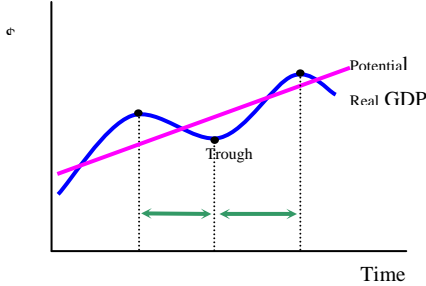


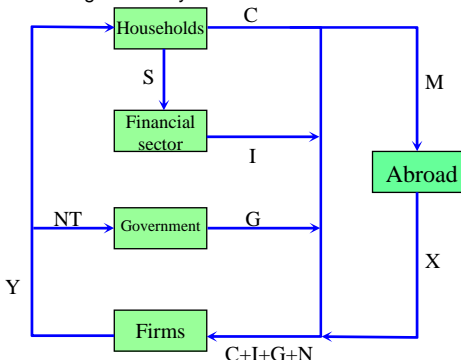
MACROECONOMICS

- Macroeconomics studies the determination of **economic aggregates**.
 - **Output** tends to rise in the long run (**long-term economic growth**), but fluctuates in the short run (**business cycles**).



SHORT TERM FLUCTUATIONS IN OUTPUT AND EMPLOYMENT (BUSINESS CYCLE)

- In the short run, **employment** fluctuates with output.
 - Unemployment rate = percentage of people in the labour force who are unemployed.
- **Inflation** refers to the process of rising prices.
 - Inflation rate = annual percentage change in the price level.
- The real **interest rate** is equal to the nominal interest rate, adjusted for inflation.
- The **exchange rate** is defined as the number of units of domestic currency required to purchase one unit of foreign currency.



Circular flow of income and expenditure ($Y = C + I + G + NX$).

THE MEASUREMENT OF NATIONAL INCOME

- **GDP** = value of all final goods and services produced in an economy during a specified period of time Volumes
- Value of domestic **output** (GDP) = value of the **expenditure** on that output = total claims to **income** that are generated by producing that output.
 - Three alternative ways to measure income.
- **GDP by value added**: Value of a firm's production – value of intermediate goods bought from other firms.
- GDP from the expenditure side: $C_a + I_a + G_a + (X_a - IM_a)$.

- **GDP from the income side**: Factor payments + depreciation + indirect taxes (net of subsidies).
- **Implicit GDP deflator** = $\frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$

| | | |
|-------------------------------|---|--|
| GROSS DOMESTIC PRODUCT | CONSUMPTION (C) | Expenditures by households on goods and services. |
| | INVESTMENT (I) | Expenditures on capital equipment and buildings by firms. Expenditures on new homes by households. Change in business inventories. |
| | GOV'T EXPENDITURES (G) | Expenditures on goods and services by all levels of the government. Does not include transfer payments! |
| | NET EXPORTS (X_A - IM_A) | Value of exports minus value of imports. |

GDP from the Expenditure Side

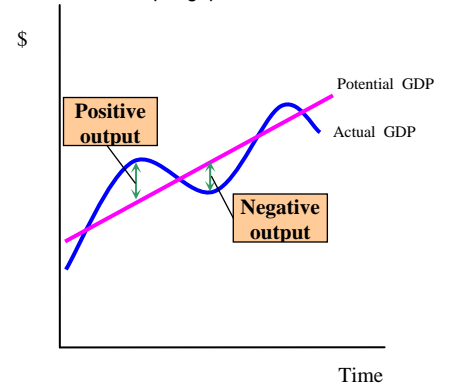
| | | | | |
|---------------------------------------|--|-------------------------------|---|---|
| NET DOM. INCOME AT FACTOR COST | NET DOM. PRODUCT AT MARKET PRICES | GROSS DOMESTIC PRODUCT | WAGES, SALARIES, AND SUPPLEMENTARY LABOUR INCOME | Total payments by firms for labour services. |
| | | | INTEREST AND MISCELLANEOUS INVESTMENT INCOME | Net interest payments to households. Payments for the use of land (incl. rent for housing). |
| | | | BUSINESS PROFITS | Total profits made by corporations. Net income of farmers and non-farm unincorporated businesses |
| | | | INDIRECT TAXES LESS SUBSIDIES | To account for the difference between factor cost and market prices. |
| | | | CAPITAL CONSUMPTION ALLOWANCE (DEPRECIATION) | To account for the difference between net and gross domestic product. |

GDP from the income side

SHORT RUN VS. LONG RUN MACROECONOMICS

- **Potential GDP** depends on the amount of **factors** available, the normal **factor utilization rate**, and **factor productivity**.
 - Changes in any of these variables change potential and actual GDP.
 - There is little, or no effect on the output gap.
- **Actual GDP** may differ from potential GDP because the **factor utilization rate** is different from its normal level.
 - Changes in aggregate demand change the factor utilization rate.

