Macro Notes - Lecture note 1-10

Macroeconomics 1 (Australian National University)

WEEK 1/2:

Fallacy of Composition: states that sum of parts is always equal to the whole.

- This might not always be true when applying logic (logical fallacy)
- Whole economy does not always behave like the sum of individual markets (Before Dep. > no distinction between micro and macroeconomics)

Positive v Normative Economics:

1. **Positive economics** is the study of *what is*. (E.g. Do students who attend lectures receive higher grades as compared to those who watch them online?)
2. **Normative economics** is the study of what *ought to be*. (E.g. Lectures should be more entertaining...)

Correlation v Causation:

- **Correlation** is a statistical relationship between two (or more) sets of data (high correlation> cause-effect link between 2 factors)
- Correlations may be **spurious** (data sets highly correlated by chance)
- Testing for **Causation**:
    1. Test of correlations are consistent with prediction
    2. Conduct further tests, make sure only one factor causes another

Elements of a Typical Macro Model:

1. **Parameters** are inputs that are fixed overtime, except when the model builder changes it for an experiment
2. **Variables** are inputs that change over time. Two types:
    a. *Endogenous* variables: explained by the model
    b. *Exogenous* variables: determined outside of the model
3. **Functional relations** are rules that characterize the relationship between two or more endogenous variables in a model
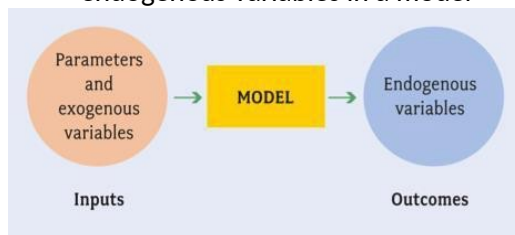
Supply and Demand (Micro) Model: The equilibrium price and quantity is determined by the

intersection of the supply and demand curves

- *Law of Supply:* Lower price > firm will supply less
- *Law of Demand:* Lower price > the more buyer will demand

The Production Model: Examines how firms (as a single entity) produce/sell G&S

- The concept of the **production function** is incorporated in this model
    - Firm takes **inputs**, uses **technology** to transform into **output**
    - Given by **Q = f (K, L, La)** where Q(output), K(Cap.), L(land), La(labour)
    - Land/Labour/Capital >Product/service generated (-value added) > G&S
- Capital:
    - *Physical Capital*: quantity of factories, equip., existing inventory in economy at a given time
    - *Human/Knowledge Capital:* Stock of skills & education In society at...""

Model 2- Circular Flow Model:

- Assume **closed economy** (in state of autarky) as opposed to **open** (trades with other economies)
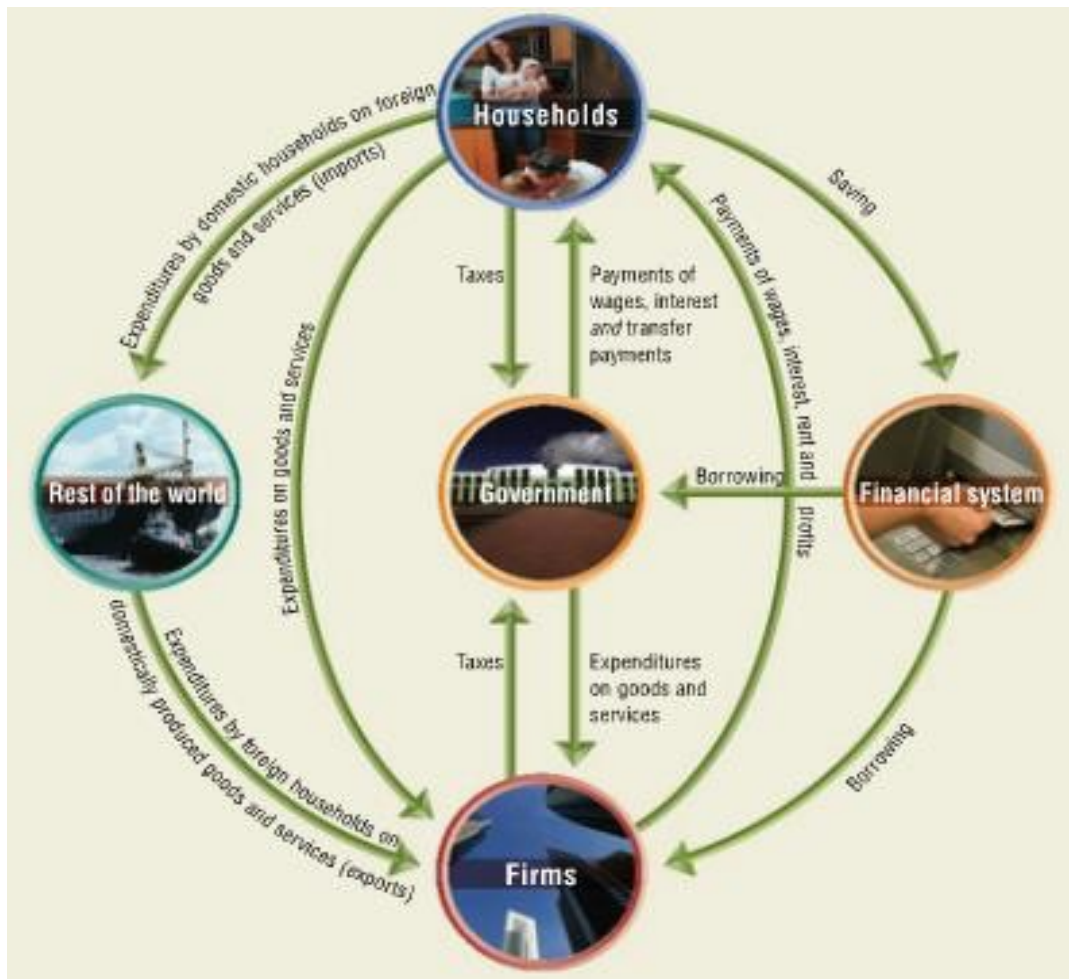
Model 3- Production Possibilities Frontier: Indicates range of outputs which efficiently produced and trade-off between different bundles of output
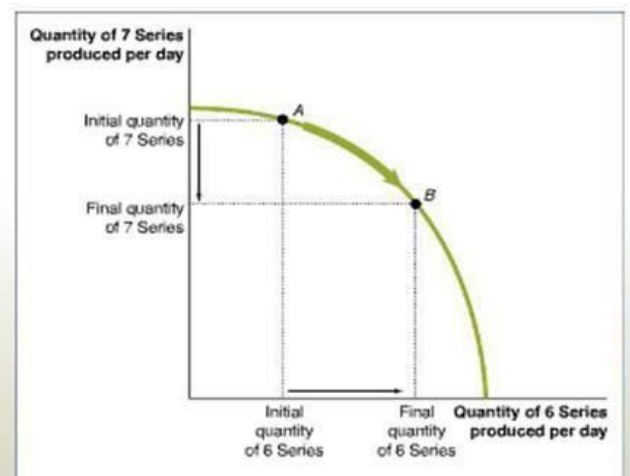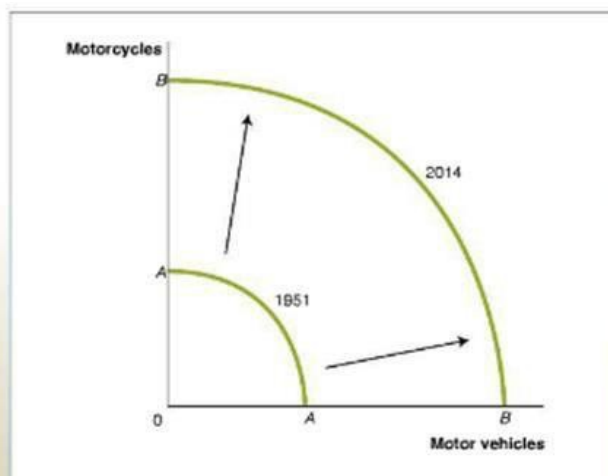
- Left graph: Firm is more productive in both industries in 2014 compared to 1951
- Right: shows OC (of moving A>B) to produce more 6s, firm gives up some 7s

The Great Depression (Eco. Behind it):
- **Reduction in economic activity** leading to **lower demands** of goods and services and increased cases of **bankruptcy**, eventually causing **higher unemployment**. Similarly, when **GDP growth is high**, as represented in 1940s, **demand for goods and services is higher** and firms **require**

- **more workers**, leading to a reduction in the unemployment rate. Inflation & Unemployment: Inverse rel. > Phillips curve
- Implementation of the *'New Deal'* by the Franklin Roosevelt Government which **closed banks** under a national banking holiday to **help stabilise** the crisis (<u>1933</u>)
- Commencement of **World War 2** where there were **increased job** opportunities, especially in the **manufacturing** sector (<u>1939</u>)

<u>Protectionism:</u>
- Imbalance between global trade and global production resulted in not enough demand for goods to go around globally
- Therefore, Gov'ts erected high tariff walls in domestic economies, attempting to keep foreign goods out/forcing people to buy domestically
- However, this resulted in domestic producers losing their international markets

<u>Deflation:</u> An absolute fall in the overall price level
- As a result of demand for workers and products drastically falling, prices and wages also decreased significantly
- Depression: falling wages depressed incomes reducing consumption and demand for output > producers reduced production, unemployment rise
- Originally thought that cheaper prices would ultimately stimulate more demand

<u>Banking Runs:</u>
- Depression: *Bank run-* everyone requested deposits back at once as banks weakened (<u>1930</u>, even worse: <u>1931</u>), thus, *New Deal was employed in 1933*

<u>Real v Financial Economy:</u>
- Economists believed that financial economy did not affect the real economy

Real:	Financial:
• Production/consumption of G&S	• Market for money/financial assets

- Depression: financial collapse > wrecked producers/consumers of G&S, therefore, there was indeed a connection ('vicious circle')

WEEK 3: <u>GDP:</u> Measure of total output for an economy over a period of time
- *GDP per capita:* (crude measure of individual wellbeing) GDP divided by total population (assumes GDP divided equally within pop.)
- **Nominal GDP** refers to a measure of GDP when prices and quantities have not been separated; **Real GDP** refers to the value of actual quantity of goods and services holding prices constant. [**Nom GDP= price level x Real GDP**]
- **Economic growth rate -** The rate of change of real GDP from one year to the next.

$$\frac{\text{Real GDP}_{\text{current year}} - \text{Real GDP}_{\text{previous year}}}{\text{Real GDP}_{\text{previous year}}} \times 100$$

<u>3 Ways to Measure GDP:</u>   **PRODUCTION = EXPENDITURE = INCOME**
1. **Expenditure measure of GDP** counts total *purchases* in the economy
2. **Income measure of GDP** counts all the *income earned* in the economy
3. **Production measure of GDP** counts the *number of goods produced* in the economy
- All approaches give identical measures of total GDP (all refer to circular flow)

<u>(1) The GDP **Expenditure** Identity:</u>

Y = C + I + G + NX, NX = Net Exports = X-M. Y = GDP IN $
- Most developed economies: C accounts comprise almost 3/5ths of total GDP expenditure (i.e. have more investment led economies; i.e. a share of I in Y)
- Trade deficit indicates country is borrowing goods (sending local currency overseas) (Negative NX: leakage, Positive NX: injection)

- **Transfer Payments** are usually Government payments to individuals (social security, welfare, Medicare) are **not included in GDP** (as no goods are produced)
- Firm **Investment** is an *expenditure*, referred to as **capital stock** which accumulates (e.g. initial I + upgrades (later))
- *Depreciation* also occurs in regards to capital stock > we apply a **depreciation charge**
- Similarly, with *capital stock for the whole economy*, **GDP - depreciation = NDP**, Net domestic Product = C + I + G + *(X - M)* <-- depreciation charge

Consumption - Spending by households on goods and services, not including spending on new houses.

Investment - Spending by firms on new factories, office buildings, machinery and inventories, plus spending by households on new houses.

Government purchases - Spending by federal, state and local governments on goods and services.

Net exports - is equal to the expenditure on *exports* minus the expenditure on *imports*

(2) The Income Approach to GDP:
- **Gross National Income (GNI)** = total domestic and foreign output claimed by residents of country = GDP + factor incomes earned by foreign residents (Measures how much a **country's residents earn** in a given period of time)
- *GNP is output produced by a country's citizens*, **GNP = GDP + Net Foreign Factor income** (Net foreign factor Inc. is the income earned from foreign domestic factor sources minus foreign factor income earned domestically)
- Income approach focusses on GDP (total income) but also alludes to **distribution of factor income** (>>>INEQUALITY) (i.e. breakdown between L (labour) and K)

(3) The Production Approach to GDP:
- Amount each producer contributes to GDP is called the value added
- Value added is the revenue generated by each produce minus value of intermediate products (each stage adds value; final/added value = GDP)
- **Primary Producer + Intermediate Producer = Final Producer**
- Two Production Accounting Approaches to GDP:
  - **Double Counting** is an issue for the production approach and there are 2 ways of dealing with it:
    1. **Calculate only final output** (G & S purchased for final use)
    2. **Value Added Approach** (most commonly used)
       - *Value added* is the increase in value that a firm contributes to a product or service
       - Calculation: **Value of sales - Intermediate goods** (cost of materials used to produce good)

What is NOT included in GDP:
- Does not measure *health of a nation's people*
- Does not include environmental conditions
- Does not include activity outside market setting (e.g. gardening, babysitting)
- Does not include transactions not reported to government (black-market) (Developing countries tend to be more 'informal' than developed nations)
- *Value* of resale goods, sale of stocks/bonds

What IS included in GDP:
- Value added by a used car dealer
- Commissions paid to stock brokers

Shortcomings in GDP as a measure of total production:
- Does not include Household production

- Does not include illegal activities

Underground economy - Buying and selling of goods and services that is concealed from the government to avoid taxes or regulations or because the goods and services are illegal.

