**

Real GDP is also called **GDP in terms of goods**, **GDP in constant dollars**, **GDP adjusted for inflation**, or **GDP in, say, 2010 dollars**.
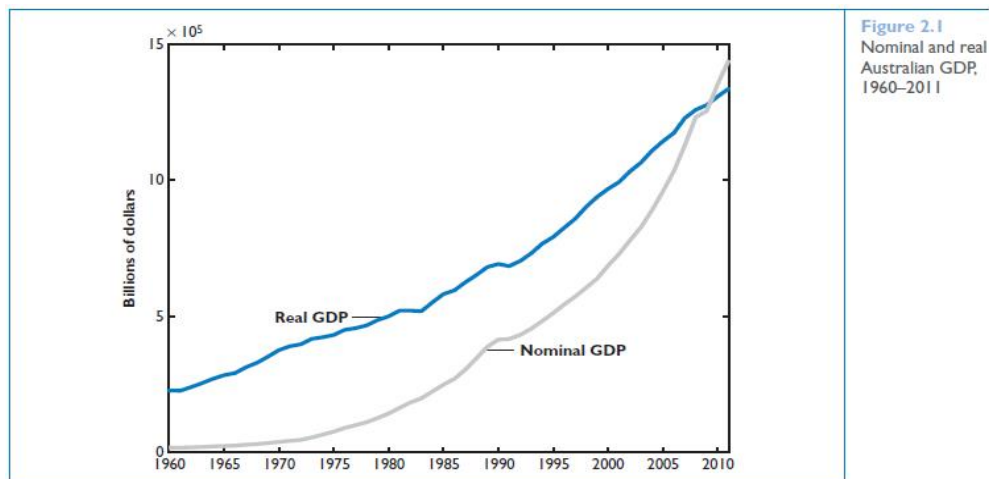
Australian and Real GDP:

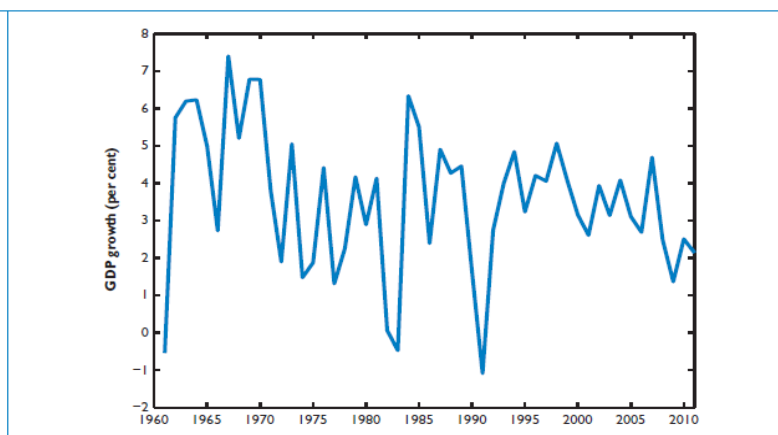From 1960 to 2011, nominal GDP increased by a factor of 83. Real GDP increased by a factor of about 6.

- Nominal GDP increased by a factor of 83
- Real GDP increased by a factor of 6

GDP growth equals:

$$\frac{(Y_t - Y_{t-1})}{Y_{t-1}}$$

- Periods of positive GDP growth are called **expansions**.
- Periods of negative GDP growth are called **recessions** (≥ 2 quarters)

Since 1960, the Australian economy has gone through a series of expansions, interrupted by short recessions. The most recent recession in 1990–91 was the most severe recession in the period from 1960 to 2011.

The Unemployment Rate

Labour force = employed + unemployed

$$L = N + U$$

Unemployment rate:
$$u = \frac{U}{L}$$

Australia June 2017
Employed 12.2 million
Unemployed 0.73 million

$$u_{Jun17} = \frac{.73}{12.2+0.73} = 5.6\%$$

Participation rate:

$$= \frac{labour\ force}{population\ of\ working\ age}$$

$$PR_{Jun\ 2017} = \frac{12.2+0.73}{19.89} = 65\%$$

The Unemployment Rate

The crisis of 2008 had a small but visible effect. The peak was after the 1989-91 recession

Why do macroeconomists care about unemployment?
Economists care about unemployment for two reasons:

- Unemployment has important social consequences.
- The unemployment rate gives them an indication of whether an economy is operating above or below its normal level of activity.

The Inflation Rate

Inflation is a sustained rise in the general level of prices—the price level. The inflation rate is the rate at which the price level increases.