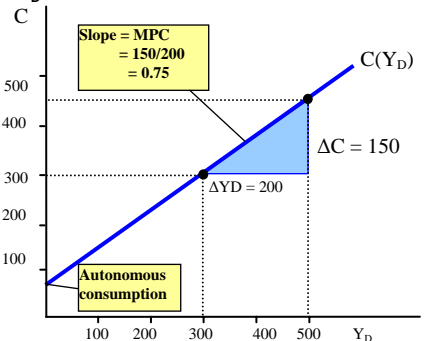
- The **output gap** widens.
- Adjustments in factor prices bring the factor utilization rate back to its normal level.
- The output gap closes.



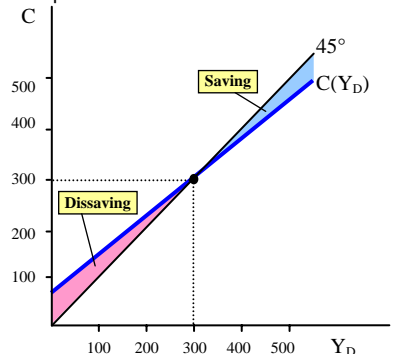
Potential GDP and actual GDP

THE SIMPLEST SHORT-RUN MACRO MODEL

- Aggregate desired expenditure (**AE**) = $C + I + G + (X - IM)$.
- Assume that consumption expenditure (C) is solely determined by disposable income (Y_D).
 - $C(Y_D) = \text{autonomous consumption} + \text{MPC} \times Y_D$



Marginal Propensity to Consume: Slope of the consumption function

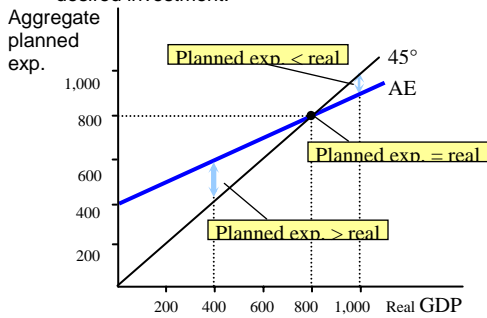


The Consumption Function: Savings and Dissavings

- Aggregate desired expenditure depends on national income.



- C, I, and IM tend to increase as national income increases.
- **Eqm** occurs when **aggregate desired expenditure = actual national income**.
- This condition implies that desired saving = desired investment.

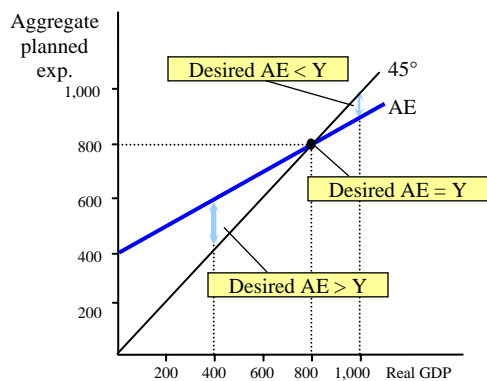


Aggregate planned Expenditure vs. Real GDP

- An increase in autonomous expenditure results in an even larger increase in real GDP.
- Multiplier effect.
- **Multiplier = $1/(1 - \text{slope of AE}) > 1$.**

ADDING GOVERNMENT AND TRADE TO THE SIMPLE MACRO MODEL

- **Public saving** = net taxes (T) – government purchases (G).
→ Public saving increases as eqm national income rises.
- **Net exports (NX)** = exports (X) – imports (IM).
→ Net exports decrease as eqm national income rises.
- **Eqm national income** occurs where ...
... desired aggregate expenditure (AE) = actual national income (Y).
... desired national saving = national asset formation.



Expressing desired aggregate expenditure as a function of Y as well.

- The presence of imports and income taxes **reduce z** and thus the **size of the multiplier**:
→ $z = (1 - t)MPC - m$.

