ECON4033 Money and Finance in China

Week 12: IS-LM Model and Its Implications for China[1]

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[1] These lecture notes are largely based on the materials prepared by Prof. Siu Kee Wong for the same topic.

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I. IS-LM Model Revisit

In the Keynesian IS-LM framework, we examine supply and demand in two separate markets: (1) supply and demand for real goods and services, and (2) supply and demand for money.

A. The Goods Market and IS Relation:

- The equilibrium condition (IS relation) in the markets for goods and services is

$$Y = Z = C(Y - T) + I(Y, i) + G + NX(Y)$$

  which indicates that: a) the demand for goods (Z) is an increasing function of output for a given value of interest rate; b) equilibrium requires that the demand for goods be equal to output (Y).

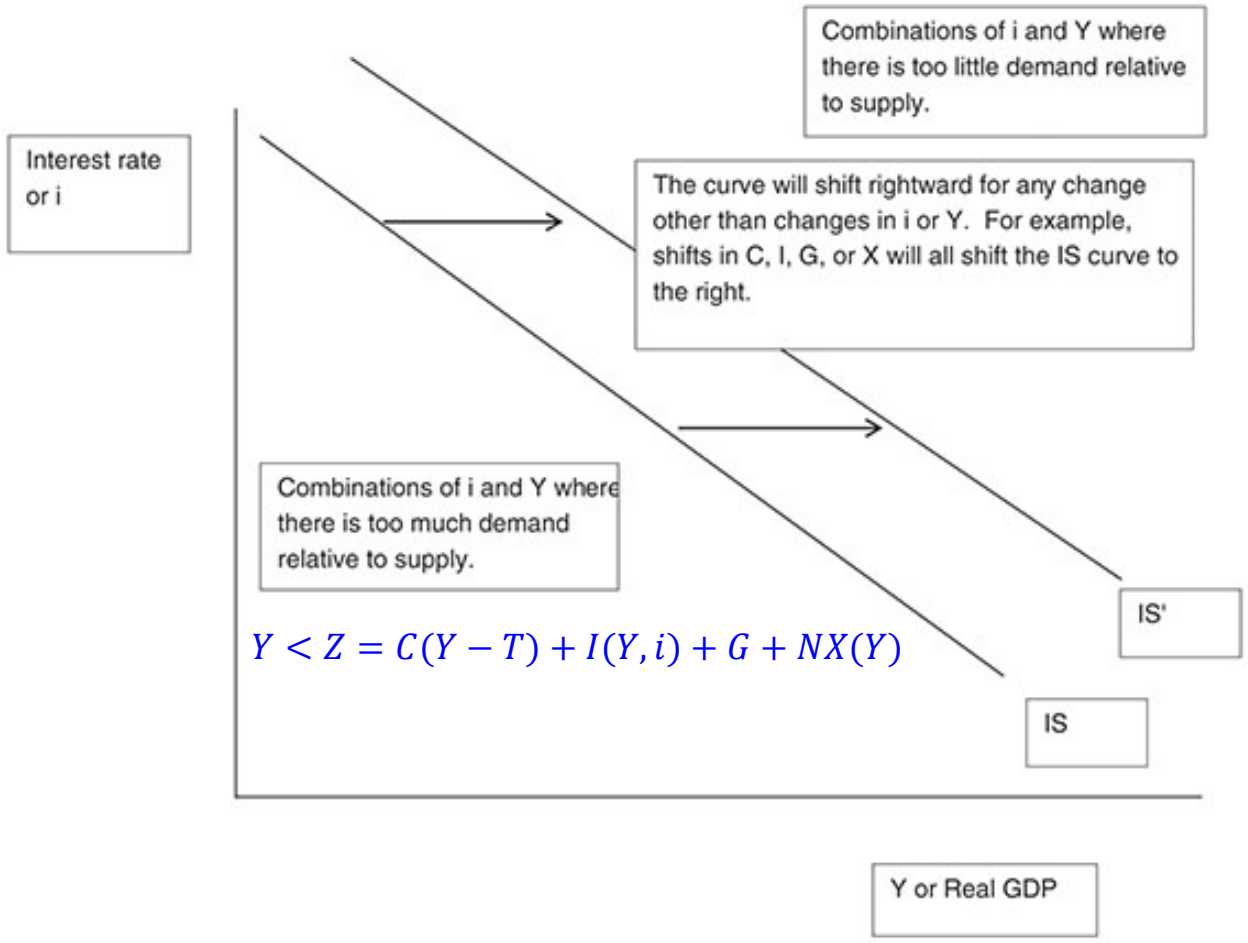
- Prices are assumed to be sticky (fixed). As such, we don't see prices at all in our framework.

- Since prices cannot relieve the pressure resulting from demand and supply shocks, inventory change comes into play in the system.

