Macroeconomic Model

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Why do we need the model?

- Many key macroeconomic variables such as output, price-inflation, interest rate, consumption, investment are a result of interaction of economic agents in a given economy.

- Nowadays, many countries also actively participate themselves in the world so that the external sector like international trade, interest rate also influence in the interaction process.

- Consider decision to consumer goods, microeconomic theory suggests consumers will compare happiness (utility) from consuming the goods (marginal rate of substitution-MRS) and their relative prices.

- Nonetheless, how much they actually consumer depends on budget available.

- In the macroeconomic sense, there are many resources constraints that would affect these macroeconomic variables.

- For example, output or GDP is the sum of value added in all sectors. How much would each sector produce depends on the demand for a product under consideration, technology and prices of factor inputs (workers, capital).

- When all individual firms have greater demand for workers, the wage would increase (Wage inflation). Workers receiving the higher wage would have greater demand for goods. This would have an effect on decision to produce.

- General equilibrium analysis is needed.

- What does the general equilibrium mean?

  All markets in the economy reach equilibrium (no excess demand and supply-market clearing)

- How many markets a given economy has?

  Depend on your analytical framework you work with.

- For example, Computable General Equilibrium (CGE) Model emphasizing on interaction of goods and labor markets, have several good markets (agriculture, mining, basic industry, machinery and transport equipment).

- Punchline: there are more than one markets to be solved (reach equilibrium).

- In macroeconomic analysis, there would be at least two markets to be solved;

Good market:

$$C(Y)+I\underset{-}{(R)}+\bar{G}+X\left(Y^{*},\frac{SP^{*}}{P}\right)-M\left(\underset{+}{Y},\frac{SP^{*}}{P}\right)=Y$$

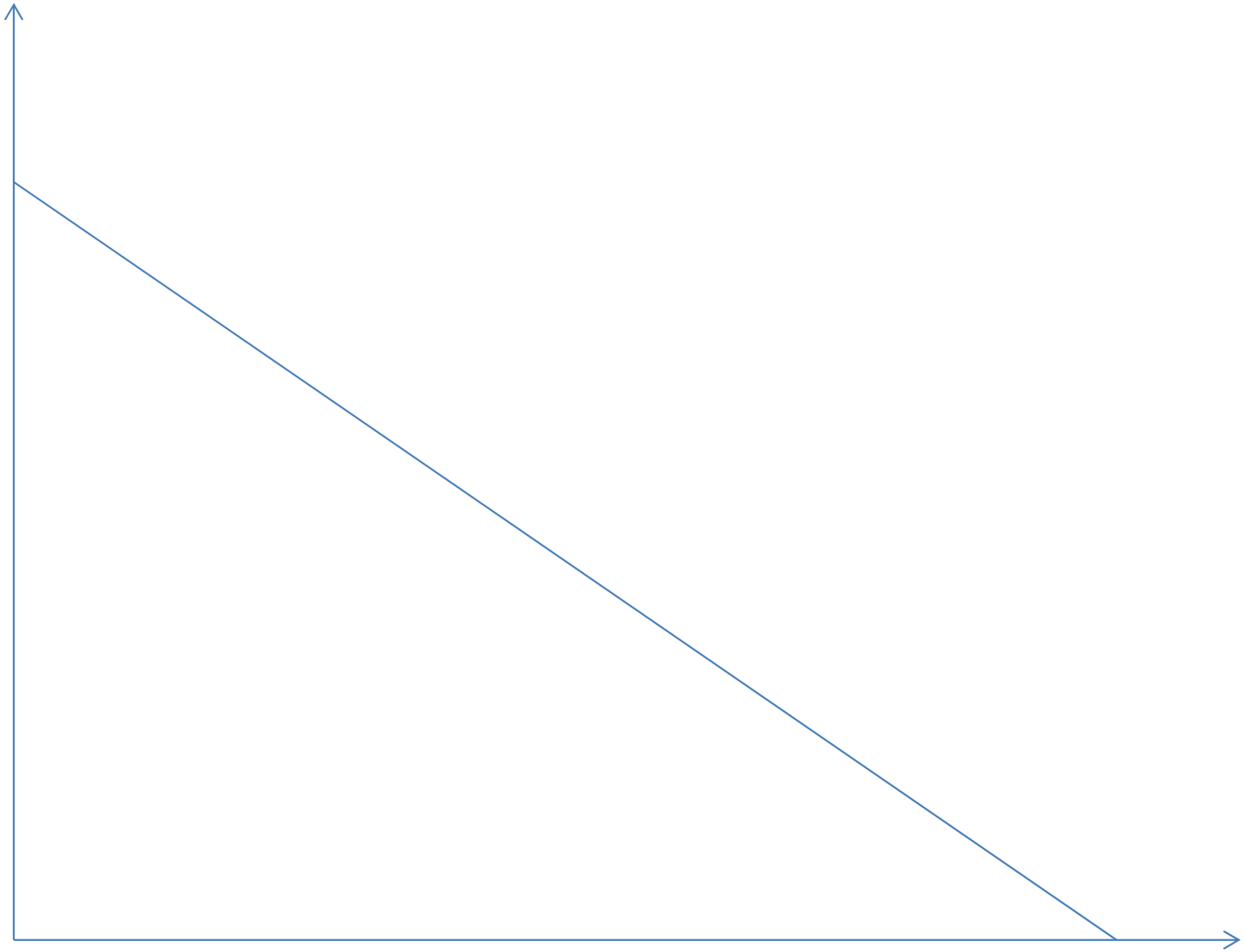
$$C(Y) + I\underset{-}{(R)} + \bar{G} + X\left(Y^*, \underset{+}{Q}\right) - M\left(\underset{+}{Y}, \underset{-}{Q}\right) = Y$$