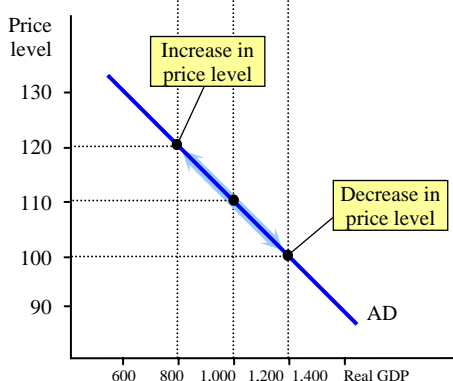
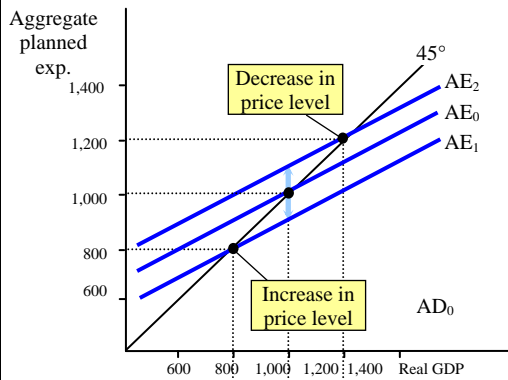
- The government **expenditure multiplier** is **smaller than the government tax multiplier**.
→ Balanced-budget increase in government purchases has a mild expansionary effect.
→ However, effect is smaller than that of deficit-financed increase in expenditure.

| | |
|--|-------------------------|
| Government expenditure (simple) multiplier | $\frac{1}{1 - z}$ |
| Government tax multiplier | $-\frac{MPC}{1 - z}$ |
| Balanced budget multiplier | $\frac{1 - MPC}{1 - z}$ |

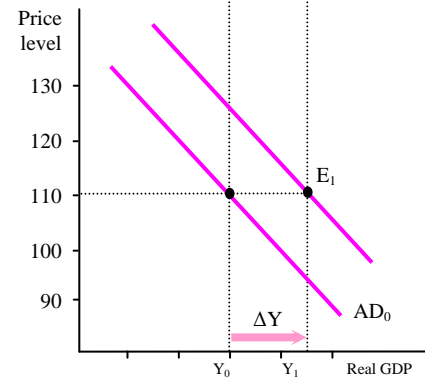
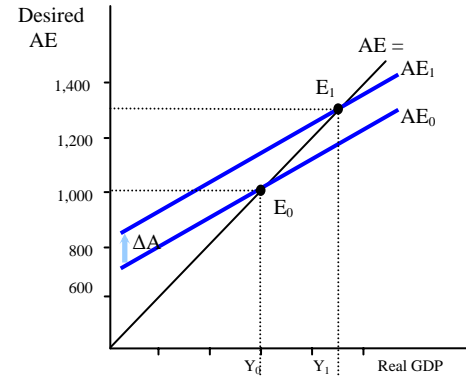
Multipliers

OUTPUT AND PRICES IN THE SHORT RUN

- The **aggregate demand curve (AD)** illustrates the **negative** relationship between eqm real GDP and the price level.
→ Changes in **AE** (other than changes in the price level) result in a shift of AD.

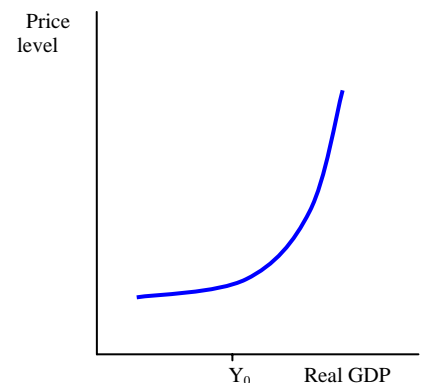


Aggregate Demand Curve



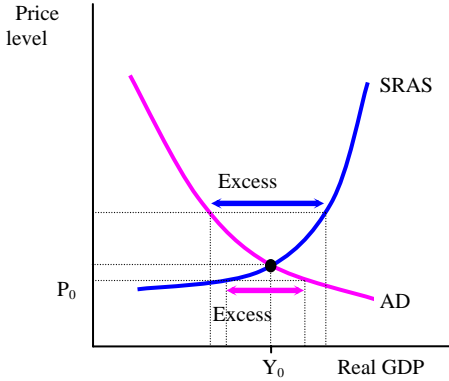
Shifts in the AD curve (aggregate demand shocks)

- The **short-run aggregate supply curve (SRAS)** illustrates the **positive** relationship between price level and quantity of aggregate output supplied, holding technology and factor prices constant.
→ Changes in **input prices** result in a shift of SRAS.

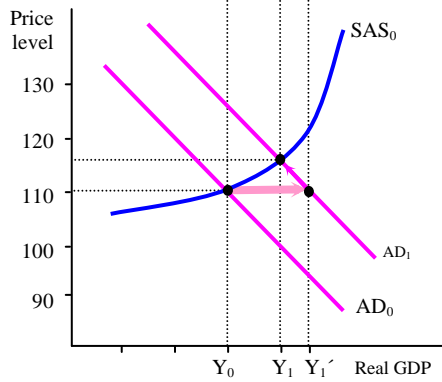
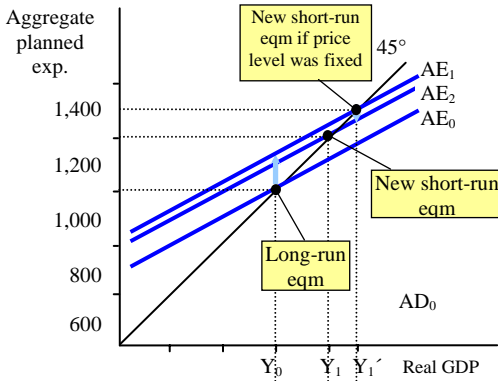


Supply side of the Economy

- **Macroeconomic equilibrium**:
→ Intersection of AD and SRAS.