- For example, when demand drops, unplanned inventory accumulates. Firms reduce outputs in response to change in inventory.

- As illustrate in the below figure, above the IS curve, for any given output Y, there is too little demand (implying inventory accumulation); below the curve there is excess demand (implying inventory reduction). In the former case, companies would cut back on production and decrease output, Y, over time; in the latter case, companies would increase production.

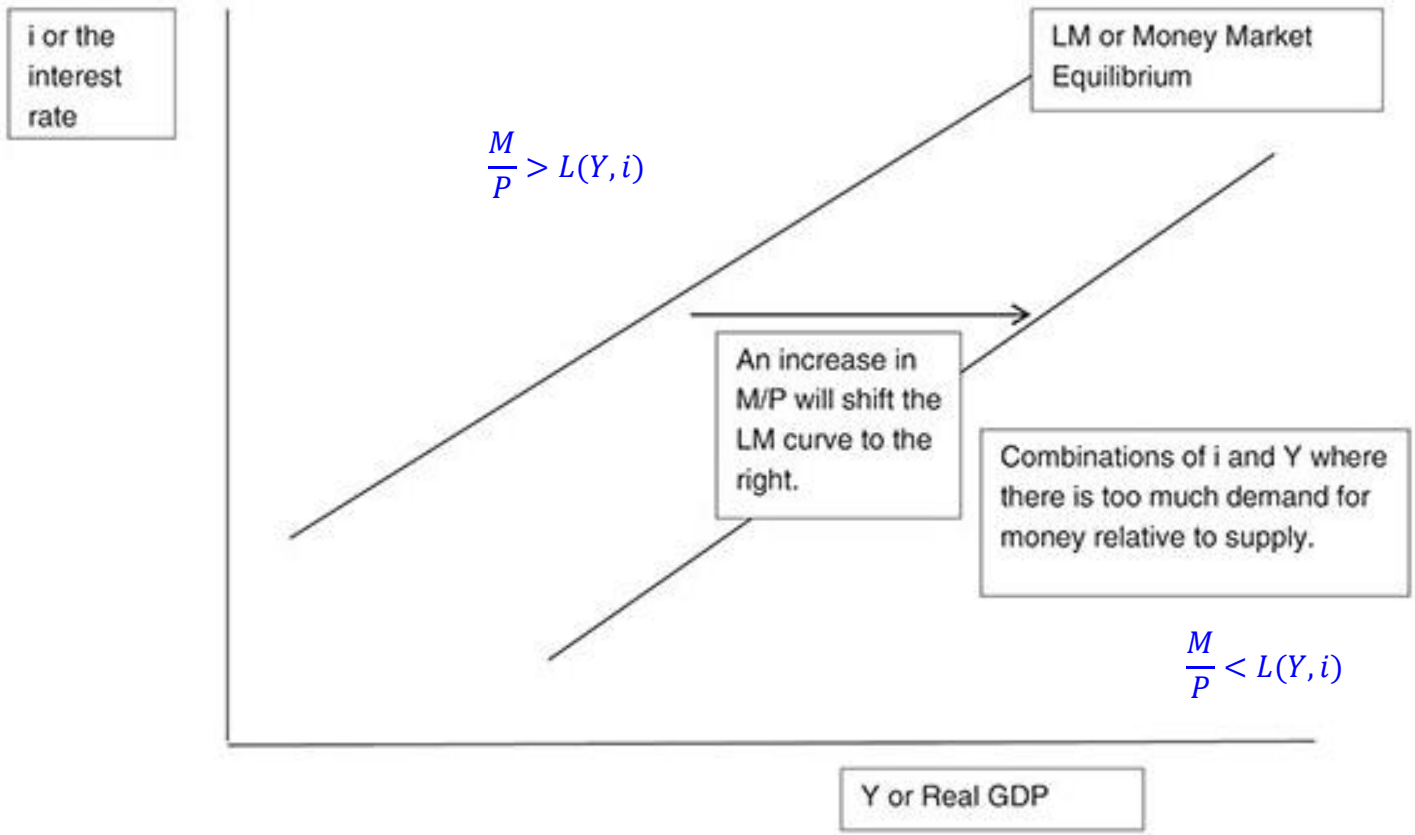
$$Y > Z = C(Y - T) + I(Y, i) + G + NX(Y)$$