Shortcomings of GDP as a measure of wellbeing:
- The distribution of GDP
- The value of leisure is not included in GDP
- The level and quality of health care and education
- GDP is not adjusted for pollution or other negative effects of production
- GDP is not adjusted for changes in crime and other social problems

Nominal GDP: The market value of final goods and services evaluated at current year prices.

Real GDP: A measure of the volume of final goods and services, holding prices constant.

Calculating Real GDP:
1. **Base year method** - The prices of goods and services in the base year were then used to calculate the value of goods and services in all other years.
   - One drawback to calculating real GDP using base year prices is that, over time, prices change relative to each other. Because this change is not reflected in the fixed prices from the base year, the estimate of real GDP is somewhat distorted.
   - The further away the current year is from the base year, the worse the problem becomes.
2. **Chain volume measures** - Starting with the previous year as the base year, the ABS takes an average of prices in the current year and prices in the previous year. It then uses this average to calculate real GDP in the current year.

Real GDP holds prices constant, which makes it a better measure than nominal GDP of changes in the production of goods and services from one year to the next.

The Inflation Rate: rate at which price level increases
- Deflation: sustained decline in price level (negative inflation rate)

Price level - a measure of the average prices of goods and services in the economy.

Inflation Rate and the 'Real World':
- Official rates are averages and may seem different for daily price changes faced by individuals, due to alternative consumer choices

Measures of Inflation:
1. **GDP Deflator**: measures the *average price of output*

$$ \text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100 $$

   (Note: Nominal GDP = price level x real GDP)
2. **CPI:** measures *average price of consumption*, or measures cost of living
- 3 stages of constructing CPI:

- o Selecting the CPI basket (based on ABS periodic survey; contains goods and services arranged in 11 large groups; fixed for multi-year period)
  - o Conducting a monthly survey
  - o Calculating the CPI

3. **Core (CPI) Inflation rate:** CPI inflation rate
   Excluding volatile elements (food and fuel)
- Attempts to reveal underlying inflation trend

CPI Bias:
1. **New Goods Bias:** When *new goods not available in base year* appear and are *more expensive* than goods they replace, they put upwards bias into CPI
2. **Quality Change Bias:** CPI counts all *price rise for quality improvements* as inflation (e.g. New Phone: P increases > all infl, disregards new functions)
3. **Commodity Substitution Bias:** *Market basket* of goods used in CPI calculations is *fixed and doesn't account for consumer substitutions away from goods whose relative P increases* (e.g. away from expensive education)
4. **Outlet Substitution Bias:** CPI does not take into account outlet substitution as people *switch to buying from cheaper sources* (e.g. Aldi instead of Coles)

WEEK 4: Financial Compounding: a process whereby the value of an *investment increases exponentially over time* due to compound interest
- Due to compounding, we cannot use normal growth formula (as base from which growth is calculated changes from year to year)
- **CAGR Formula:**

$$CAGR = \left(\frac{Ending\ Value}{Beginning\ Value}\right)^{\left(\frac{1}{\#\ of\ years}\right)} - 1$$

Long-run economic growth - The process by which rising productivity increases the average standard of living.

The best measure of the standard of living is real GDP per person, which is usually referred to as *real GDP per capita*.

What determines the rate of long-run economic growth:
1. **Labour productivity** - The quantity of goods and services that can be produced by one worker or by one hour of work.
   - The quantity of capital (both physical & human capital) per hour worked
   - The level of technology

Note - A very important point is that just accumulating more inputs—such as labour, capital and natural resources—will not ensure that an economy experiences economic growth unless technological change also occurs.

Potential GDP - The level of GDP attained when all firms are producing at normal capacity.
- Potential GDP will increase over time as the labour force grows, new factories and office buildings are built, new machinery and equipment are installed and technological change takes place.

Note - Every firm has a certain capacity to produce goods and services. The capacity of a firm is *not* the maximum output the firm is capable of producing.

Financial system - The system of financial markets and financial intermediaries through which firms acquire funds from households.

- Without a well-functioning financial system, economic growth is impossible because firms will be unable to expand and adopt new technologies.

This expression tells us that in a closed economy investment spending is equal to total income minus consumption spending and minus government purchases: $I = Y - C - G$

Private saving is equal to what households retain of their income (Y) after purchasing goods and services (C) and paying taxes (T): $S_{private} = Y - C - T$

Public saving (Spublic) equals the amount of net tax revenue (T) the government retains after paying for government purchases (G): $S_{public} = T - G$

Total saving in the economy (S) is equal to the sum of private saving and public saving:
$S = S_{private} + S_{public}$ or $S = (Y - C - T) + (T - G)$ or $S = Y - C - G$

We can conclude that total saving must equal total investment: $S = I$

Balanced budget - When the government spends the same amount that it collects in taxes.
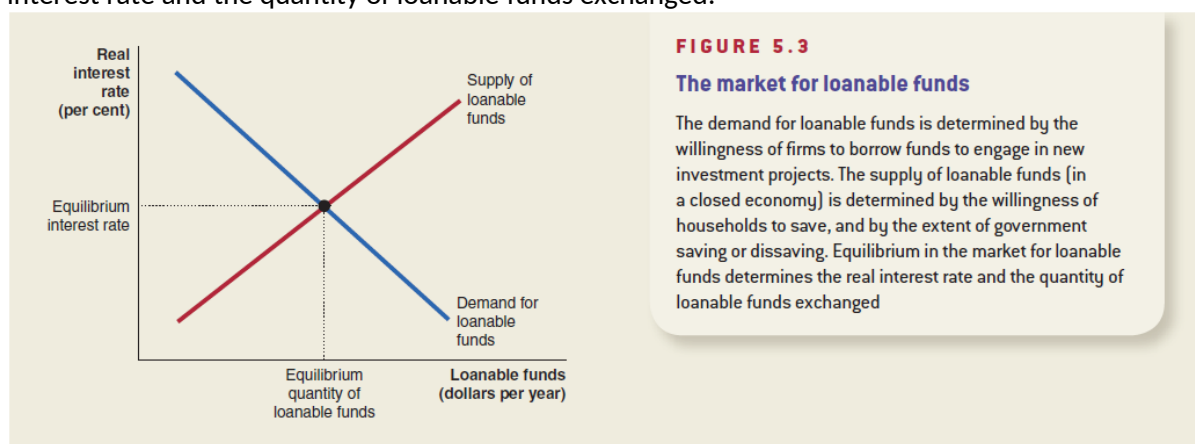**Budget deficit** - When the government spends more than it collects in taxes
- When the federal government runs a budget deficit, the Reserve Bank of Australia sells government financial securities such as bonds to borrow the money necessary to fund the gap between taxes and spending.
- In this case, rather than adding to the total amount of saving available to be borrowed for investment spending, the government is subtracting from it.
- We can conclude that, holding all other factors constant, there is a lower level of investment spending in the economy when there is a budget deficit than when there is a balanced budget.

Budget surplus - When government spending is less than its net taxes.
- A higher level of saving results in a higher level of investment spending. Therefore, holding all other factors constant, there is a higher level of investment spending in the economy when there is a budget surplus than when there is a balanced budget.

Market for loanable funds - The interaction of borrowers and lenders that determines the market interest rate and the quantity of loanable funds exchanged.

FIGURE 5.3

The market for loanable funds

The demand for loanable funds is determined by the willingness of firms to borrow funds to engage in new investment projects. The supply of loanable funds (in a closed economy) is determined by the willingness of households to save, and by the extent of government saving or dissaving. Equilibrium in the market for loanable funds determines the real interest rate and the quantity of loanable funds exchanged

- The demand for loanable funds is downward sloping because the lower the interest rate the more investment projects firms can profitably undertake, and the greater the quantity of loanable funds they will demand.

- The supply of loanable funds is determined by the willingness of households to save and by the extent of government saving or dissaving. When households save they reduce the amount of goods and services they can consume and enjoy today. The willingness of households to save rather than consume their incomes today will be determined in part by the interest rate they receive when they lend their savings.

Crowding out - A decline in private expenditure as a result of an increase in government purchases.
- By borrowing to finance its budget deficit the government will have *crowded out* some firms that would otherwise have been able to borrow to finance investment.

Note - A budget surplus increases the total amount of saving in the economy, shifting the supply of loanable funds to the right. In the new equilibrium the interest rate will be lower and the quantity of loanable funds will be higher. We can conclude that a budget surplus increases the level of saving and investment.

Economic growth model - A model that explains changes in real GDP per capita in the long run.

Labour productivity - The quantity of goods and services that can be produced by one worker or by one hour of work.

Technological change - A change in the ability of a firm to produce output with a given quantity of inputs.
- *Better machinery and equipment*
- *Increases in human capital*
- *Better means of organising and managing production*

Note: that technological change is *not* the same thing as more physical capital.

Human capital - The accumulated knowledge and skills workers acquire from education and training or from their life experiences.

Per-worker production Function - The relationship between real GDP, or output, per hour worked and capital per hour worked, holding the level of technology constant.

New growth theory - A model of long-run economic growth that emphasises that technological change is influenced by economic incentives, and so is determined by the working of the market system.

Patent - The exclusive right to produce a product for a period of time from the date the product was invented.

Copyright - The legal right of the creator of a book, movie, piece of music or software program to the exclusive right to use the creation during the creator's lifetime, plus an additional period of time for their heirs.

Multifactor productivity (MFP) - The quantity of goods and services produced per combined input of labour and capital.

Government policy can help increase the accumulation of knowledge capital in three ways:
1. *Protecting intellectual property with patents and copyrights.*
2. *Subsidising research and development.*
3. *Subsidising education.*

Why are many low-income countries growing so slowly? There is no one answer, but most economists point to five key factors:
🞄 Failure to enforce the rule of law
🞄 Wars and revolutions
🞄 Poor public education and health
🞄 Slow technological development
🞄 Low rates of saving and investment

Note: The easiest way for developing countries to gain access to technology is through foreign direct investment in which foreign firms are allowed to build new facilities or to buy domestic firms.

Property rights - The rights individuals or businesses have to the exclusive use of their property, including the right to buy or sell it.
Rule of law - The ability of a government to enforce the laws of the country, particularly with respect to protecting private property and enforcing contracts.
Foreign direct investment - The ownership of, or controlling interest in, assets, such as a factories, businesses or farms, in a foreign country.
Foreign portfolio investment - The purchase by an individual or firm of financial securities, such as shares or bonds issued in another country.
Globalisation - The interaction and integration between businesses, governments and people of different countries as they become open to foreign investment and international trade.

Note: Globalisation has benefited developing countries by making it easier for them to get investment funds and technology.

The Economic "Problem" of Growth:

- Modern eco paradigm: expect regular increases in output and income as modern economies are built on regular and constant economic growth, compounded
- If no growth: *stagnation* occurs leading to a permanent recession

Solow-Swan Growth Model:
- Before Solow-Swan, 'short run' was not included in growth theory formula
- New model was not as sensitive to changes in variable values
1. **Production:** Starts with national production function (in 'Cobb-Douglas' form)

$$Y_t = F(K_t, L_t) = \bar{A} K_t^{1/3} L_t^{2/3}$$

2. **Resource Constraint:** Adds explicit constraint, where Output used for C or I

$C_t + I_t = Y_t$

3. **Capital Accumulation:** Add evolution of capital stock (making it 'endogenous')

$$K_{t+1} = K_t + I_t - \bar{d} K_t$$

Depreciation: Amount of capital worn out each period

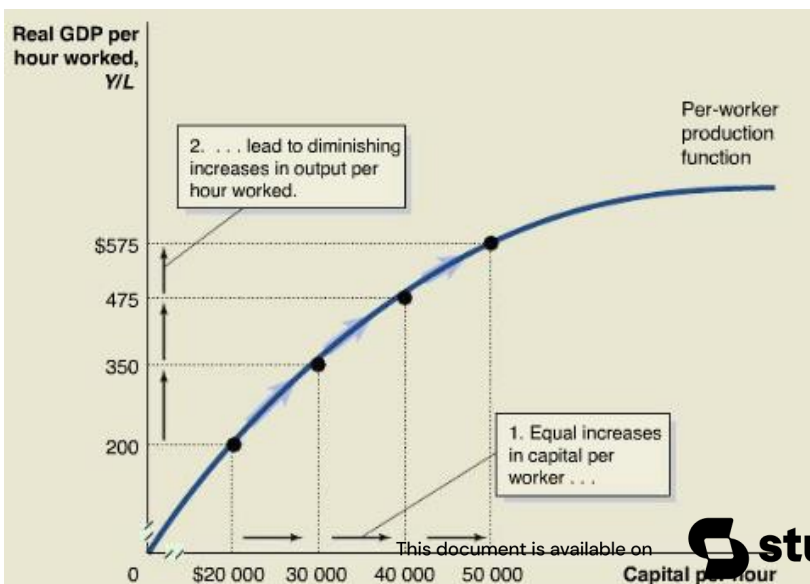4. **Labour:** We assert that labour remains exogenous and constant at:

$$\bar{L}$$

5. **Investment:** Total I = Constant Investment rate x Total Output

$$I_t = \bar{s} Y_t$$

Saving and Investment: (Saving is difference between I and C); Y_t -
$C_t = I_t$

Graphical Result:

Real GDP per hour worked, Y/L

2. . . . lead to diminishing increases in output per hour worked.