- Aggregate demand and aggregate supply **shocks** result in shifts of AD and SRAS, respectively.
 - The **steeper SRAS**, the **smaller** the size of the **multiplier**.

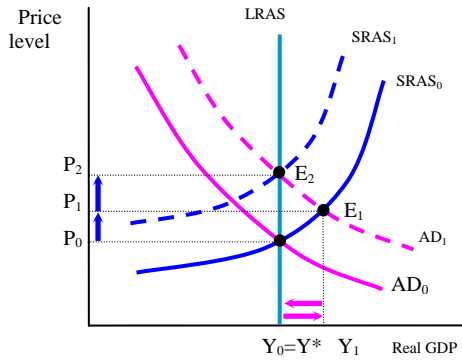


Aggregate Demand Shock

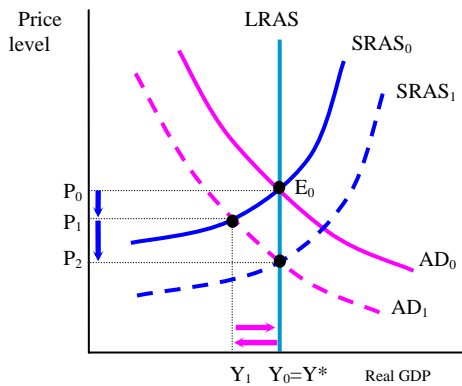
OUTPUT AND PRICES IN THE LONG RUN

- Output gap** = difference between actual output (Y) and potential output (Y*).

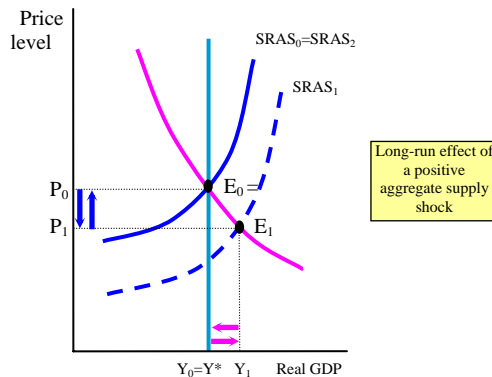
- Potential output is equal to an economy's long-run aggregate supply (LRAS).
- Both **aggregate demand** and **aggregate supply** are subject to continual **random shocks**.
 - These shocks lead to temporary changes in real GDP.
 - Real GDP returns to potential GDP through adjustment in input prices.



Expansionary AD Shocks



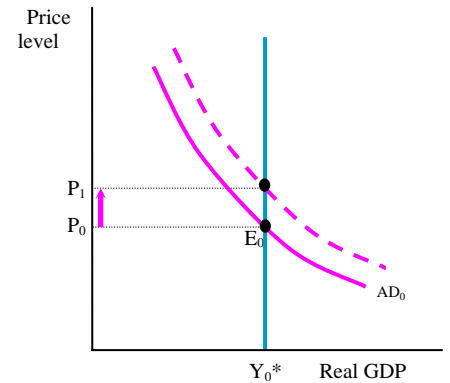
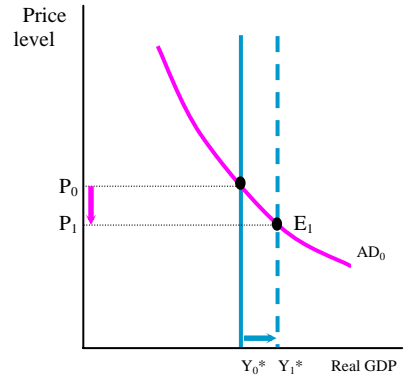
Contractionary AD Shocks



Supply Shocks

- Short run eqm** is given by the intersection of **AD and SRAS**.

- Long run eqm** is given by the intersection of **AD and LRAS**.
 - LRAS is vertical at $Y = Y^*$.
 - In the long run, total **output** is determined solely by conditions of **aggregate supply**.