$$Y < Z = C(Y - T) + I(Y, i) + G + NX(Y)$$

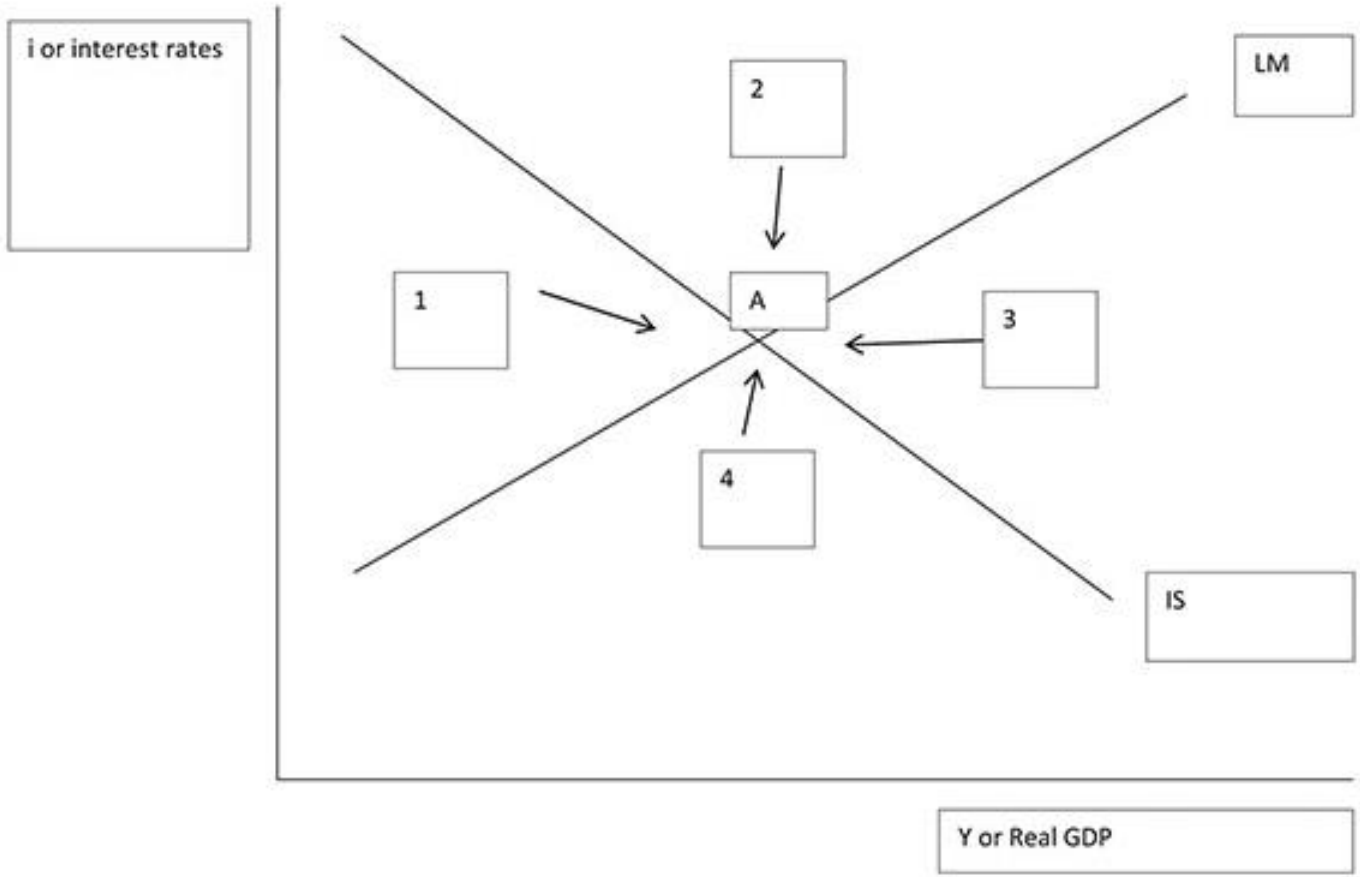
B. Money Market and LM Relation

- The LM curve describes equilibrium in the money market. It shows all combinations of Y and i in which the money market is in equilibrium:
  - Supply of real money: $M^S = \frac{M}{P}$;
  - Demand for real money: $M^D = L(Y, i)$;
  - Equilibrium: $\frac{M}{P} = L(Y, i)$.
- Interpretation: In equilibrium, real money supply equals the real money demand, which depends on real income Y, and the interest rate i.
- China chooses to fix money supply instead of interest rate target. The PBC relies on the stock of money as an intermediate policy target (i.e., simple quantity-based framework). What does this mean to the LM curve?
  - If M^S is fixed instead, an exogenous increase in Y will result in an excess demand for money and i will have to adjust upwards to restore money market equilibrium.
  - This means the Y and i are positively related in the money market.