Per-worker production function

$575
475
350
200

1. Equal increases in capital per worker . . .

0    $20 000   30 000   40 000   50 000   Capital per hour worked

- Summarise key relationship: real output/hr worked and capital/hr worked with a given technology determining shape of the curve (trade-off evident)
- Diminishing returns occur because workers become more productive with more capital only to certain point (e.g. computer/2nd computer)
- 2nd Diagram: shows what happens as Technology(f) improves (in Y=f(K,L))
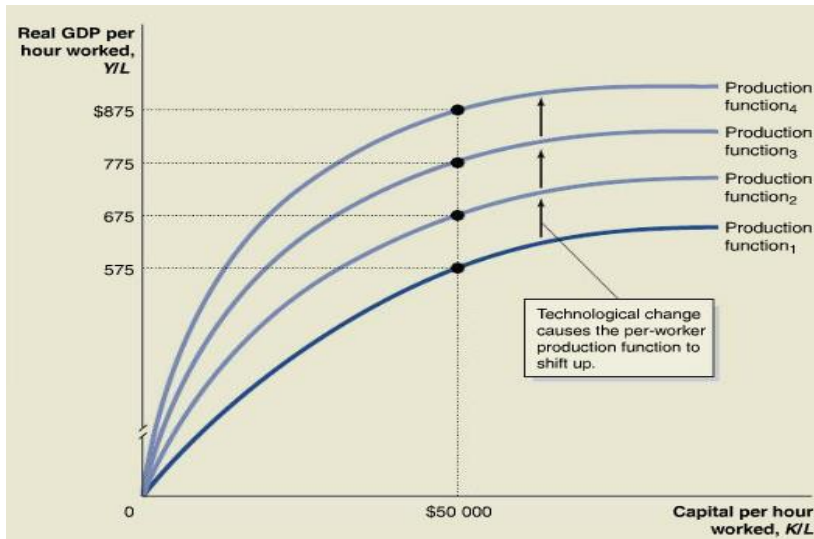
Production Function:
- Total K and L are vital to GDP; more saving > more I > higher K > higher Y
- Larger L yields higher Y (however, *diminishing returns* by accumulating more)
- We adjust A (productivity parameter) to match GDP

Sources of Productivity:
- **Human Capital:** stock of skills for productivity, Improvement through-
  - Education (school, professional training)
  - Health (unhealthy workers are less productive)
- **Technology**
- **Institutions** (property rights, law, Gov't systems, etc.)
  - Well defined institutions and laws create a climate for Eco Growth
- **Exogenous Shocks:** War, famine, Plague and death
  - WW1: European Growth decreased as a result of casualties

Economies of Scale: Increasing returns to scale (exponential growth)
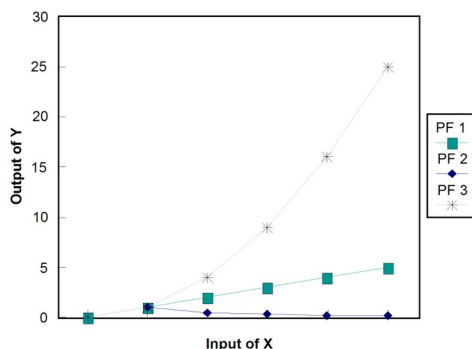
- PF1: Constant returns to scale (like *Solow-Swan* model), PF2: negative returns to scale, PF3: increasing returns to scale

The Great Convergence:
- Developed world still remains wealthier than developing world, but faster growth for developing has narrowed gap in terms of GDP/capita

Capacity Utilisation:
- Short run: Capacity of economy is fixed, therefore, we focus on **capital utilisation:** how much of existing productive capacity is being used and how much 'slack' there is left over
- Potential v Actual Output: At 80% capital utilisation rate only 80 cars are produced > 20 cars which could be made are unproduced daily(Eco loss because slack capacity is evident and resources used elsewhere > OC)

Business Cycles: Fluctuation of actual output around potential. Alternating periods of economic expansion and economic contraction relative to trend growth.
- Capacity utilisation forms an underlying cause of business cycles: alteration between slack period (short run output is **below potential**) and 'overheated' periods (output is above potential)

Graph 1
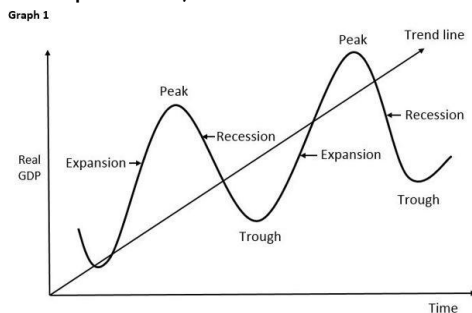
Note: An economic contraction will often begin with a decline in spending by firms on capital goods, such as machinery, equipment, new factories and new office buildings, or by households on new houses and consumer durables, such as furniture and cars. As spending declines, firms selling capital goods and consumer durables will find their sales declining. As sales decline, firms cut back on production and begin to lay off workers. Rising unemployment and falling profits reduce income, which leads to further declines in spending, and a recession may occur.

As the contraction or recession continues, economic conditions gradually begin to improve. The declines in spending eventually come to an end; households and firms begin to reduce their debt, thereby increasing their ability to spend; and interest rates decline, making it more likely that households and firms will borrow to finance new spending. Firms begin to increase their spending on capital goods as they anticipate the need for additional production during the next expansion. Increased spending by households on consumer durables and by businesses on capital goods will finally bring the recession to an end and begin the next expansion.

Expansion
- Increase interest rate unless caused by rising productivity levels & expansion of potential GDP.
- Increase in employment (Decrease in unemployment rate)

Contraction
- Decrease interest rate unless caused by high prices for production inputs or if real wages rise at a rate that is faster than the rate at which labour productivity increases.
- Decrease in employment. (Increase in unemployment rate)

Why have they become less extreme (until GFC)?
1. Shift from manufacturing to services (service investments more flexible)
2. Gov't policies (management of business cycle and increase in transfer pay.)
3. Financial Sector Stability

<u>GFC</u>
- Began with financial crisis, turned into real economy crisis (unlike Gr Dep.)
- As a result of deregulation of financial institutions in US

WEEK 5: Unemployment

Unemployed - individual must be actively seeking work, currently jobless
Labour Force - working age population who are willing and able to work
Discouraged workers - People who are available for work but have not looked for a job during the previous four weeks because they believe no jobs are available for them.

The unemployment rate:

$$\frac{\text{Number of unemployed}}{\text{Labour force}} \times 100$$

The labour participation rate:

$$\frac{\text{Labour force}}{\text{Working age population}} \times 100$$

<u>Who is not included in the Labour Force?</u>
1. Eligible to work but not available for work (e.g. retirees)
2. Available for work but not currently looking
   a. Not available to work during the reference period
   b. Discouraged workers

<u>Problems with Measuring the Unemployment Rate:</u>
1. Number of discouraged workers increases during a recession (Therefore, unemployment rate appears to be lower than reality)
2. Quality of work is disregarded
3. People who falsely claim to be unemployed

<u>Importance of Labour Force Participation:</u>
- L is a key parameter in GDP growth
- If we increase participation of labour force, we can increase GDP
- Employment policy also concentrates on benefitting groups (e.g. women)

<u>Other Characteristics of Unemployment:</u>
- Unemployment rate is only a broad average indicator
- <u>How long are people usually unemployed?</u>
  - **Long term Unemployed**: Those in the labour force who have been constantly unemployed for a year or longer, Causes:
    - Overall economic conditions
    - Age (young and unskilled and old are prone to this)
    - Gender, race, ethnicity or social class

<u>Quality of Work:</u>
- Data fails to capture if worker is in the job they desire
- Data does capture whether work is part-time or full-time; **Underemployed:** part time worker wishes to work full time
- Low unemployment rate with high underemployment rate is not an ideal situation (recent *casualisation of employment* trend in Australia)

<u>Types of Employment:</u>
- Last 20 years: Increased job creation for part time as opposed to full time

- This 'casualisation' trend reflects worrying signs (however some prefer PT)

Types of Unemployment:
1. **Cyclical Unemployment:** Caused by business cycle contraction (cutbacks in production, workers re-enter after economy begins recovery)
2. **Frictional Unemployment:** Short term unemployment arising from process of matching people with jobs (Workers between jobs)
   - School leavers, university graduates, People quitting jobs in the hope of finding a new one (high frictional unemployment may exist as the economy is picking up growth as workers and employers take time to match worker attributes with jobs)
3. **Seasonal Unemployment:** Due to factors such as weather, tourism variations, calendar related events (e.g. retailing during holidays)
   - Employers will keep baseline workers and make rest casual
4. **Structural Unemployment:** Due to mismatch between worker skills and requirements of the job (e.g. technology > workers redundant)

Full Employment: Occurs when there is no cyclical unemployment, *at full employment the 'normal' unemployment types still exist (e.g. frictional/structural)*
- **Natural Rate of Unemployment:** Unemployment rate when economy is operating at potential GDP
- **Non-Accelerating Inflation Rate of Unemployment (NAIRU):** level of unemployment rate *below which inflation will rise*

Note: If the unemployment rate falls below the NAIRU, firms will find it harder to retain and recruit workers without increasing wages. These increases in wages will then flow through to increases in prices.

Actual Unemployment = Frictional + Structural + Cyclical

Costs of Unemployment:
- Loss of GDP (through lower L) and OC of 'slack' human capital
- Deterioration of human capital over time
- Retraining costs
- Financial costs to Gov't (benefit payments, loss of tax revenue)
- An unemployed individual suffers:
  - Loss of income, skills, self-esteem and incurs social & retraining costs

Job Creation & Destruction:
- Australian economy creates and destroys many jobs every year > Dynamic
- Job creation/destruction is normal due to change in consumer tastes, technology and entrepreneurial failure
- Flow of workers in/out are large with separations consisting of:
  - *Quits:* workers leaving jobs for better alternative
  - *Layoffs:* come from changes in employment level across firms

The Bathtub Model of Unemployment:
- 2 endogenous variables: Employment (E) and Unemployment (U)
- Model states how these 2 variable change over time

$$E_t + U_t = \overline{L}$$

Week 6: Inflation

Real v Financial (Money) Economy: (Inflation - a money phenomenon)
- Inflation affects the money economy **NOT** the real economy (found through *Nominal GDP = Real GDP x Price Level*; therefore, only affects Nominal)

- Thus, distinction between real (physical world) & Monetary/Financial Economy (circulation of money/financial instruments); Monetary economy is based on real economy

<u>Classical Dichotomy and Money Neutrality:</u>
- **Classical Dichotomy:** In *real and nominal become separate* - When all prices in economy double > relative prices **don't** change (nothing real is affected)
- **Neutrality of Money** follows on: Money supply changes have **no effects** on *real economy* and only **affects** *prices*
- Classical & Neoclassical (Micro) holds that money is neutral with respect to real economy in the **long run**
- **Inflation** is neutral in LR <u>not</u> in SR

<u>Inflation and Price Level:</u>
- **Price level-** average across all prices (usually measured as index no.)
- Rate of change between index no.s between periods > **Inflation rate**

<u>Short-run costs of Inflation:</u> In real SR world there are lags and rigidities
- **Arbitrary Redistributions of Wealth:** Driven by changes in money prices
  - *Debtors benefit* if they have fixed rate debt contracts (as Interest rates don't match inflation rate); *Lenders suffer*
  - *Pensioner suffers* if pension not indexed to inflation; *banks suffer* if issues fixed rate loans and pays interest rates moving with market
- **Tax Distortions:**
  - <u>*Bracket creep:*</u> rise up tax brackets, pay more under progressive tax
- **"Shoe Leather" (Transaction) Costs:** *OC of time and energy people spend trying to counteract inflation* effects (e.g. consumer spend more/save less; supplier edit prices or menus > *menu costs*)
  - 'Inflation induced' transactions: High Inflation = unstable/surcharge
- **Distorted Consumption and Investment Incentives:**
  - Money depreciates in real terms with high inflation
    - Incentive for consumers to convert money into real assets
    - Consumers buy more/excess goods to beat rapid depreciation