Long run and Short Run Equilibrium

- Fiscal policy** may be used to **stabilize** output and employment.
 - **Discretionary fiscal policy**: Change in government expenditure or taxes initiated by an act of parliament.
 - **Automatic stabilization**: Change in government expenditure or taxes triggered by the state of the economy

THE NATURE OF MONEY

- Most economists today believe that **changes in the supply of money** ...
 - ... have important **short-run effects** on real GDP and employment.
 - ... have no real **effects in the long-run**, i.e. in the long run, only the price level changes.
- Money serves as **medium of exchange**, **store of value**, and **unit of account**.
- The banking system in Canada consists of two main elements:
 - **Bank of Canada** (Canada's central bank).
 - **Commercial banks**.

| Assets | Liabilities |
|----------------------------|----------------------|
| Gov't of Canada securities | Notes in circulation |



| | |
|-------------------------|-------------------------------|
| Advances to banks | Gov't of Canada deposits |
| Foreign-currency assets | Deposits of banks (reserves) |
| Other assets | Foreign-currency liabilities |
| | Other liabilities and capital |

Assets and Liabilities of the Central bank in Canada:
Bank of Canada

| Assets | Liabilities |
|---------------------------------|------------------------------|
| Reserves | Demand deposits |
| Mortgage and non-mortgage loans | Savings deposits |
| Canadian securities | Time deposits |
| Foreign-currency assets | Gov't of Canada deposits |
| Other assets | Foreign-currency liabilities |
| | Shareholders' equity |
| | Other liabilities |

Assets and Liabilities of Commercial Banks in Canada

- Commercial banks can **create money**, because they only need to hold small reserves to back their deposit liabilities.
→ **Desired reserve ratio (v)**:
Fraction of its deposits that a commercial bank wants to hold as reserves.
→ $\Delta \text{ Deposits} = \Delta \text{ Reserves} / v$
- The **Bank of Canada controls the money supply** because it has almost complete control over reserves.

| Assets | | Liabilities | |
|-------------------------|------|-------------|------|
| Cash and other reserves | 200 | Deposits | 1000 |
| Loans | 900 | Capital | 100 |
| | 1100 | | 1100 |

Initial, hypothetical balance sheet of a commercial bank:

| Assets | | Liabilities | |
|-------------------------|------|-------------|------|
| Cash and other reserves | 220 | Deposits | 1100 |
| Loans | 980 | Capital | 100 |
| | 1200 | | 1200 |

Suppose that the Bank of Canada buys \$100 worth of securities on the open market.

MONEY, OUTPUT, AND PRICES

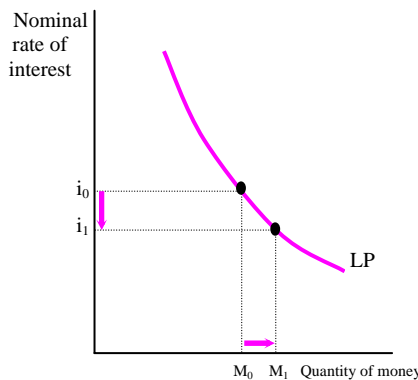
- Present value** of an asset:
 - Sum of discounted future payments that it generates.
 - Inversely related to the **interest rate**.
 - Equal to the asset's **market price**.

| | |
|---|---|
| PV of a single future payment in n years | $\frac{R}{(1+i)^n}$ |
| PV of a sequence of payments over T periods | $\frac{R_1}{(1+i)} + \frac{R_2}{(1+i)^2} + \dots + \frac{R_T}{(1+i)^T}$ |

| | |
|--------------------------------------|---------------|
| PV of a perpetual stream of payments | $\frac{R}{i}$ |
|--------------------------------------|---------------|

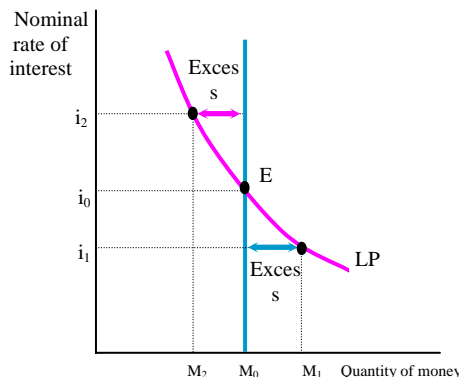
Present Value and the Interest Rate

- Simple model in which people can divide wealth between bonds and money:
 - **Money**: needed for **transactions, precaution, and speculation**.
 - Opportunity cost of holding money = interest rate on bonds.
- Nominal demand for money** depends on real GDP, interest rate, and price level.
- Real demand for money** = nominal demand for money divided by the price level.
 - Varies directly with real GDP and inversely with the interest rate.