$$\beta_0 + \beta_1 Y + I_0 - \beta_2 R + \bar{G} + \beta_3 Y^* + \beta_4 Q - M_0 - \beta_5 Y - \beta_6 Q = Y$$

$$\left[\underbrace{\beta_0 + I_0 + \bar{G} + \beta_3 Y^* + \beta_4 S - M_0 - \beta_6 S}_{\text{Intercept}}\right] - \beta_2 R = \left[1 - \beta_1 + \beta_5\right] Y$$

You can easily extend the model. For example, the classical theory suggests, private investment depends on income.

You can also alter the functional form.



Draw the diagram illustrating the relation between real exchange rate (Q) and interest rate in the good market equilibrium

$$\beta_0 + \beta_1 Y + I_0 - \beta_2 R + \bar{G} + \beta_3 Y^* + \beta_4 Q - M_0 - \beta_5 Y + \beta_6 Q = Y$$

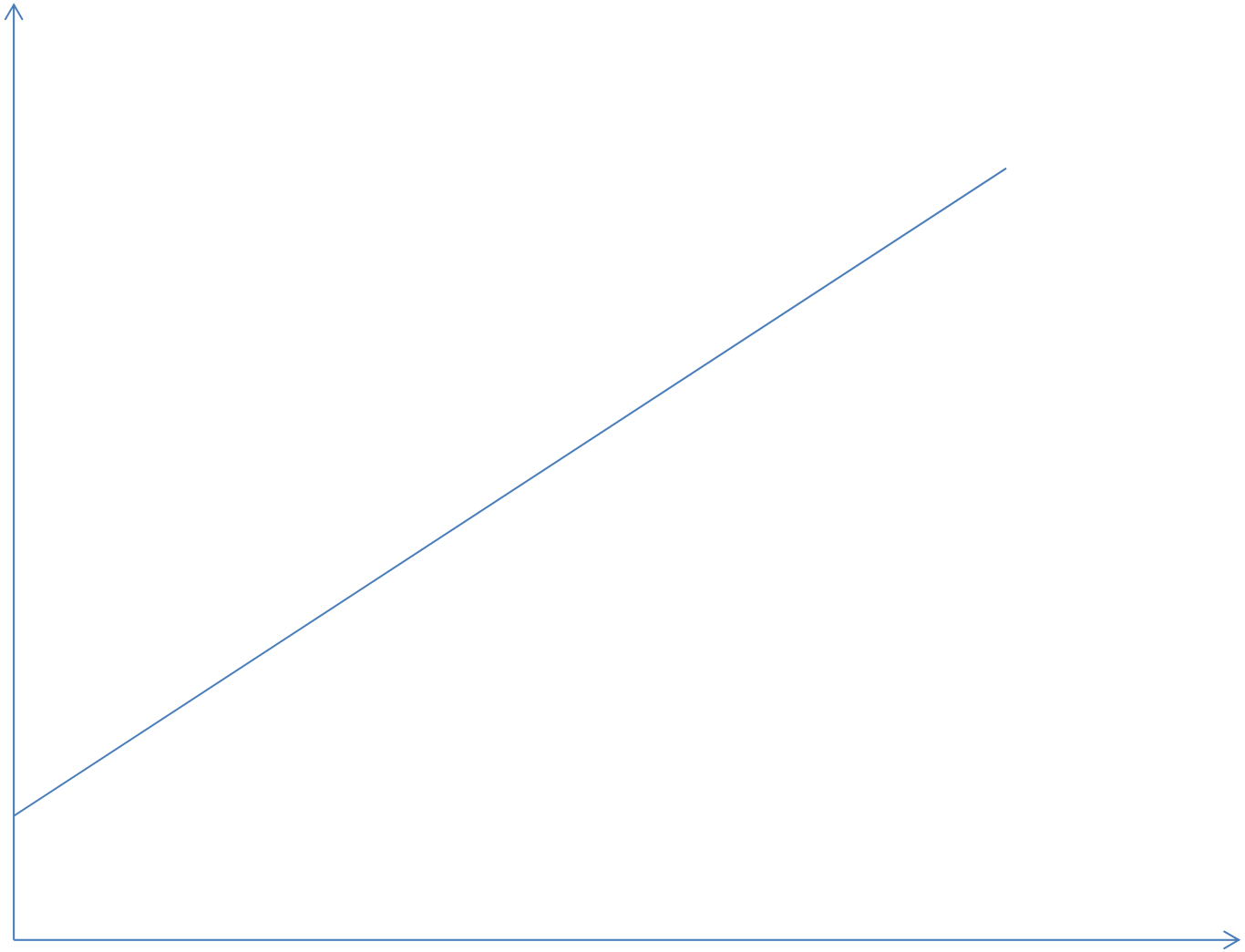
$$\beta_0 - \left[1 - \beta_1 + \beta_5\right] Y + I_0 + \bar{G} + \beta_3 Y^* - M_0 - \beta_2 R = \left(\beta_6 - \beta_4\right) Q$$

- Money Market

$$M_s = M_d$$

$$\bar{M}_s = \alpha_0 + \alpha_1 Y - \alpha_2 R$$

$$\bar{M}_s - \alpha_0 + \alpha_2 R = \alpha_1 Y$$



Points to be considered

What does it mean when both lines are crossed?