<u>Hyperinflation:</u> extremely high inflation increasing at a rapid pace
- **Causes:** Government excessively prints money to pay for spending
  - Often associated with ravages of war when real economy is pressed to cover costs of armed off/defence (e.g. China 1945 concl. WW2)
    - As Gov't prints more money > consumer buy more to avoid high price later > Demand increases exponentially > Hyperinflation.
    - E.g. Chinese Prof. Earnings: 1946-CNC$60K, 1948-CNC$3.1M/month > did not even cover food and rent (Gov't issues larger currency denominations (Zimbabwe))
- **Effects:**
  - Hoarding/stockpiling creates shortages (with excessive demand)
  - Value of currency plummets
  - **To end hyperinflation:** <u>*credible policy changes*</u> (Germany: new currency/austerity measures) must occur (Gov't printing money needs action that people believe will be effective) otherwise *government will fall* (like in China)

<u>Strong Inflation:</u> Typically, >10%; devalues currency and erodes purchasing power but not as quickly as hyper and not as slowly as normal (2-3%)

- Costly high rates, rate of increase builds up unpredictability > difficulties and distortions; hence, Gov'ts and central bank's target 'normal' inflation

<u>Actual v Expected Inflation:</u>

- Inflation measured either *ex ante* (before fact) or *ex post* (after fact)
  - *Ex ante*- expected inflation (what we think for next period)
  - *Ex post inflation*- actual inflation rate
- Some **forecasting error** will be present, differentiates actual & expected
- **Effect:** If actual is <u>persistently</u> above/below expected > creates inflationary/deflationary spiral (based on expectations)

<u>Wage-price Spiral:</u>

- Workers demand higher wages than expected inflation as they think actual inflation will be higher than expected
- Wages drive other prices up and actual inflation becomes higher than predicted. (This process continues from year to year)
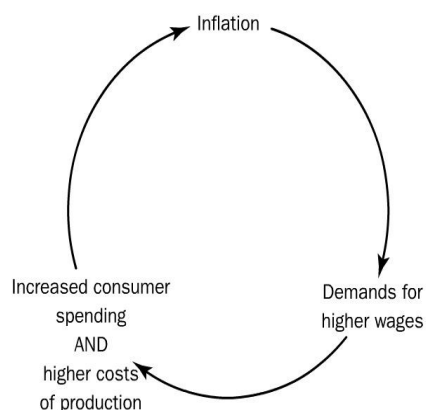

<u>Financial Intermediation:</u> Financial institutions match those who need funds with those who have funds. Mediating process between two parties

- *Deflation* causes real interest rates to increase > stress on borrowers > (banks only control nominal not real interest rates) banks ran 'tight' credit (> bank runs); complicating bank portfolio investment choices
- *Hyperinflation*: banks go bankrupt as loans lose value and people stop making deposits

<u>Loanable Funds Model:</u> LR equilibrium model

- Must be a price set for ability to trade 'surplus' across time periods (> given through model)
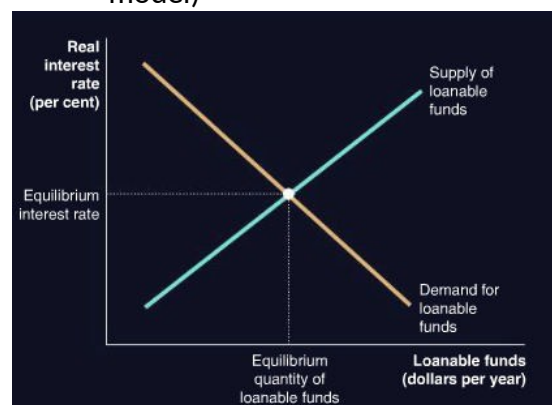
- Standard neoclassical model (loanable funds model): Supply & Demand for surplus funds as mediated through financial sector (hence, Equil. Price)
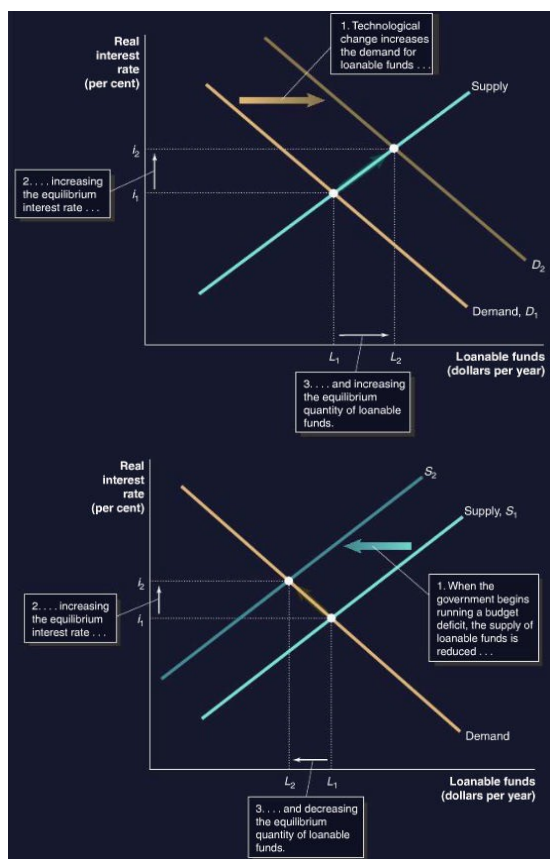
- **Demand shock (exogenous D shift):** Technical change causing a 'shock' > increase D for loanable funds (e.g. shift to computerisation requiring big investment)
  - Increases cost of money (real interest rate)

- **Supply Shock:** e.g. Gov't deficit which takes surplus funds (savings) out of circulation
  - *Crowding out effect*
  - Same result: higher interest rates

Real and Nominal Interest Rates:
- **Real interest rate (r)** = Marginal Product of Capital (MP_K); paid in goods
- **Nominal interest rate (i)** = interest rate on savings account; paid in dollars
- *FISHER EQUATION:* nominal interest rate = real int. rate + rate of infl (π)

$$i = r + \pi$$

Week 7: Aggregate Expenditure

Derivation of AE curve: (*Note: AE model is Short-Run Model; unlike Solow-Swan*)
1. Redefine **Y** (GDP) as **Aggregate Expenditure** (AE): *total spending* in economy; therefore, **AE = C + I + G + NX**
   - **Aggregate Expenditure Model** (AEM): macroeconomic model focussing on **SR** relationship between total spending and real GDP
2. Assume *price level is consistent* for given AE curve
3. **Macro-equilibrium condition**: **AE = Y** (Aggregate Expenditure = GDP)
4. Examine relationships for components (C, I, G, NX); 5. Elaborate how they add to AE; 6. 'Run' AE model and see how it matches with equil. Condition
   - Side Comments: Assume macro economy tends towards stable equilibrium (implied through equilibrium condition)

Factors affecting Consumption (C): Choice to consume influenced by:
- Current disposable income
  - Disposable income (YD): after **tax/transfer payments** income (As C incr./dec, YD incr./decreases)
- Expected future income
  - More future YD will increase current spending (and opposite)

- Household Wealth: (Wealth- accum. Of income in form of assets)
  - **'Wealth effect'**- higher wealth induces more comfort to spend (provides buffer which can be drawn to fund spending if need be)
- Price Level (refers to ALL prices)
  - Inflation > decreased real value of wealth > lowered C
- Interest Rate   (Higher (real) Interest rate = harder for firms to borrow)
  - Real interest rates rise > lowers C (and opposite)

Consumption function: refers to relationship between consumption and YD/DI
- $C = f(DI_{current}, DI_{future},$ wealth, inflation, int. rate) **>(holding constant): C = f(DI)**
- **C = A + (MPC x YD)**; where **MPC = slope** of consumption function, **A = autonomous consumption** (made regardless of YD)
  - **MPC =   C / YD**

Factors that affect Investment (I): influenced by **savings (S)**: how much I available

$$\Delta Y = \Delta C + \Delta S$$

- As **Y = C + S + T**; therefore, assuming T is constant, we get above)
- **MPS =   S / Y ;   MPC + MPS = 1**
- According to *Solow-Swan S=I (as all savings are invested)*, however, in the SR there a *number of complications* > S does **NOT** = I

Planned, Unplanned and Actual Investment: In SR model: no 'idle funds', i.e. savings/excess funds are spent by businesses
- **Inventories:** goods that have been produced but not yet sold
  - **Actual Investment** will equal **planned investment** only if there is no **unplanned change** (i.e. $I_{actual} = I_{planned} + I_{unplanned}$)
  - All surplus funds/savings converted to business asset (some assets may sit idle in form of unsold inventories); e.g. Company produces 100 tables planning to sell all but only sells 60 > 40 = unplanned inv.

Planned v Unplanned Inventories:
- Planned Inventories are OK and are *part of planned investment*. Require stock on hand to ensure demand is met and max sales are experienced.
- Unplanned Inventories occur when planned sales don't materialise (like table business above) > Actual I = Planned I + Unplanned change in Inv.)

Level of Planned Investment determined by:
1. *Expectations of future profitability*
2. *Real interest rate*: = Cost of money; as debt finance is used in this sector
3. *Taxes*: As T rises, investment potential decreases
4. *Cash flow*: Cash Income - Cash Outflow; Profit = Rev - Costs
5. *Price Level*

45° line diagram: illustrates macroeconomic equil. Y = AE = NI (National Income); measures real national income against planned real AE
Also known as the **Keynesian cross diagram**.
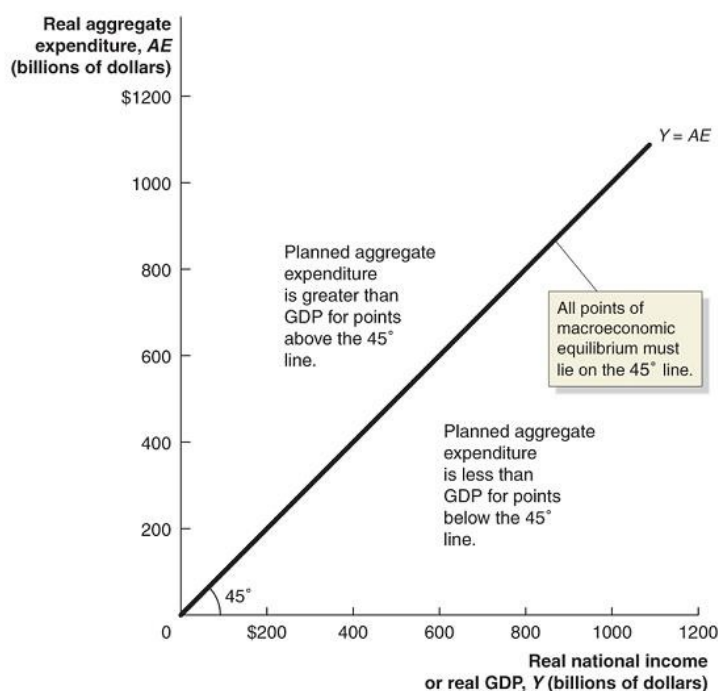
- Points above line: AE > GDP (too many $ chasing too few goods)
- Points below: AE < GDP (goods unsold, left over GDP) P51-64 Draw in

If...	Then...	And...
Aggregate expenditure is **equal** to GDP	inventories are **unchanged**	the economy is in **macroeconomic equilibrium.**
Aggregate expenditure is **less** than GDP	inventories **rise**	GDP and employment **decrease.**
Aggregate expenditure is **greater** than GDP	inventories **fall**	GDP and employment **increase.**
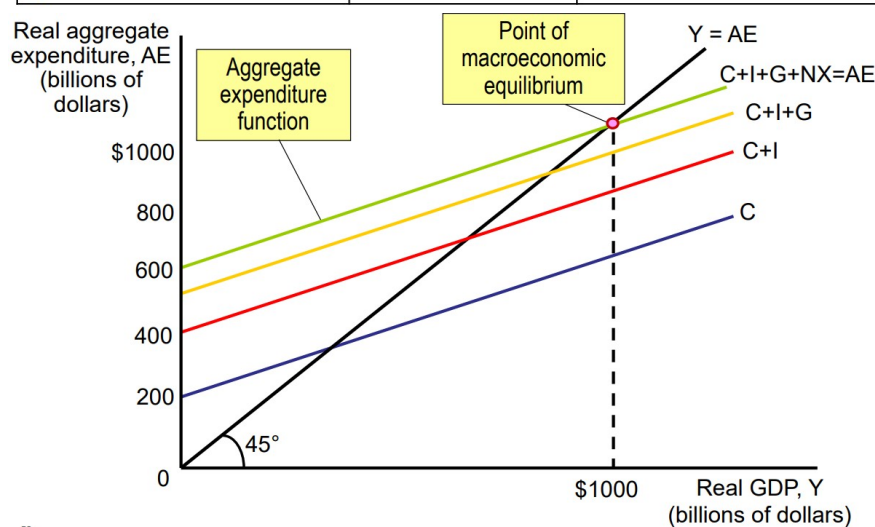
- Macroeconomic equilibrium overall occurs where the AE line crosses the 45° line. In this case, that occurs at a GDP of $1000 billion.