Deflation is a sustained decline in the price level, or a negative inflation rate.

The GDP Deflator

$$P_t = \frac{nominal\ GDP_t}{real\ GDP_t} = \frac{\$Y_t}{Y_t}$$

The GDP deflator is what is called an index number—set equal to 100 in the base year. The rate of change in the GDP deflator equals the rate of inflation:

$$\frac{(P_t - P_{t-1})}{P_{t-1}}$$

Nominal GDP is equal to the GDP deflator times real GDP: $\$Y_t = P_t Y_t$

The Consumer Price Index

The GDP deflator measures the average price of output, while the consumer price index (CPI) measures the average price of consumption, or equivalently, the cost of living. The CPI and the GDP deflator move together most of the time.

Inflation of the Consumer Price Index and the GDP Deflator in Australia:

Figure 2.4 Inflation rate, using the CPI and the GDP deflator, 1960–2011
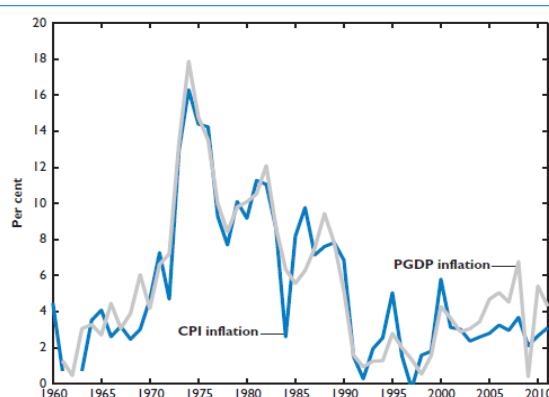
The inflation rates, computed using either the CPI or the GDP deflator, are largely similar.

SOURCES: ABS, cat. no. 6401.0, Table 1 (col. J); RBA Bulletin, Table G11 (cols L and W). © Commonwealth of Australia.

Why do they differ in the 2000s? Commodity prices

In Q1 2017, PGDP inflation =5.8% (due to export prices ~ terms of trade)
            CPI inflation   =1.9%

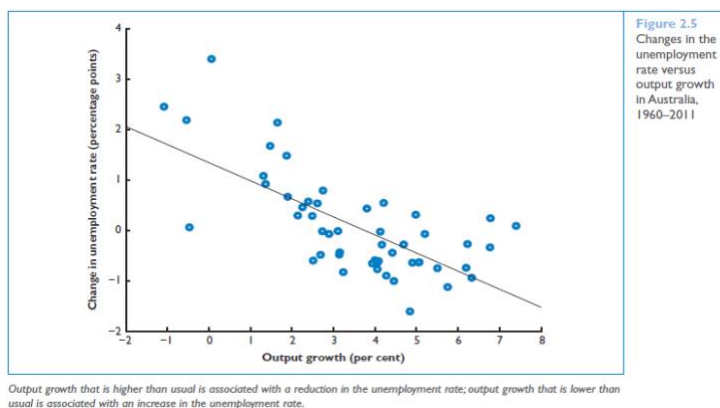**Why do Macroeconomists care about inflation?**

Economists care about inflation for at least two reasons:

- It affects relative prices (e.g. the real wage) and thus income distribution.
- It creates other distortions
  - Changes in relative prices create uncertainty and affect decision making
  - Inflation can affect taxes through tax bracket creep
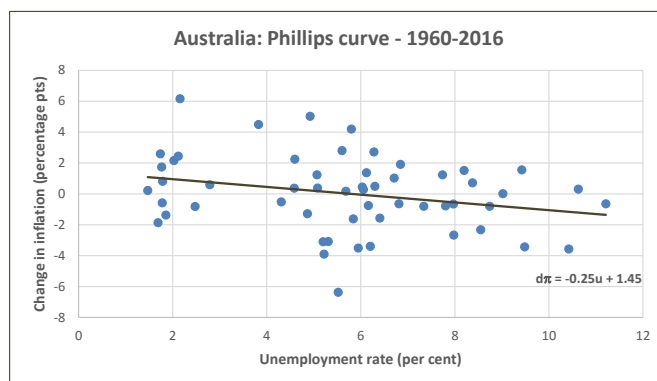
Output, Unemployment and the Inflation Rate

Okun's Law:

Output growth is negatively related to the change in the unemployment rate

Figure 2.5
Changes in the unemployment rate versus output growth in Australia, 1960–2011

Output growth that is higher than usual is associated with a reduction in the unemployment rate; output growth that is lower than usual is associated with an increase in the unemployment rate.