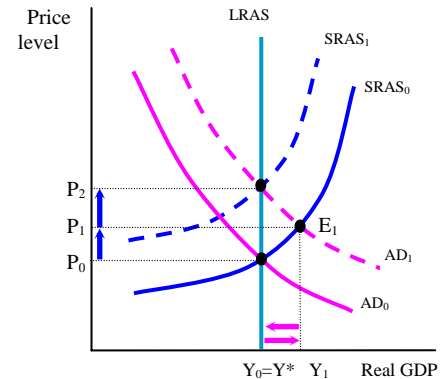


Liquidity preference function (LP)

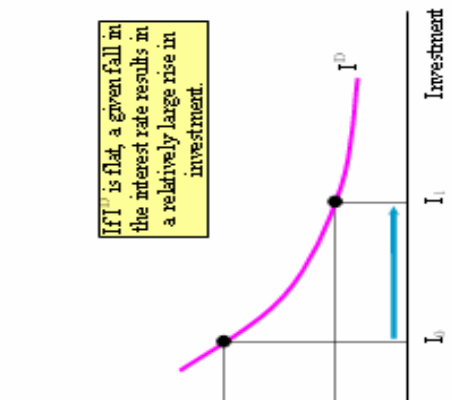
- An increase (decrease) in the **money supply** leads to a fall (rise) in **interest rates**.
→ **Aggregate demand** rises (falls).
- Effect of monetary policy on the price level and real GDP:
 - **Long run**: Only the price level is affected (**neutrality of money**).
 - **Short run**: Monetary policy is most effective if **LP** is steep, and **P** and **SRAS** are flat.



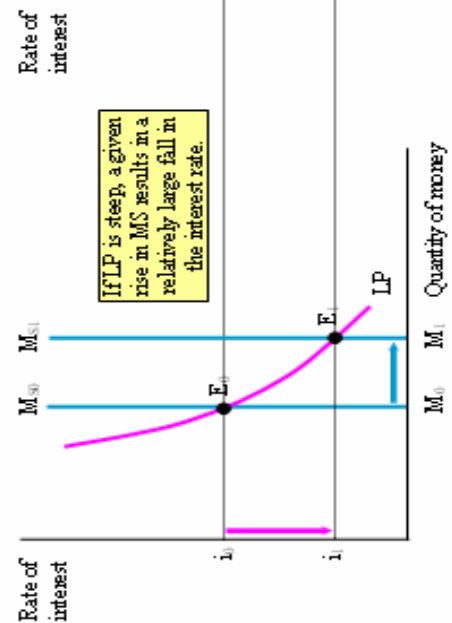
Liquidity preference theory of interest



Effect of changes in the money supply on real GDP and the price level: long run



If **LP** is flat, a given fall in the interest rate results in a relatively large rise in investment.



If **LP** is steep, a given rise in **MS** results in a relatively large fall in the interest rate.

Effect of changes in the money supply on real GDP and the price level: short run



MONETARY POLICY IN CANADA

- Major **tools** the Bank of Canada uses to control the money supply are:
 - **Open market operations.**
 - **Government deposit shifting.**

| | |
|--------------------|-------------|
| Private households | |
| Assets | Liabilities |
| Bonds | -100 |
| Deposits | +100 |

| | |
|-----------------|-------------|
| Commercial bank | |
| Assets | Liabilities |
| Reserves | +100 |
| Demand deposits | +100 |

| | |
|--------------------|-------------|
| Bank of Canada | |
| Assets | Liabilities |
| Bonds | +100 |
| Com. bank deposits | +100 |

Open Market Operations

| | |
|-----------------|-------------|
| Commercial bank | |
| Assets | Liabilities |
| Reserves | +100 |
| Gov't deposits | +100 |

| | |
|--------------------|-------------|
| Bank of Canada | |
| Assets | Liabilities |
| Gov't deposits | -100 |
| Com. Bank deposits | +100 |

Government Deposit Shifting

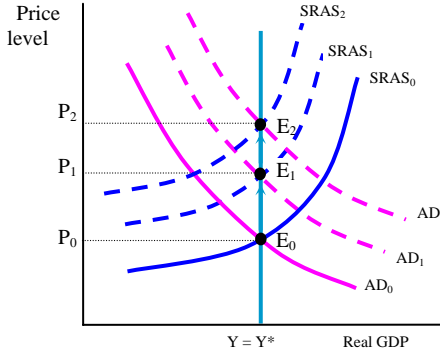
- A rise (fall) in the **money supply** results in a fall (rise) of **interest rates**.
 - Investment and net exports rise (fall).
 - Aggregate demand and **eqm real GDP** rise (fall).
- The Bank of Canada's policy variables are **real GDP** and the **price level**.
 - **Money supply** and **interest rates** are used as intermediate targets.
- Policy instruments are **reserves** in the banking system (or the monetary base).
- Long execution lag** of monetary policy makes monetary fine-tuning difficult.
 - Policy may have a **destabilizing effect**.

INFLATION

- Inflation** = process of rising prices.