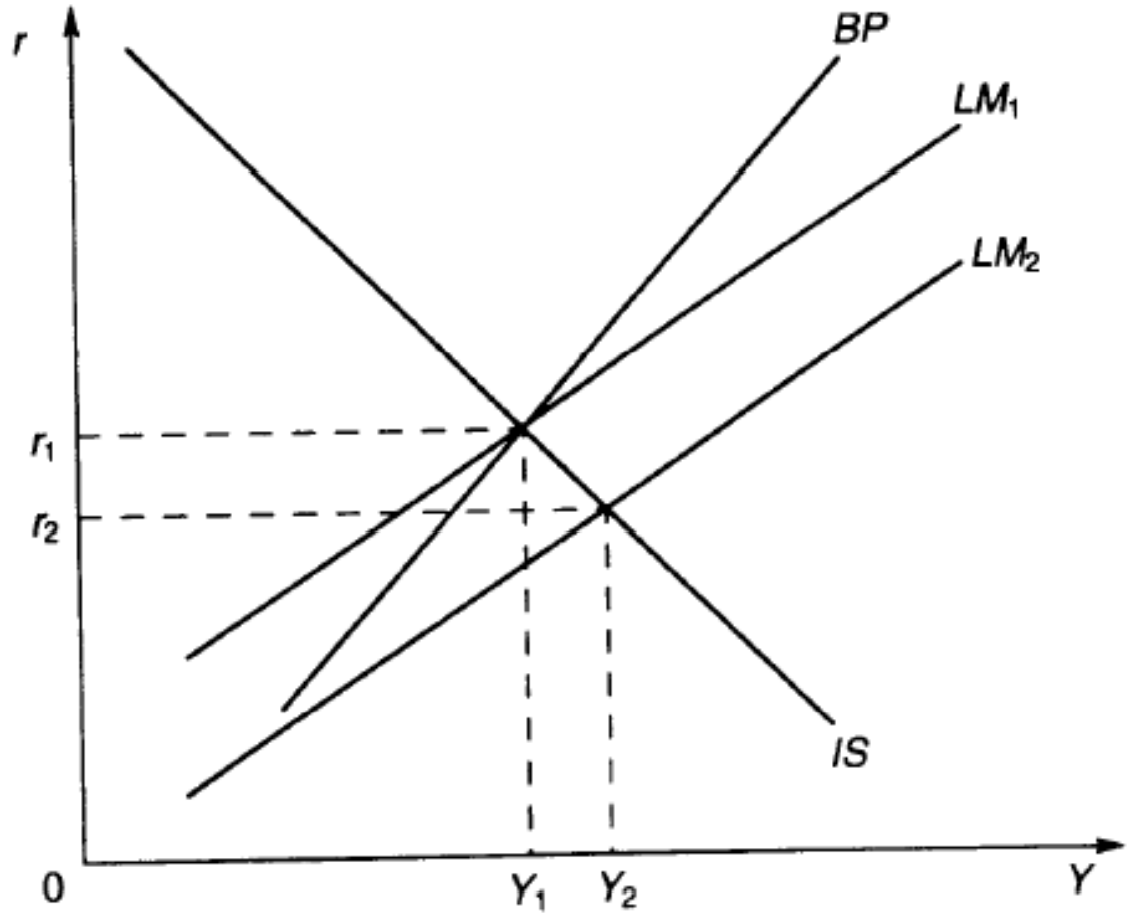
1. Each line reflects the combination (interest rate and output) that is in the equilibrium.

2. When lines are crossed, the corresponding interest rate and output levels indicate the equilibrium in both markets (General Equilibrium).

- What would happen if other factors which are not listed on the vertical and horizontal axis change?
  - The central bank increased money supply?
  - After the boom in health insurance, people would hold less cash for unexpected accidents that might have.
  - Private sector invests huge amount of money in preventing flooding this year.

- Punchline: Shift and Move along the curve

Mundell-Fleming Model



What is BOP/BP?

- BP or BOP is the balance payment equation;

$$BOP = X\left(Y^*, Q\right) - M\left(Y, Q\right) + FDI + CAP\left(R, R^*\right)$$

$$0 = \beta_3 Y^* + \beta_4 Q - M_0 - \beta_5 Y - \beta_6 Q + FDI + \gamma_1 R - \gamma_2 R^*$$

$$Y = \frac{1}{\beta_5}\left[\beta_3 Y^* + \left(\beta_4 - \beta_6\right) Q - M_0 + FDI - \gamma_2 R^*\right] + \frac{\gamma_1}{\beta_5} R$$

Montiel Approach

- Separate into sub-cases
- Use different notation; IS –GM; LM-MM
- Remove BOP but incorporate the role of central bank into the model clearly.

Case 1: Fixed Exchange Rate and Perfect Capital Mobility

- In the world where capital mobility can be perfectly mobile and there is no exchange rate risk (exchange rate fixed), domestic and foreign interest rates can not be different.

- Otherwise, capital will move to make them identical.

- A relationship between interest rate and output (as expressed in BP line in the MF model) vanishes. Why?

- Under the fixed exchange rate, balance of payment can be either positive or negative (No need to be on BP/BOP curve).

- When balance of payment is not zero, the central bank must clear imbalances.