- If GDP is less than $1000 billion, the corresponding point on the AE line is above the 45° line, planned aggregate expenditure is greater than total production, firms will experience an unplanned decrease in inventories and GDP will increase.
- If GDP is greater than $1000 billion, the corresponding point on the AE line is below the 45° line, planned aggregate expenditure is less than total production, firms will experience an unplanned increase in inventories and GDP will decrease.
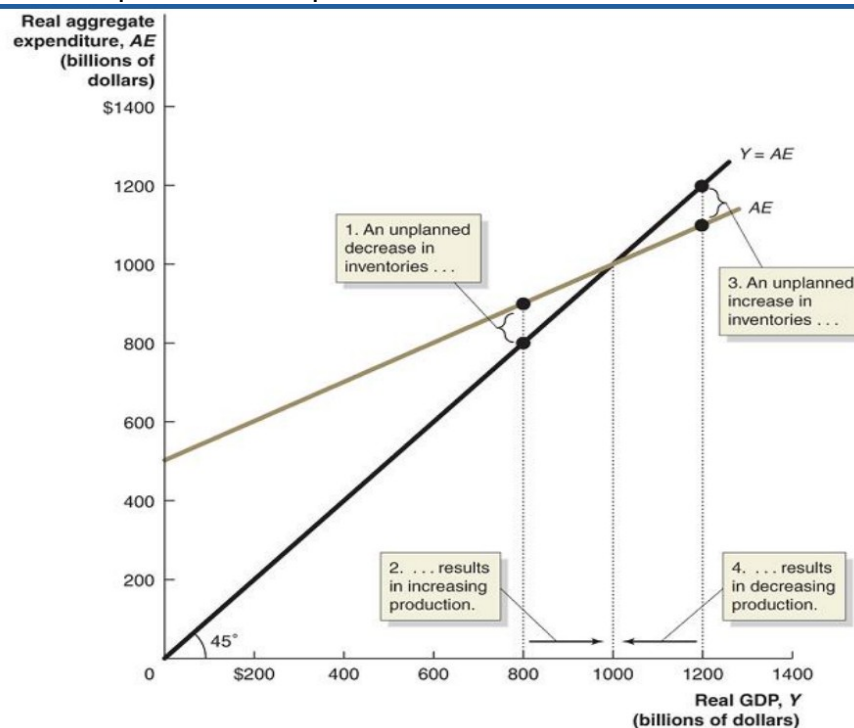
Autonomous v Induced Consumption: Consumption function intercepts vertical axis at point > 0 due to autonomous C
- *Autonomous Consumption:* C independent/regardless of outcome
- *Induced Consumption:* C determined by level of income (& slope of line)

The Multiplier Effect:
- *Induced Expenditure:* depends on level of GDP
- *Autonomous Expenditure:* does **not** depend on level of GDP
- Creates effect where incremental spending increase > greater effect on GDP > **MULTIPLIER** ((incr. in equil. Real GDP)/(incr. in autonomous exp.)
    - **Multiplier Effect:** process where increase in auto. exp. leads to larger increase in real GDP (occurs when auto. exp. Incr./decreases)

Multiplier = k = 1/1-MPC = 1/MPS ;   Y= k x G

How AD curve is derived from the AE model:
- An increase/decrease in AE will affect not only real GDP, but also price level and changes in AE
    - Price level only fixed for **given** curve (assumption to make curve)
    - Varying price level causes AE curve to shift up and down
- **From above insight**, AD curve can be built
    - AD curve: shows relationship between price level and quantity of real GDP demanded by households, firms and Gov't (planned AE)

Difference between AD curve and Micro D curve:

- *Micro D curve shows*: willingness to pay (WTP) for G&S (price) and willingness to buy at that price (quantity) > after adding up all curves - derive total WTP for G&S across economy on average.
- *AD curve:* shows how **AE varies with differing price** levels across entire economy. **AD includes all components of spending (C, I, G, NX)** and has nothing to do with WTP.

Week 8:

AD-AS: **Aggregate Demand and Aggregate Supply (AD-AS) model** examines how short-run fluctuations in real GDP and price level occur and how they affect total output.

Aggregate Supply (AS) Curve:
- **Short-run aggregate supply (SRAS) curve:** shows relationship in SR between price level and quantity of real GDP supplied
- **Long-run aggregate supply (LRAS) curve:** Similar to above
  - shows that **price level does NOT affect real GDP** Draw in p20

AD slope sign: AD is derived from AE because:
- Wealth effect: change in price affects real wealth and therefore, C
- Int. Rate Effect: Price change affects real int. rate and hence, investment
- International Trade: Price change affects relative real price of foreign and domestic goods and also international exchange rates, and hence, NX
- AD curve shows relationship between price level and quantity of real GDP demanded, holding everything else constant.
  - Changes in price > movement up/down stationary AD curve
  - **If price level increases > reduce 1or more of components (C,I,G,NX) > sign becomes negative**

Steepness of AD curve: Draw in p8
- If flatter > more **elastic**, responsiveness of Real GDP to price level is larger
  - For more elastic, Price changes have bigger impact on Real GDP
- Elasticity dependent on responsiveness of real GDP to price changes, determined by functions of C, I, G, NX (if any of these are more responsive > curve become flatter/more elastic; yield greater change)

AD shifts: when an exogenous 'shock' occurs; Variable that cause shift include:
1. Changes in Gov't policies (e.g. taxes: left, gov't purchases: right)
2. Changes in expectations of households/firms
3. Changes in foreign variables in outside economies (e.g. relative income levels between countries)
   - E.g. Fall in value of AUD against USD: NX increase (cheaper for other currencies to buy AUD); *AD curve shifts right*
   - all shifts above, due C,I, G, NX spending increasing/decreasing

AD Movement: **If P changes and nothing else does** > movement
- C, I, G, NX is all **fixed**; only looking for trade-off: real GDP & price changes
- E.g. increase in P level decreases value of Superannuation accounts held by Australian households > Upward movement along AD curve

Shifts in LRAS & SRAS: Changes in P do **NOT** affect LRAS; but shifts with *time* as:
- Workers/machinery in economy increase/technological change prevalent
  - Shifts because potential GDP increases over *time*
  - Given through Solow Swan model: $Y = A f(K,L)$

<u>Shifts in AS:</u> when 'exogenous' shock present, such as:
- **Expected changes in future P level** (e.g. if <u>P level expected to be 3%</u> <u>higher</u> next year > expected <u>rising costs</u> > SRAS curve shifts <u>left</u>)
- Adjustments (workers/firms) to **errors in past expectation** about P level
- Unexpected **P changes** of important **natural resource** (e.g. 'oil shocks')

<u>Why AS slopes upwards?</u>
- SRAS curve us upwards sloping: In SR, firms **produce more** if **higher prices**
- This is because input prices (L,K) rise slower than final product prices
- 3 major theories which explain positive relationship between inflation (price level) and output:
    1. *Money Illusion:* In SR people 'misread' inflation (expectations higher/lower than actual) > temporary illusion
    2. *Sticky Wages:* Wages may take more time to adjust than prices (if actual Infl < (expected) when wages set > OUTPUT FALLS as REAL WAGE IS HIGHER THAN EXPECTED > until adjusts (lags)
    3. *Sticky Prices:* e.g. goods may have long term contracts with purchases/complex pricing (> real P affected by actual inflation)

<u>Difference between AS and microeconomic supply (S) curve:</u>
- Market S curve: shows true marginal cost (MC) for producers in market, assuming input relative prices remain constant
    o As P rises for good X, seller is willing to supply more given their MC, yielding upward slope. Adding up all sellers = Aggregate Market S
- AS curve: shows how **changes in P level changes amount offered by producers** in aggregate in SR.

<u>Market Equilibrium in LR and SR:</u> Draw in p36/37
- In LR equilibrium: AD and short run AS curves intersect at point along LRAS curve
- In SR equilibrium: where SRAS and AD curves intersect
- Business cycles (@equil.) indicates:
    1. **No inflation** in economy (P level =100; firms expect 100 in future)
    2. **No LR Eco Growth** (Potential GDP will remain same in the future)

<u>Recession:</u> Draw in p41
- Assume some decline in AD (e.g. I falls) (> in SR: recession/LR: P falls)
    - **SR Effect:** AD curve shifts left, real GDP decreases
- Adjustment back to potential GDP in LR
    - **LR:** <u>SRAS curve shifts right</u> back to original GDP

<u>Expansion:</u> Draw in p44
- **SR effect:** AD curve shifts right, real GDP & P rise
- **LR effect:** *Auto. Adjustment Mechanism*- SRAS curve shifts left (orig. GDP)

<u>Supply Shock:</u> (affects S side first now) Draw in p47
- **SR effect:** SRAS curve shifts left, GDP falls, P rises
- **LR:** SRAS curve shifts right (back to potential (original graph)

<u>Using Model to Explain Inflation:</u> AS & AD have price levels contained within them; AD-AS models can show 2 causes of inflation caused by shocks:

1. *Cost push inflation*: rise in costs due to supply shock & leftward AS shift (**SAME AS GRAPH ABOVE**)
2. *Demand-Pull Inflation:* Inc. in AD > outwards AD shift

<u>Dynamic AD and AS model:</u>   *3 changes to basic model-*   Draw in p56/57

1. *Potential GDP increases continually > **LRAS curve shifts***
2. *During most years AD curve shifts to the right*
3. *SRAS curve shifts right when firms **expect** high inflation*

Week 9: School of Macroeconomics thought

<u>Keynes General Theory:</u> Expand neo-classical model; 3 major themes:

1. **Effective Demand (Consumption):**
   - *Say's Law* held that Supply created its own Demand (markets were producer driven and C simply followed production)
   - **Keynes argued consumers had their own minds** and not only restricted to the fact that supply created demand (referred to *Effective D:* consume all that's supplied > too low: Great Dep.)
   - Keynes argued that a **Gov't role (G)** was needed for AD was sufficient to buy output of AS. (Importance of C)
2. **Role of Time:** (Originally thought Macro-economy just 'adjusts')
   - Keynes argued that **Gov't intervention** was integral as **adjustment may take too long** and people have needs & die
3. **The psychology of Consumers and Investors:**
   - <u>Marginal Efficiency of Capital (MEC):</u> If an investor is confident that they will get back more returns than costs > Investment will be made (I: critical element);
   - *Classical: MPK (Marginal Product of K) = r(real. Int. rate) = MEC*; **Keynes argued MEC might not be equal since MEC drives I decision, which drives output (suboptimal Y>problematic)**
     1. *Financiers are not entrepreneurs:* Savers (source of funds) and borrower (immediate fund user) may have differing perceptions from investors in real assets.
        - Savers make decision about money quantity (loanable funds) & borrowers decide real quantities (e.g. plant/equipment)
        - Savers & borrowers set an r(financial Q). If **r >MPK (real Q): funds above expected real returns of investment** > Intervention needed to restore
     2. **Animal Spirits:** Keynes' word for **investor & saver psychology**. *Panic or overoptimism* may cause **MEC>/< MPK** :(leads to booms/busts); (MEC=what entrepreneurs think returns will be)
     3. *Monetary Distortions:* Keynes argued money can have real eco effects over significant time period
        - e.g. nominal Int. rate cannot be < 0; real can be below 0L disincentives to invest

- **Liquidity trap:** 0/or very low Int. rate is positive in times of *deflation* (cannot provide optimal I) > intervention in AE necessary

Keynesian Economics: Unlike neoclassical model; focus is on **SR & Effective D** as opposed to LR and Supply.
- Money is **NOT** neutral in SR, and instantaneous price adjustment are NOT assumes ("sticky")
- Eco agents have psychologies; operate under uncertainty
- Markets may need intervention to clear (as opposed to Say's Law)

Keynesian Policy Tools: Draw in p42
- As Keynesian models are spending driven; **G** is a key instrument to managing business cycle
- **G used in countercyclical way**, Gov't employs **fiscal policy** (use of taxes and expenditures to offset reduction/increases in private eco activity which cause recession/inflationary excesses)

Phillips Curve: Phillips found a consistent inverse relationship: Unemployment HIGH > Wages increased SLOWLY; Unemployment LOW > Wage Increased RAPIDLY
- Using this, **Phillips Curve**: implies boom = increases inflation; recession = decreases inflation

Keynesian 'Fine Tuning':   Draw in p47
- Keynesian activism suggests that the **Gov't can use fiscal policy to choose ANY point on the Phillips Curve**.
  - Dependent on level off **G** chosen & SR structure of economy (e.g. Choose 3% Infl. Rate consistent with 5% unemployment rate OR 4% Infl. & 6% Unemployment rate dependent on SR structure and level of G chosen)

AD-AS explanation of stagflation:
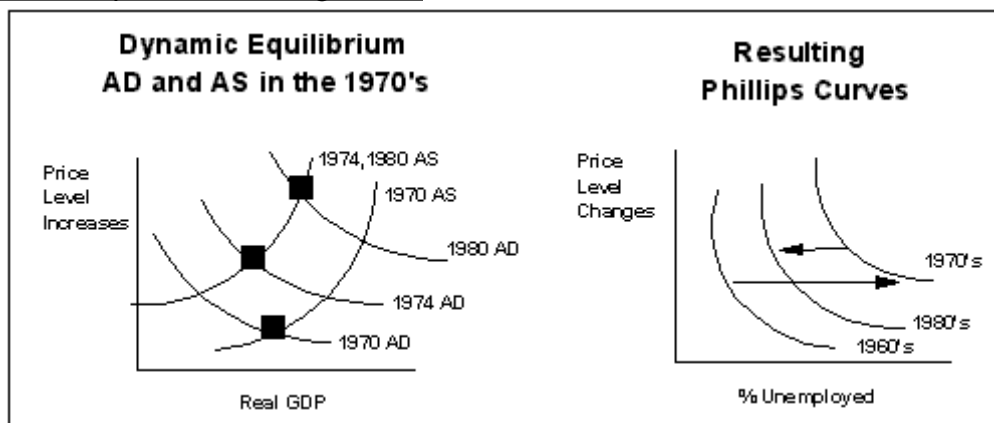
- 1970s US: Infl. Rate =15%, GDP falling, Unemployment high > **Stagflation**; contradiction to Phillips Curve (Infl. HIGH = Low U.E)
  - **AD curve shifted right** in 1974 & again in 1980; this **combined with supply shocks** (oil), shifting AS back: resulted in **GDP falling and inflation rising simultaneously**
  - Caused **deterioration in Phillips curve** (which was only partially relieved by improvement in 1980s)

- Therefore, cause: overconfidence of policymakers on oversimplified Phillips curve (as in reality could be explained)

Rational Expectations and Policy Irrelevance:

Rational Expectationists *challenge assumption that the Phillips Curve* can be manipulated by policymakers. RE view- **'policy irrelevance':** Gov't should do little or nothing as they make things worse.