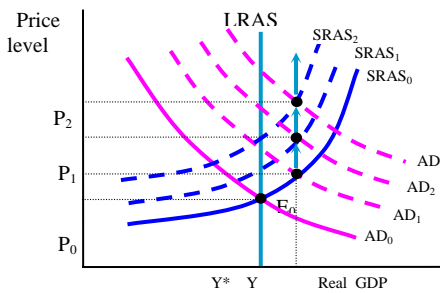
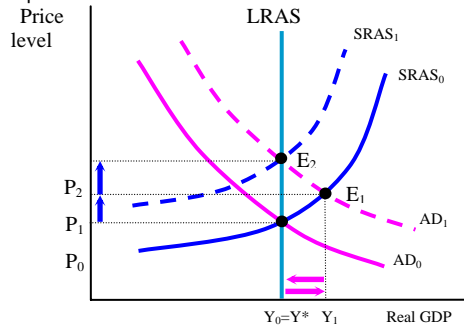
| | |
|------------------------------|---|
| $Y > Y^*$ (inflationary gap) | <ul style="list-style-type: none"> $U < U^*$ (excess demand for labour) Wages and unit costs tend to rise. |
| $Y < Y^*$ (recessionary gap) | <ul style="list-style-type: none"> $U > U^*$ (excess supply of labour) Wages and unit costs tend to fall. |

Adding Inflation to the Model

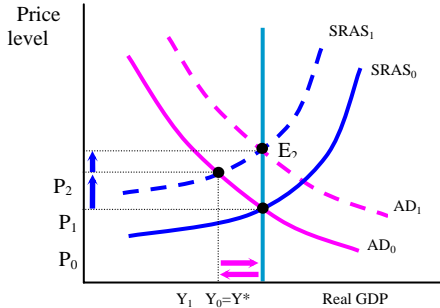


Constant Inflation

- Without monetary validation, **demand (supply) shocks** cause **temporary** bursts of inflation.
 - Inflationary (recessionary) gaps are removed by rising (falling) factor prices
 - SRAS shifts leftward (rightward).
 - Real GDP returns to potential GDP, the **price level rises (falls)**.
 - Real GDP returns to potential GDP and the price level to its **initial level**.

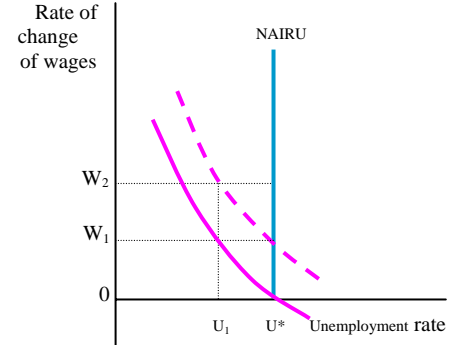


Demand Shocks



Supply Shocks

- Only with **continuing monetary validation** can **inflation** initiated by either supply or demand shocks **continue indefinitely**.
- The **Phillips curve** describes the relationship between unemployment and the rate of change of wages.
 - **Short run:** Phillips curve is **downward sloping**.
 - **Long run:** Phillips curve is **vertical** at U^* .



Phillips Curve

- Disinflation** = reduction in the rate of inflation.
 - Cost = cost of the recession that is generated by the process (sacrifice ratio).

UNEMPLOYMENT

- Cyclical unemployment** is the difference between the actual level of employment and NAIRU.
- Two opposing theories that try to explain causes of cyclical unemployment:
 - **New Classical theories** (no involuntary unemployment).
 - **New Keynesian theories** (involuntary employment).

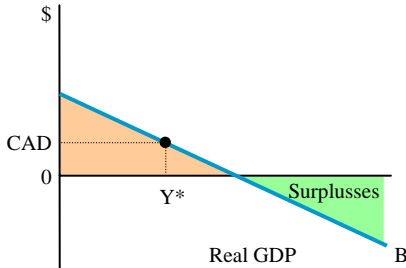
| | |
|------------------------------------|--|
| Long-term employment relationships | Tendency of employers to smooth income of employees by paying a steady money wage and letting profits and employment fluctuate to absorb effects of temporary changes in demand. |
| Menu costs and wage contracts | Changing prices and wages in response to minor and temporary changes in demand is costly and time consuming (only infrequent adjustment). |
| Efficiency wages | Paying a wage premium may be profitable if it raises workers' efficiency. |
| Union bargaining | Those already employed (union members) will wish to bid up wages (above eqm). |

- NAIRU** is composed of frictional and structural unemployment.



BUDGET DEFICITS AND SURPLUSES

- Annual budget deficit = change in outstanding debt = $(G + TR + i^* D) - T$
- Primary budget deficit = $(G + TR) - T$
- The budget deficit function (B) describes the inverse relationship between the budget deficit and real GDP.