Phillips Curve:

The change in the inflation rate is negatively related to the unemployment rate

Australia: Phillips curve - 1960-2016

$d\pi = -0.25u + 1.45$

A Successful Economy:

A successful economy combines high output growth, low unemployment and low inflation.

- Can all these objectives be achieved simultaneously?
- Is low unemployment compatible with low and stable inflation?
- Do policy makers have the tools to sustain growth, to achieve low unemployment while maintaining low inflation?

These are the key questions of macroeconomics.

The Short, Medium and Long Run

Output is determined by:

- Demand in the short run, say, up to a few years,
- The level of technology, the capital stock, and the labour force in the medium run, say, up to a decade or so,
- Factors such as education, research, saving, and the quality of government in the long run, say, a half century or more.

The Composition of Australian GDP, 2011

Table 3.1 The composition of Australian GDP, 2011

Chain volume measures		Billions of dollars		Per cent of GDP	
GDP (Y)		1335		100	
1 Consumption (C)		747		56.0	
2 Investment (I)		314		23.5	
	Nonresidential		243		18.2
	Residential		71		5.3
3 Government spending (G)		321		24.1	
4 Net exports		−49		−3.7	
	Exports (X)		255		19.1
	Imports (IM)		−304		−22.8
5 Inventory investment		4		0.3	

SOURCE: RBA, Bulletin Table G11. © Reserve Bank of Australia, 2001–10. All right reserved.

Proportions have changed little in 2016, but GDP has risen to $1629bn (i.e. $1.629tr)

The Composition of GDP

- **Consumption (C)** refers to the goods and services purchased by consumers.
- **Investment (I),** sometimes called **fixed investment,** is the purchase of capital goods. It is the sum of **non-residential investment** and **residential investment.**
- **Government Spending (G)** refers to the purchases of goods and services by the federal, state, and local governments. It does not include **government transfers**, nor interest payments on the government debt.
- **Imports (IM)** are the purchases of foreign goods and services by consumers, business firms, and the Australian government.
- **Exports (X)** are the purchases of Australian goods and services by foreigners.

Net exports (X – IM) is the difference between exports and imports, also called the **trade balance**

$$Exports = imports \Leftrightarrow trade\ balance$$
$$Exports > imports \Leftrightarrow trade\ surplus$$
$$Exports < imports \Leftrightarrow trade\ deficit$$

Inventory investment is the difference between production and sales – tiny so we will ignore it.

The Demand for Goods

The total demand for goods is written as:

$$Z \equiv C + I + G + X - IM$$

- The symbol "$\equiv$" means that this equation is an **identity**, or definition.
- Under the assumption that the economy is closed, $X = IM = 0$, then:

$$Z \equiv C + I + G$$

Consumption: $C = C(\underset{(+)}{Y_D})$

The function $C(Y_D)$ is called the **consumption function.** It is a **behavioural equation**, that is, it captures the behaviour of consumers.

Disposable income, (Y_D), is the income that remains once consumers have paid income taxes and received transfers from the government.
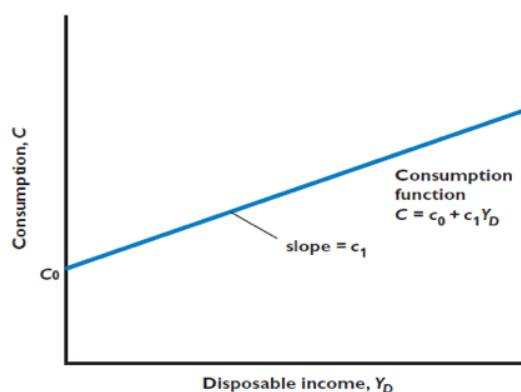
$$Y_D \equiv Y - T$$

Consumption and Disposable Income

Consumption increases with disposable income, but less than one for one.

$C = C(Y_D)$

$Y_D \equiv Y - T$

$C = c_0 + c_1(Y - T$

Consumption function
$C = c_0 + c_1 Y_D$

slope = c_1

Consumption, C

c_0

Disposable income, Y_D

Investment (I) and Fiscal Policy (G, T):
Investment is taken as given, or treated as an exogenous variable:

$$I = \bar{I}$$

Government spending, G, together with taxes, T, describes fiscal policy—the choice of taxes and spending by the government. We shall assume that G and T are also exogenous (external).