- If agents use all info available, they make better forecasts of inflation rate and have same info as Gov't > then increase in G: very short term Phillips curve trade-off > Increase in spending and output. After realising, G has no 'real' shift in economy > Agents 'price in' this 'stimulus': adjust prices & wages upwards and revert to justifiable output levels.
- Keynesian policy assumes Phillips curve stable over time; RE (agents anticipate Gov't actions & adjust behaviour): simple trade-off policy menu breaks down.
- RE: Keynesian policy only applies for LR, effective only if 'surprise' to individuals

Monetarism: meaning, Exchange Equation, Quantity Theory of Money

- Upheavals of unstable Phillips curve and stagflation > need for 'automatic' Gov't policy (policy should be stable & predictable)
    - *Crude Monetarists:* only money supply drives price inflation
    - *Modern Monetarists:* Money supply drives price inflation **and** growth in predictable way
    - Friedman: G. Depression due to policy errors by central bank
- Quantity Theory of Money: Monetarism built on accounting identity which spawned the theory.
    - Identity- **Exchange Equation: MV = PT**; (M= amount of money in economy, V=velocity, P= Average Price of all G&S sold, T= (transactions)quantity od all G&S sold)
    - Using above, monetarists say **amount of money will directly affect price level and/or output level**
- Monetarism holds that:
    - Money (more powerful tool) drives economy; (therefore, Keynesian reliance on Fiscal Policy : **G** - is misplaced)
    - **M should be stable to keep P and overall economy stable**
    - Stagflation: central banks followed monetarism to break spiral > **mixed results** (US: Volcker, UK: Thatcher)

New Classical Economics: Rational Economists spawned another theoretical development: 'Revenge of Neoclassicals'

- *Contrary to Keynesian,* New Classic Theorists argue that the *whole is NOT different to the sum of parts* > i.e. **MICRO theory is sufficient to explain Macroeconomic movements, including business cycles**.

Real Business Cycles (RBC): New Classical Theory uses RBC to explain macro movements. They argue that ONLY **Exogenous shocks** (oil, war, broad tech innovation) **cause business cycles**

- One shock occurs, adjustment process brings economy back to underlying structural steady state (Equil. Restored in end)

<u>Hayek's critique of Keynes:</u> Hayek states that one must *analyse parts of economy to understand the whole* (hence, <u>**rejects**</u> **Keynes: whole is different to sum** (Hayek: need to understand parts))

- Hayek argues economy is **production driven**, and that **production is highly decentralised but effective for resource allocation** (driven by proper price signals)
- Argues that Keynes' AD policies disrupt coordination system

<u>Minsky & Financial Instability Hypothesis:</u> Minsky argues two things:

1. Financial system has intricate interdependency with real sector at all times
2. Nature of interdependence shaped by innate human psychology (especially crowd thinking & human judgement)

- <u>Hypothesis:</u>
    - Modern capitalist economies **prone to financial instability and crisis** (booms/busts inevitable) (result of risk expectation and perception being distorted during normal eco times > investors/financiers start to take greater risk with their K)
    - Banks (seeking greater returns) offer more credit and fail to address risk profiles of borrowers (credit quality decline)
    - Asset bubbles (P of asset far beyond reasonable expectation of value of returns) created
    - Herd mentality created as lenders & borrowers chase returns
    - Reality: Fall in asset price > declining business returns > BUBBLE BURSTS > Financial crisis
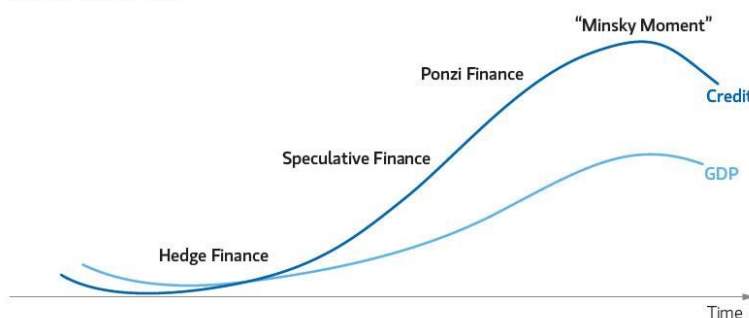
Hedge Finance: banks are conservative (remember last crash); *Speculative:* bank chase returns (bubble forms); *Ponzi:* Herd mentality, *Minsky moment:* bubble busts

Week 10: ***"The financial sector & monetary policy"***

Money & the macroeconomy

- Money has a sort of split personality in macroeconomics.
- In the long-run money is neutral and simply exists to facilitate exchange in the real economy.
- In the short-run, money can interact with the real economy to have real – but temporary – effects.
- Thus far we have been working without an elaborated theory of money (though we have seen elements dealing with aspects of money (the Fisher Separation Theorem) and the money markets (loanable funds).

What is money & why do we need it?

- A "**medium of exchange**" allows us to conduct transactions more efficiently than bartering (i.e. direct exchanging of goods and services for other goods and services, e.g. giving someone a haircut in exchange for a lesson in economics).
- To say that money is a "**store of value**" is to say that money can 'hold', in abstract terms, the value of resources reliably across time. Many commodities are perishable (e.g. food) and some become obsolescent (e.g. suits of armour) and thus cannot hold value consistently. Money, in a general sense, does not have this problem, being an 'abstraction' from real goods which allows value to be stored, saved and retrieved as desired.
- A "**unit of account**" (or "**measure of value**") basically means that a clear and easy-to-use benchmark is provided against which to measure all prices and transactions against.
- A "**standard of deferred payment**" refers to the function of facilitating economic transactions across time, i.e. borrowing and lending.

What can serve as money?
1. The good must be acceptable to most people.
2. It should be of a standardised quality.
3. It should be durable.
4. It should be valuable relative to its weight so that it can be easily transported.
5. It should be divisible.

Liquidity
- One of the prime advantages of money in a money economy is that it is "liquid".
- That is, money can be immediately tendered and received for transactions between buyers and sellers of real goods and services.

Measuring Money by degrees of liquidity
- The most liquid part of a nation's money supply is the **monetary base** which includes currency in circulation and accounts, called reserves, which private banks hold with the economy's central bank, which pay no interest.
- Reserves ensure that banks have sufficient cash on hand in case there is a run on the bank asking for currency withdrawals.

Measuring the money supply
Currency: Notes and coins held by the private non-bank sector. **M1:** The narrowest definition of the money supply which is comprised of currency plus the value of all demand deposits with banks. (**Demand deposits:** Also called current deposits, these are deposits in financial institutions that are transferable by cheque, by debit cards at EFTPOS terminals and through electronic transfer between accounts. They are called demand deposits because they are available on demand, and are repayable in notes and coins). **M3:** M1, plus all other deposits of the private non-bank sector with domestic and foreign-owned banks operating in Australia. Includes certificates of deposit, term deposits and deposits with banks from building societies, credit unions and other authorised deposit-taking institutions. **Broad Money:**M3, plus deposits into non-bank deposit-taking institutions minus holdings of currency and deposits of non-bank depository corporations. Non-bank depository

corporations include finance companies, money market corporations and cash management trusts.

The Reserve Bank of Australia uses several different measures of the money supply. In the pyramid each measure includes the assets of the measure above it, as well as additional assets
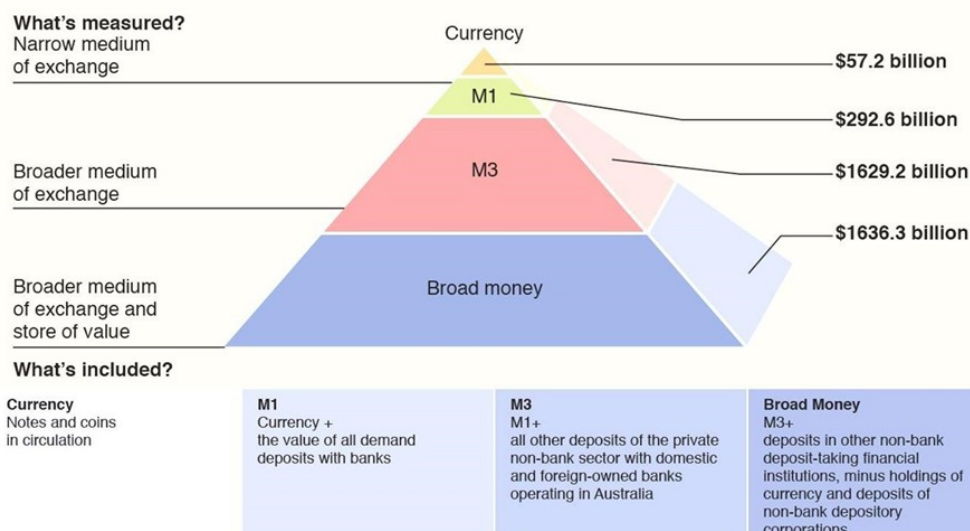
"Commercial" Banking

- **Commercial banking** is a business where an entity (the commercial bank) first accepts money from savers, primarily in the form of interest-bearing deposits. From the bank's perspective, it is borrowing money from depositors. The bank then lends out that borrowed money taken in through deposits in the form of bank loans. This is the core business of a commercial bank and the economic function it serves is to efficiently connect 'surplus financial units' and 'deficit financial units'.

- (Banks often also invest deposits in financial securities and other investments which provide a financial return. In this case we would refer to the bank's 'trading book' as opposed to its 'banking book' which covers the deposit and lending functions. Banks that only have a trading book or which structure financing such as a corporate share issue, are referred to as **investment banks** or **merchant banks**.)

Financial intermediation
- Credit is a product of such a process and is often more important than money itself, especially for businesses. Credit creation is largely driven through and by the **banking sector**. Credit creation affects the macroeconomy in potentially large and very subtle ways.

Money creation
Commercial banks thus have two basic dimensions.
- First, they operate as private businesses to connect savers and borrowers and earn profit in the form of spread.
- Second, they have systemic functions:
- (1) to provide (hopefully) for an efficient allocation of funds across present and future;

- (2) leveraging existing 'official' money into a larger money supply or money creation. This second function is reflected in the official money supply accounts as these include bank deposits as well as currency.

Reserve ratio (RR): A bank's ratio of reserves to deposits. If a bank has $100 in deposits and puts aside $10 in reserves its RR is $10/$100 = 0.1 = 10%. Note the leverage here: the bank is only keeping 10 cents out of every deposit dollar it borrows and lends out the rest.

Excess reserves: Reserves above the normal ratio of reserves to deposits. Banks like to keep the smallest amount possible in reserves because reserves are simply cash in the vault – they earn no return and, with inflation, depreciate in value. A bank cannot keep zero reserves because depositors do withdraw money from time to time and there needs to be sufficient cash to service that demand. But if banks keep too much in reserves, they sacrifice net spread.

Bank runs: This leveraged business model works well most times. But if too many depositors suddenly decide to take out their money, then a bank run can occur, and that can mean the bank will literally run out of cash before it can meet all the demand for cash from its depositors, even if technically solvent (i.e. having a positive net worth (total assets – liabilities). This is what occurred during the Great Depression and, to a much lesser degree, with certain institutions during the GFC.