- Capital inflows (outflows) cause money supply increase (decrease). What happen to interest rate?

$$W_C = SF_C^* + B_C - M = 0$$

$W_C =$ Central Bank's Wealth

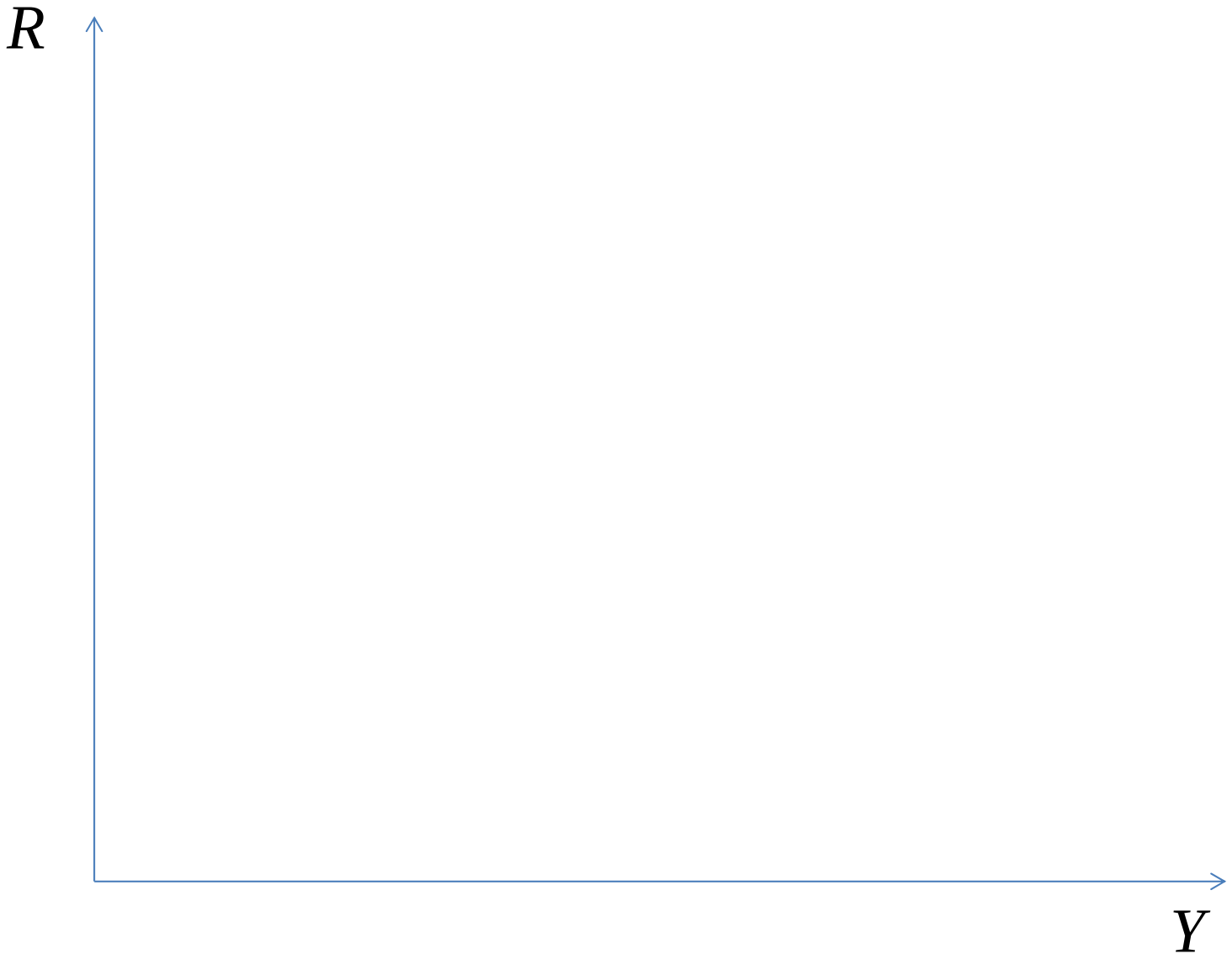
$F_C^* =$ Foreign Asset held by Central Bank

(Foreign Exchange Reserve)