Budget Deficit Function

- Cyclically adjusted deficit (CAD): estimate of the gov't budget deficit for $Y = Y^*$.
→ Changes in CAD determine the **stance of fiscal policy**.
- Change in debt-to-GDP ratio: $\Delta d = x + (r - g)d$
- If taxpayers are not purely Ricardian, a **reduction in taxes along with an increase in the budget deficit** will result in **crowding out** of ...
... investment (closed economy).
... net exports (open economy).
→ Government deficits **redistribute resources** away from future generations toward the current generation.
- An increase in government debt may impede the conduct of monetary and fiscal policy.
- Even with **positive overall deficits** the **debt-to-GDP ratio** may be **falling**.

ECONOMIC GROWTH

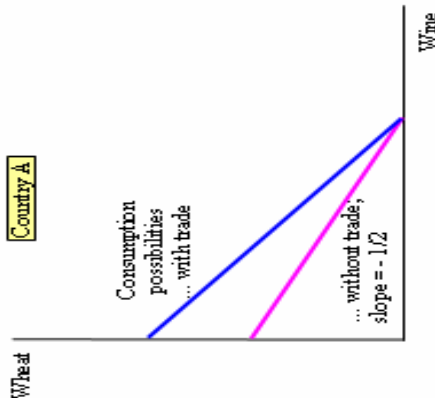
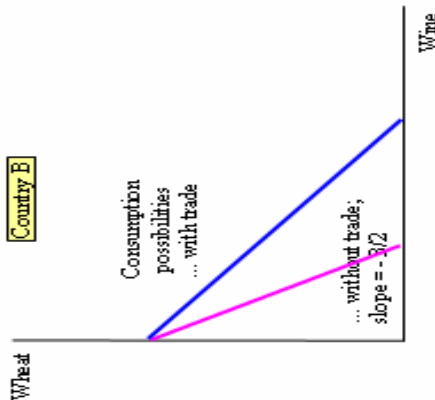
- **Economic growth** is the increase in potential output due to:
 - Increases in **factor supplies**.
 - Increases in **factor productivity**.
- **Investment** in productive capacity results in a rightward shift of **LRAS**.
- The **neoclassical theory of growth** displays ...
... **diminishing returns** when one factor is increased on its own.
... **constant returns** when all factors are increased proportionately.
Along a **balanced growth path**, capital and labour grow proportionately.
 - GDP rises, but GDP per capita is unchanged (no improvement in living standards).
- **New growth theories** treat technological change as endogenous.
Some modern growth theories display constant or increasing returns to investment.
→ Emphasize the **unlimited potential of knowledge-driven technological change**.
- **Resource exhaustion** and **pollution** put limits to growth.

CHALLENGES FACING THE DEVELOPING COUNTRIES

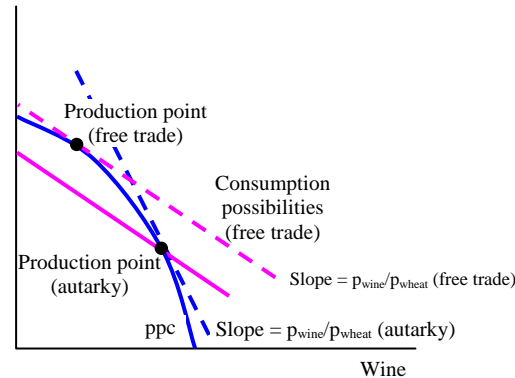
- The **development gap** describes the discrepancy between the standards of living in countries at either end of the distribution (developed vs. developing countries).
- **Impediments to economic growth** are related to resources, human capital, agriculture, population growth, cultural barriers, domestic saving, infrastructure, and foreign debt.
- Development policies based on the older view were **inward-looking** and focused on **import substitution**.
- Development policies based on the Washington consensus call for more **outward-looking, international-trade oriented, and market-based** route.

THE GAINS FROM INTERNATIONAL TRADE

- **Gains from trade** arise from **different opportunity costs**.
→ **Specialization** in the activity in which opportunity costs are lowest.
→ World production increases.
→ **Consumption possibilities increase**.



Sources of Gains from Trade



Gains from trade with variable cost

- Additional gains from trade arise in cases of:
 - Economies of scale, greater product variety, learning-by-doing.
- **Patterns of trade:**
 - Countries **export** goods for which they have a **comparative advantage**.
 - Countries **import** goods for which they have a **comparative disadvantage**.
- **Terms of trade:**
 - Ratio of the average price of a country's exports to the average price of its imports.
 - Determines the division of the gains from trade.

TRADE POLICY

- Free trade through specialization, allows for maximization of world output.
- There are some national objectives that are used arguments against free trade.
- Common methods of protection:
 - Tariffs, quotas, voluntary export restrictions, non-tariff barriers.