Simple deposit multiplier: the ratio of the amount of deposits from new monetary base and money created by banks to the amount of new reserve.

$$Simple\, deposit\, multiplier: \frac{1}{RR}$$

Example: So, given an injection of $5000 in deposits, and an RR is 10%, the simple deposit multiplier would equal $5000/0.1 = $50,000. How much net money is created as a result? A nuance: the net increase in money supply is $50,000 - $5,000 = $45,000 since the initial $5000 in deposits came from increase in **monetary base.**

The real-world deposit multiplier (not shown here) would generally be smaller than the simple deposit multiplier because:
- banks may hold excess reserves above their RR.
- Not all monetary base is deposited. Households and firms keep roughly constant the amount they hold in currency relative to the value of their savings account balances.

In general the discrepancies between the two will not be large, though of course they may be greater during abnormal times

Consequences of money creation
- This money creation system can also go awry if banks lend too much (become too leveraged by keeping reserves too low) or too little (keeping too much money in

reserves). This was what Minsky argued would happen regularly in his Financial Instability Hypothesis.
- Quantity of credit creation is considered in our model. Not explicitly shown is the quality of credit offered. Minksy argued that banks, in a boom, would not only lend too much, but would lend to high-risk borrowers (or, in a contraction, not lend to lowrisk borrowers)

Central bank: an institution that is responsible for managing a country's money supply and usually its banking system as well.

The exchange equation and the quantity theory of money
Here is the version of it proposed by economist <u>Irving Fisher</u>. (our earlier version used T in lieu of Y)
M = money supply; V = velocity of money P = price level; Y = real GDP
$$M \times V = P \times Y$$

Velocity of money: the average number of times each dollar in the money supply is used to purchase goods and services which are included in GDP. V is affected by levels of Y, P and M.
$$V = \frac{P \times Y}{M}$$
Let's change the equation from levels to growth rates, i.e. MV = PY now becomes:
$$\Delta M + \Delta V = \Delta P + \Delta Y$$

Irving Fisher argued that V was constant, following the monetarists. But he looked at Y directly (instead of T) and obviously Y does grow (though classical economists did assume that in the very long run a 'stationary state' of no growth would be reached so one would reach a crude monetarist truism then).
<u>Fisher's relationship is thus:</u>
$$\Delta P = \Delta M - \Delta Y$$

Irving Fisher was, however <u>incorrect</u> about V being constant.
♣ Quantity theory of money predictions do not hold true from year to year and hence neither does pure monetarism. V did change in response to economic conditions, breaking down the ability to control inflation by strict rules for growth in M or even, being able to control M itself reliably
♣ However, in the long run, the quantity theory provides useful insights into monetary dynamics and policy:
- Inflation over the long-run results from the money supply growing at a faster rate than the economic growth rate.
- Correlation and causation: inflation may cause money growth as well as the other way round.

The legislated goals of monetary policy
1. Full employment of the labour force.
2. Stability of the Australian currency.
3. Economic prosperity and welfare for the people of Australia.

'Tactical' goals
1. low and stable price inflation
2. sufficient financial system liquidity (not too much or too little)
3. a calibrated foreign exchange rate (a dollar not too high or too low relative to other currencies)
4. overall financial system integrity, including in financial institutions

Key financial variables to achieve the goals of monetary policy
1. market interest rate
2. liquidity levels in the economy
3. money market equilibrium, i.e. the dynamics of supply and demand for money.

Key RBA policy levers
The RBA has 'levers' (akin to tactics) that it can use to achieve its tactical goals and effect the broader legislated strategic goals of monetary policy. These include:

♣ **Cash rate:** The interest rate on loans in the overnight money market. The RBA sets this directly.

♣ **Open market operations (OMOs):** The RBA purchasing or selling financial instruments such as Commonwealth Government Securities and private bonds and securities, either by outright purchase or sale, or by the use of repurchase agreements. This is a way of indirectly setting the market interest rate of which the cash rate is only a part.

♣ **Money supply management:** The RBA has a strong influence over the money supply more directly, being able to modulate the monetary base and overall system liquidity and credit.

Supply & demand for money
- The **money demand curve** is downward sloping to show the inverse relationship between the interest rate on financial assets and the quantity of money demanded.
- The **interest rate on financial assets** is the opportunity cost of holding money.
- Low interest rates reduce the opportunity cost of holding money
- High interest rates increase the opportunity cost of holding money

The demand for money
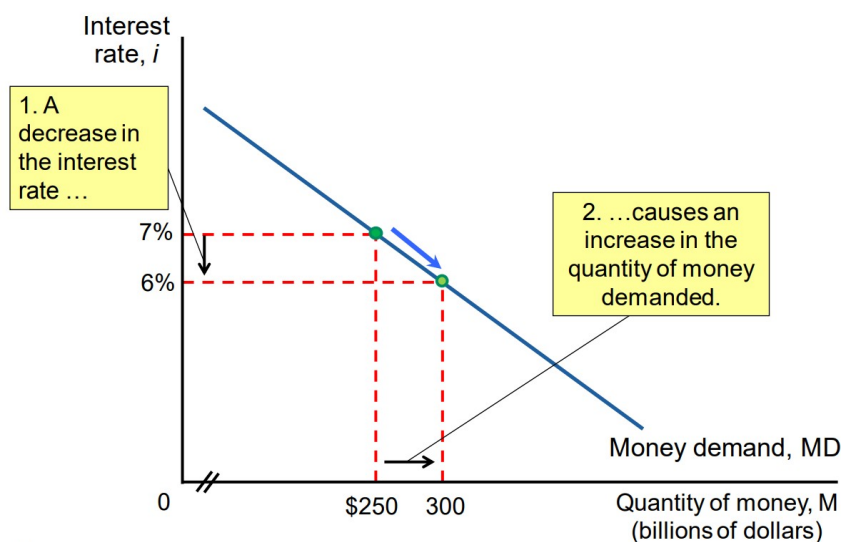
Shifts in the money demand curve

1. <u>Real GDP.</u> Basically the greater income is, the greater the demand for money. To take an individual example, if you typically keep 1% of your income on hand for cash needs, you will demand more cash in absolute terms as your income increases.
2. <u>The price level</u>. As (nominal) prices increase you need more (nominal) cash to make any given purchase.
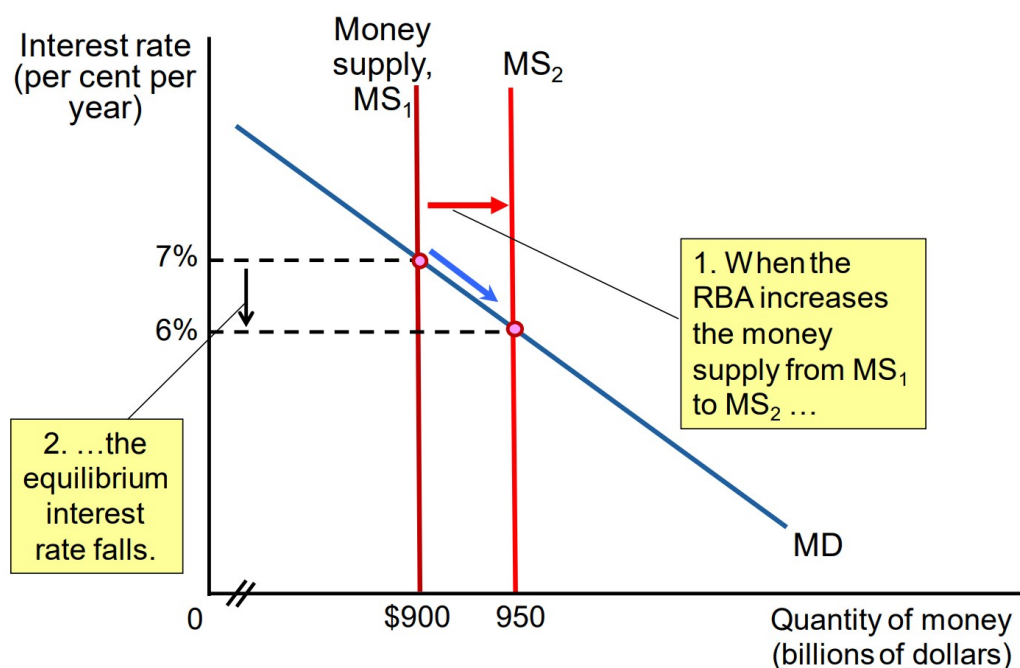
The supply of money

Money supply is also a bit unique because

a) money is not desired in and of itself and but meets a derived demand;
b) money is supplied largely 'monopolistically' by the monetary authority (and augmented by the money creation supply);
c) the marginal cost (MC) of modern money is largely costless.
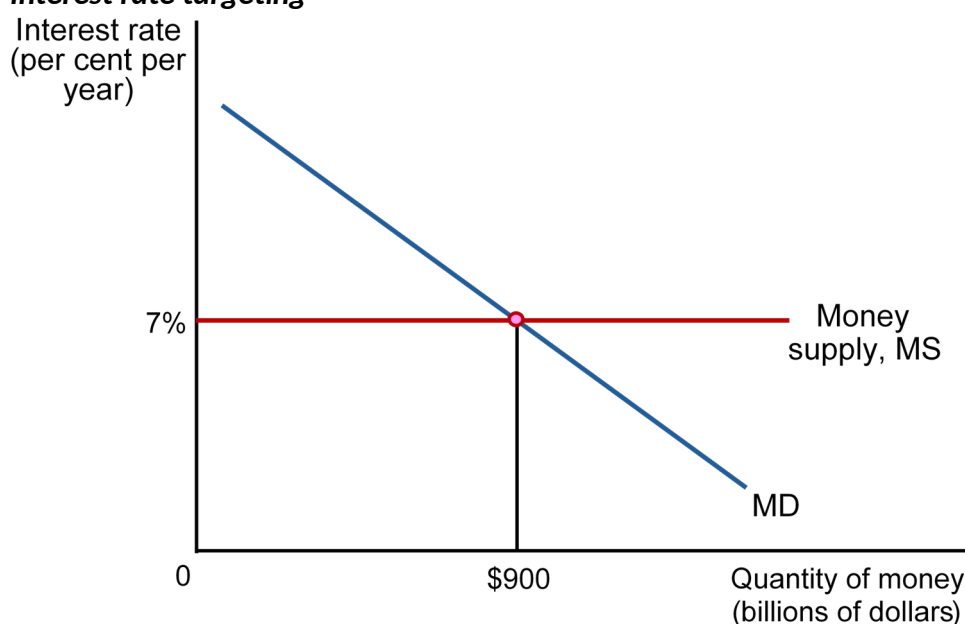
The RBA has two choices on supplying money.

- One is setting the money supply as a vertical curve. This is called **monetary targeting** and amounts to a policy of the Central Bank fixing MS at a certain level
- The other is to supply money into the market until a desired market interest rate results, i.e. a horizontal curve. This is called **interest rate targeting**

Monetary targeting

Interest rate (per cent per year)

Money supply, MS$_1$

MS$_2$

7%

6%

1. When the RBA increases the money supply from MS$_1$ to MS$_2$ …

2. …the equilibrium interest rate falls.

MD

0   $900   950   Quantity of money (billions of dollars)

Interest rate targeting

Interest rate (per cent per year)

7%   Money supply, MS

MD

0   $900   Quantity of money (billions of dollars)

A note on the cost of printing money

- Seigniorage or seigneurage is from the Old French term, seigneuriage "right of the lord (seigneur) to mint money". It refers to the difference between the value of money and the cost to the State to produce and distribute it.

Inflation targeting refers to conducting monetary policy so as to commit the central bank to achieving a publicly announced level of inflation.

Where does our loanable funds model fit here?

In the money market model, the focus is on the short-term nominal rate of interest. To simplify we can think of this as the market for 'cash' or 'liquidity', a short-run need driven by

the monetary base and the interest rate set akin to the RBA's 'cash rate' or the cost of liquidity.

In the loanable funds model, we are more concerned with longer term borrowing and lending devoted to investment (I). To simplify, we can think of this market as the market for capital which is deployed mainly for longer-term investment needs and where the interest rate represents the 'cost of capital'. It is in this market where bank money creation is key. When conducting monetary policy, it is the short-term nominal interest rate that is most affected by increases and decreases in liquidity. There is a close connection between movements in the short-term nominal interest rate and the long-term real interest rate though they can sometimes move in opposite directions for periods.

The mechanics of money supply & interest rate management

♣ The RBA buys and sells securities, for 'cash' (usually electronic transfers, not actual currency), in the money markets through **open market operations (OMOs):** The RBA purchasing or selling financial instruments such as Commonwealth Government Securities and private bonds and securities, either by outright purchase or sale, or by the use of repurchase agreements.

♣ It also sets the **cash rate** which is the interest rate on loans in the overnight money market, generally banks lending to and borrowing from each other and with the RBA. The cash rate is determined by the interaction of demand for and supply of funds in the overnight money market but a benchmark cash rate is set administratively by the RBA – and the subject of much news coverage. This is considered a key 'signal' to the market regarding the RBA's policy stance, i.e. 'loose' or 'tight'.