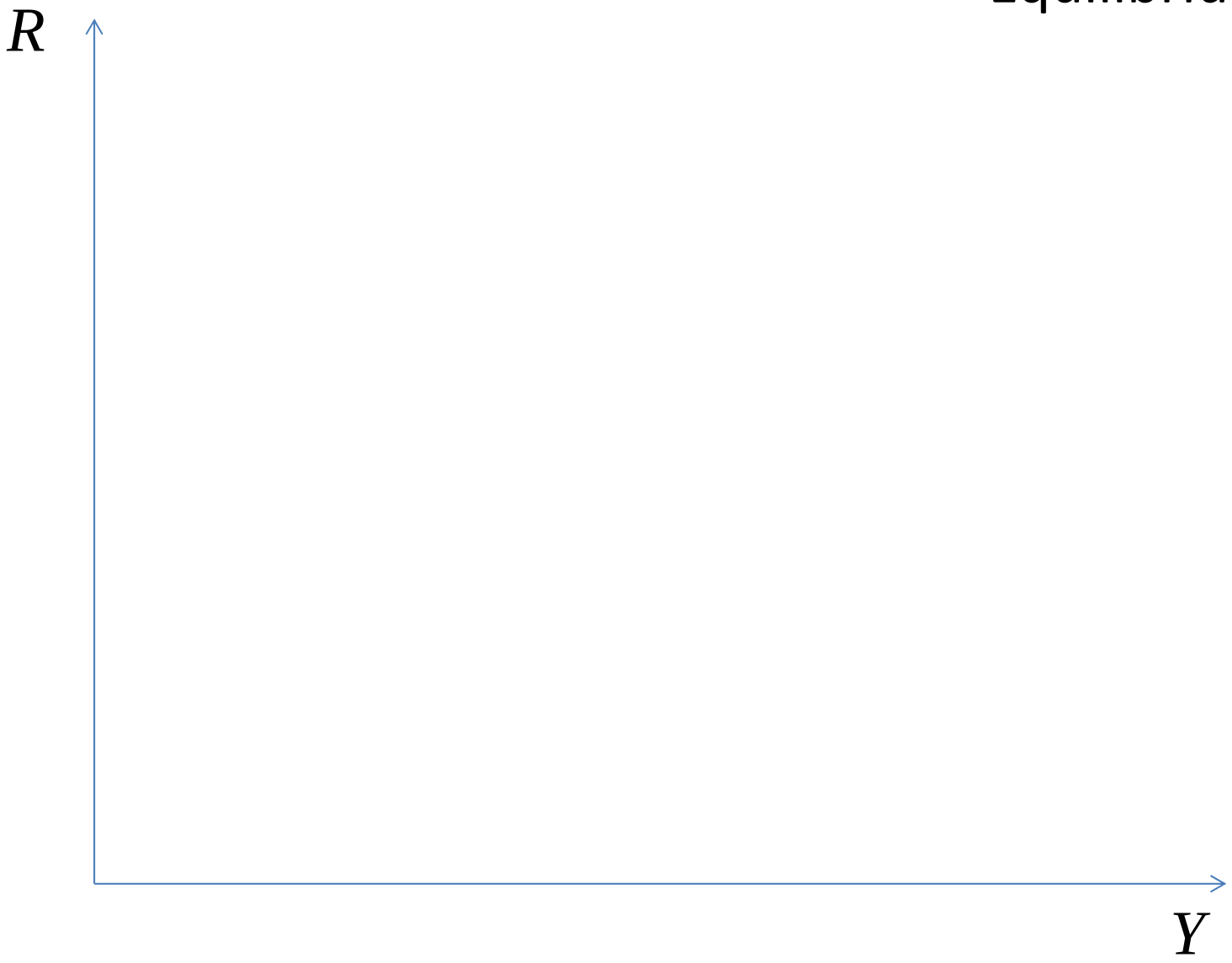
$B_C =$ Bonds issued by Central Bank

$M =$ Money supply

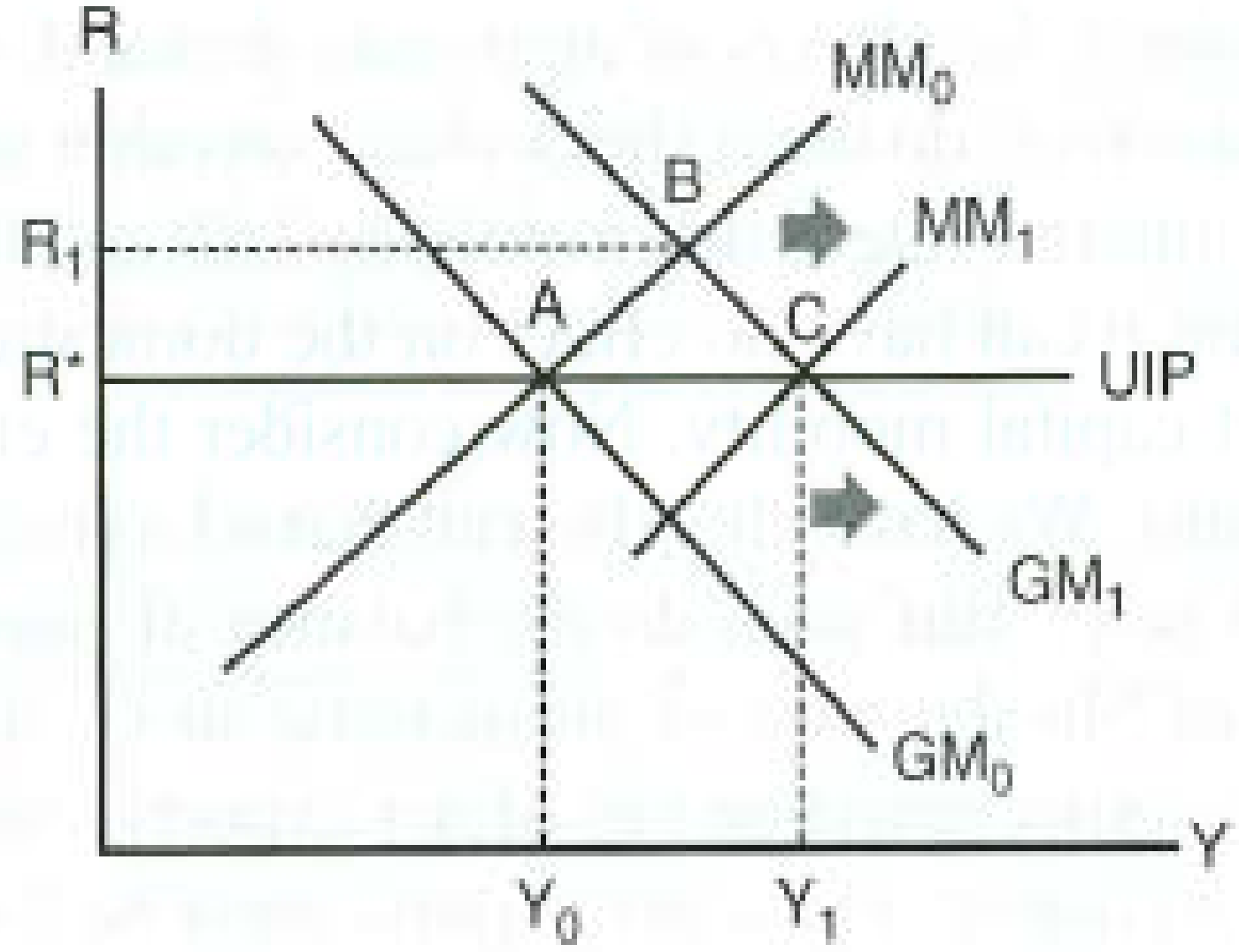
UIP Curve



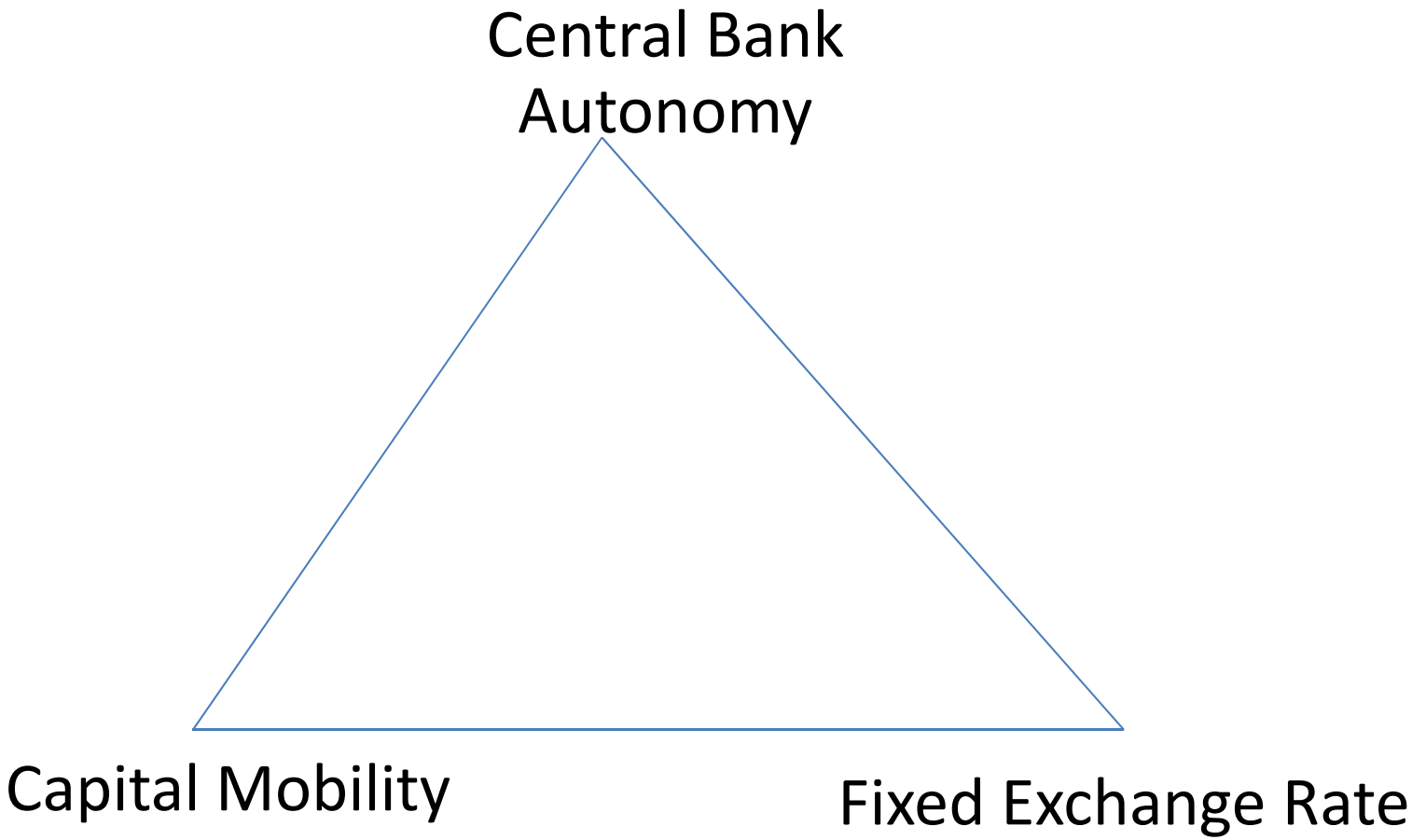
Equilibrium



Monetary and Aggregate Demand Shocks



Impossible Trinity Theorem



What rationale for fixing exchange rate?

- East Asian financial crisis literature points that adjustability in exchange rate induces speculative attacks.

- Speculative attack is a situation in which domestic and foreign residents switch such a large volume of resources from domestic currency-denominated assets to foreign currency-denominated ones that they either threaten to exhaust the central bank's stock of foreign exchange reserves or otherwise to compel the central bank to abandon its announced exchange rate parity.

- The abandonment of the fixed parity makes for a dramatic even known as a currency crisis.

- Currency crises happen when the central bank's commitment to defend the value of currency conflicts with some other economic objective. There are two types of crisis models;

- First-generation models-the competing objective is a fiscal one. The central bank is mechanically committed to the objective of financing an ongoing government fiscal deficit by buying bonds that the government issues to raise funds.

- In the second generation, the potential competing objectives can be much broader, including fiscal objective, the level of economic activities, the health of domestic financial system.