♣ **Repurchase agreement:** The RBA offers to buy (or sell) Commonwealth Government Securities and other eligible financial instruments from banks or other authorised financial dealers, provided the same banks or dealers are prepared to repurchase (or resell) them at a future date, often in a few days' time, at a price agreed at the outset. "Repos" are the major way the RBA conducts OMO nowadays.
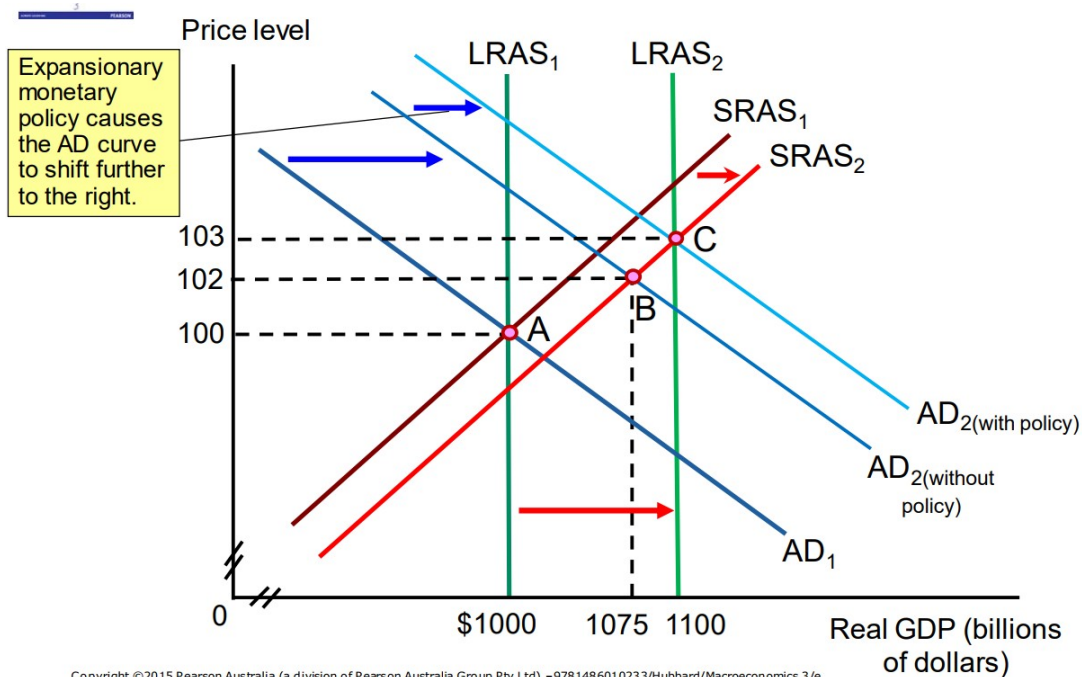
How interest rates affect Aggregate Demand (AD)

The interest rate works indirectly on AD. Changes in interest rates will not affect government purchases, but they will affect the other three components of aggregate demand, as we can gather from the discussion of AE components:

1. Consumption.
2. Investment.
3. Net exports

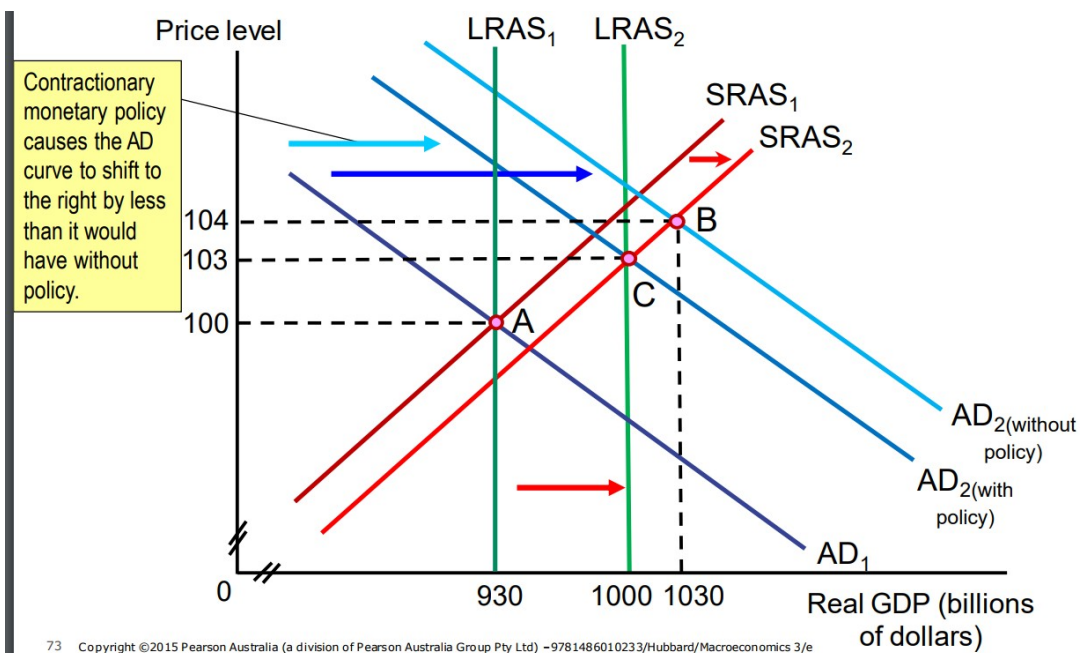***Expansionary monetary policy ('loose')*** refers to the use of monetary policy by the RBA to decrease interest rates to increase AD and hence real GDP.

This decrease typically flows through to decreases in interest rates which then affect the entire economy. Lower interest rates may encourage investment, increase net exports, and may increase consumer spending. Real GDP and the price level will rise.
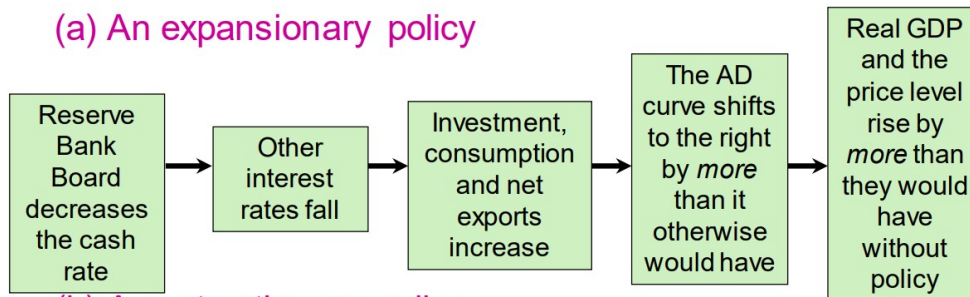
Expansionary monetary policy

Price level

Expansionary monetary policy causes the AD curve to shift further to the right.

LRAS₁ LRAS₂ SRAS₁ SRAS₂

103 — C
102 — B
100 — A

AD₂(with policy)
AD₂(without policy)
AD₁

0   $1000   1075 1100   Real GDP (billions of dollars)

Contractionary monetary policy ('tight') refers to the use of monetary policy by the RBA to increase interest rates to reduce inflation.

Price level

Contractionary monetary policy causes the AD curve to shift to the right by less than it would have without policy.

LRAS₁ LRAS₂ SRAS₁ SRAS₂

104 — B
103 — C
100 — A

AD₂(without policy)
AD₂(with policy)
AD₁

0   930   1000 1030   Real GDP (billions of dollars)

(a) An expansionary policy

| Reserve Bank Board decreases the cash rate | → | Other interest rates fall | → | Investment, consumption and net exports increase | → | The AD curve shifts to the right by *more* than it otherwise would have | → | Real GDP and the price level rise by *more* than they would have without policy |

(b) A contractionary policy
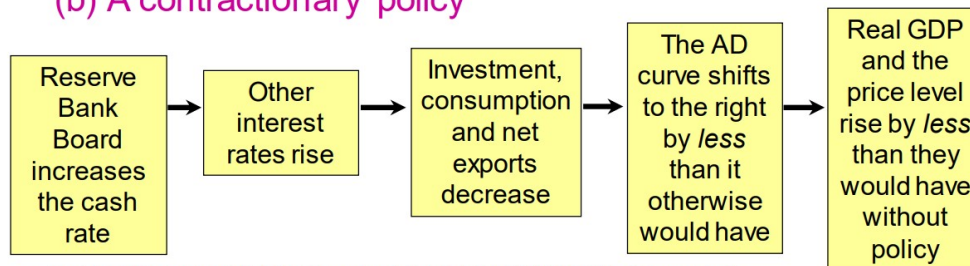
| Reserve Bank Board increases the cash rate | → | Other interest rates rise | → | Investment, consumption and net exports decrease | → | The AD curve shifts to the right by *less* than it otherwise would have | → | Real GDP and the price level rise by *less* than they would have without policy |

Policy lags

♣ There may be a **recognition lag**—a delay before the RBA recognises that a contraction is imminent.

♣ The longest time lag with monetary policy is the **impact lag**—the time taken for monetary policy to affect real GDP. Time lags may reduce the ability of monetary policy to impact on the economy at the appropriate time.

Monetary policy asymmetry

- Monetary policy is more effective at reducing the rate of inflation during an economic boom than it is at stimulating aggregate demand during a contraction or recession.
- That is, its effects are 'asymmetrical' with respect to moderating inflation.
- So in bad times, businesses will be unwilling to borrow if the economic outlook is not good. Banks may also be reluctant to make loans, as occurred in some countries following the 2007- 2008 global financial crisis. In that case a lowering of interest rates will often have relatively little impact on AD.
- In boom times, however, rises in rates often can be very effective (and, if overdone, too effective – a big reason behind Australia's 1991 recession – 'the recession we had to have in Paul Keating's words, Treasurer at the time).

Distributional impacts of monetary policy

♣ Monetary policy is a 'blunt instrument' and does not affect all people or industries equally.

♣ With contractionary monetary policy:
- Savers can benefit and increase their spending.
- Borrowers (individuals and businesses) face higher interest repayments on loans.
- Low income earners are often 'marginal' borrowers, and may be at a higher risk of loan defaults.

♣ With expansionary monetary policy borrowers benefit more than savers.

The liquidity trap

Indeed, the GFC ushered in a policy across central banks of driving interest rates down to zero – and in some cases, as in Germany and now Japan, even negative nominal rates at times (i.e. a charge to hold either government securities or money balances in the central bank). This is the classic **'liquidity trap'** noted by Keynes, i.e. that there is a limit to the effectiveness of interest rate cuts in especially hard times. At some point all money provided will simply be held rather than spent or lent. Keynes argued that in these circumstances, fiscal policy by government was necessary, i.e. a boost in G to boost AD.

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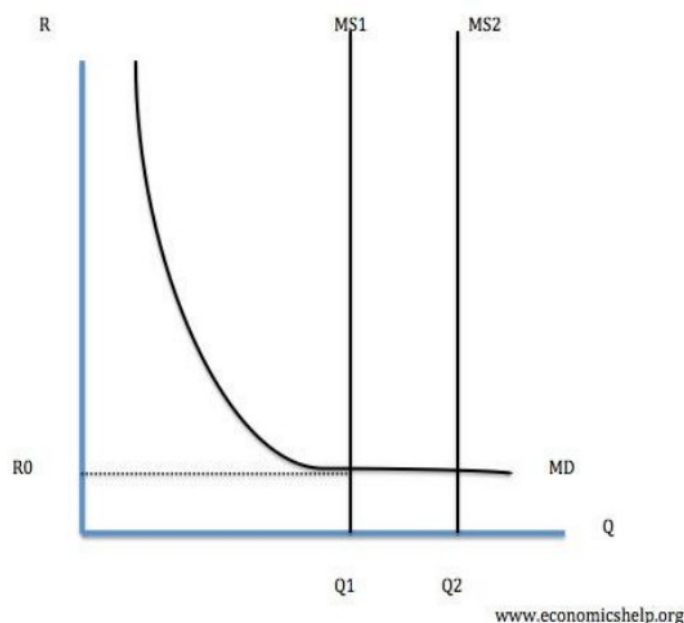
Quantitative Easing (QE)

- Quantitative Easing (QE) is at its heart both simple and radical: A CB prints money and uses this money to buy assets off of firms and bank balance sheets – generally financial securities such as shares and bonds.
- This is OMO on steroids. Generally the prices paid by the CB were well above the actual market price. This was done in part to make sure that financial institutions did not become insolvent, leading to the financial death spiral that occurred during the Great Depression.
- This has echoes of Minsky's prescription for government equity positions in businesses during downturns to insulate against collapse. The CB is not taking ownership of the firms but is actively intervening in their balance sheets

What about inflation?

- Normally the printing of money on a vast scale would be seen to be inflationary. In this case the Fed was more worried about deflation and was hoping an injection of money supply would combat that.
- More broadly, this was formally not a pure printing of money but an exchange of money for assets. The assets in effect were sopping up the new money and it was hoped that this new money would flow back out through the economy in the form of new loans.

- Asset purchases are certainly standard practice for CB's and in normal markets financial flows from the CB to the economy are 'sterilised' through such purchases both on the way in and on the way out, the unwinding of the sale involving the CB selling the asset back to the private party

Lender of Last Resort (LOLR)
- This is a backstop to a financial system that may occasionally but inevitably go bust.
- A LOLR will be provide liquidity into the financial system (either generally or to specific institutions) when the system is at risk of a general collapse.
- This is a key Central Bank function for a country