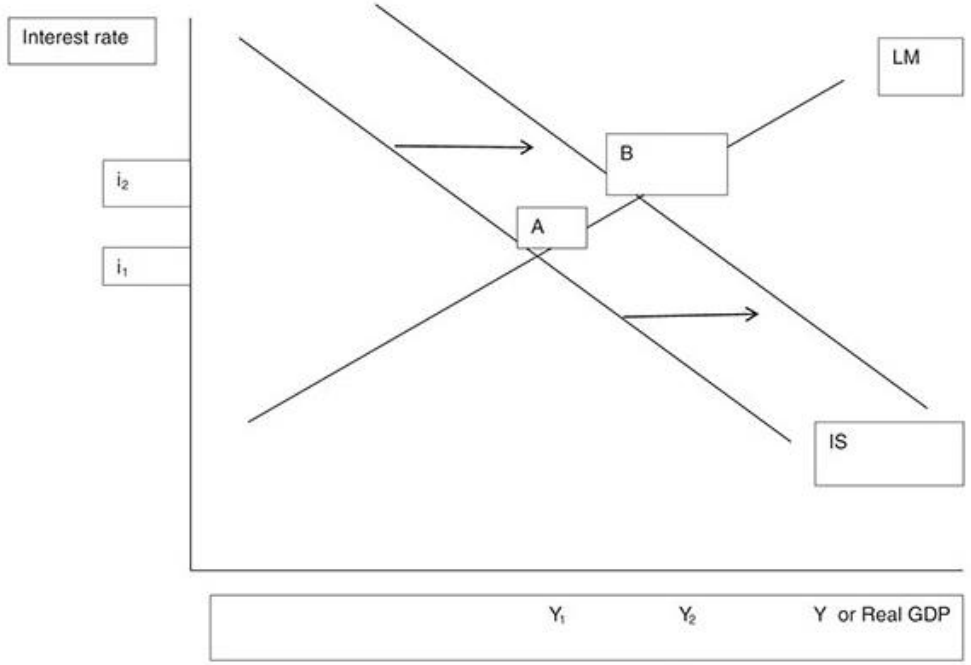

i or the interest rate
LM or Money Market Equilibrium
$\frac{M}{P} > L(Y, i)$
An increase in M/P will shift the LM curve to the right.
Combinations of i and Y where there is too much demand for money relative to supply.
$\frac{M}{P} < L(Y, i)$
Y or Real GDP

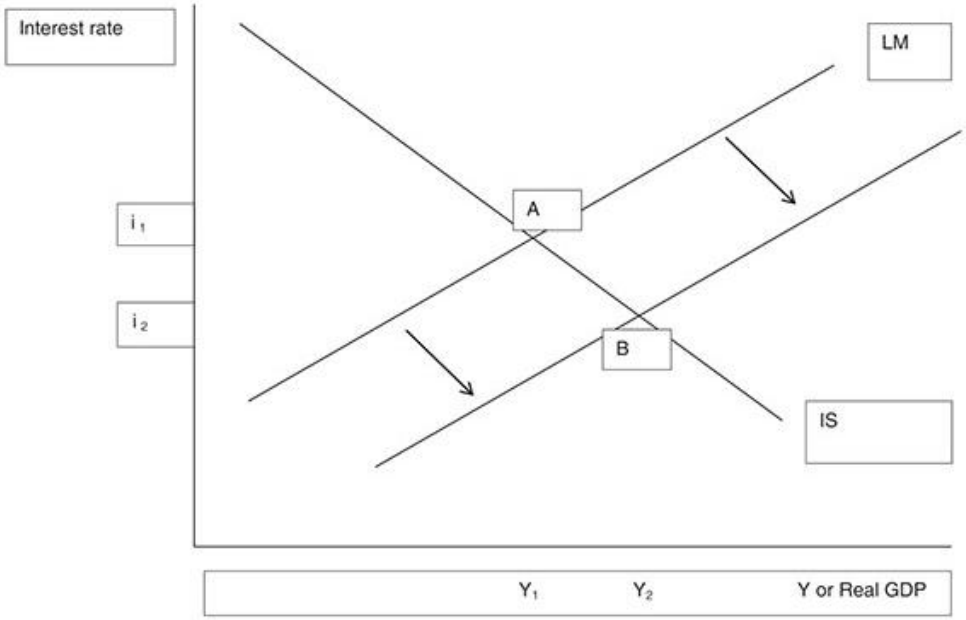
C. Equilibrium in Both Markets

- As illustrated in the following graph, at point "*A*" both the goods and money markets are in equilibrium. In quadrants 1, 2, 3, or 4 we have either inventory accumulation / decumulation or an excess supply or excess demand for money.



- Any autonomous increase in the demand for goods (such as an increase in government spending G) will shift the IS curve to the right. This will cause Y to increase and I to increase as well through the multiplier effect.
- An increase in the real money supply M/P shifts the LM curve to the right and downward. This also cause output to rise but triggers interest rate to fall.
- Both expansionary monetary policy and fiscal policy result in output increase, but will affect interest rate in opposite directions.

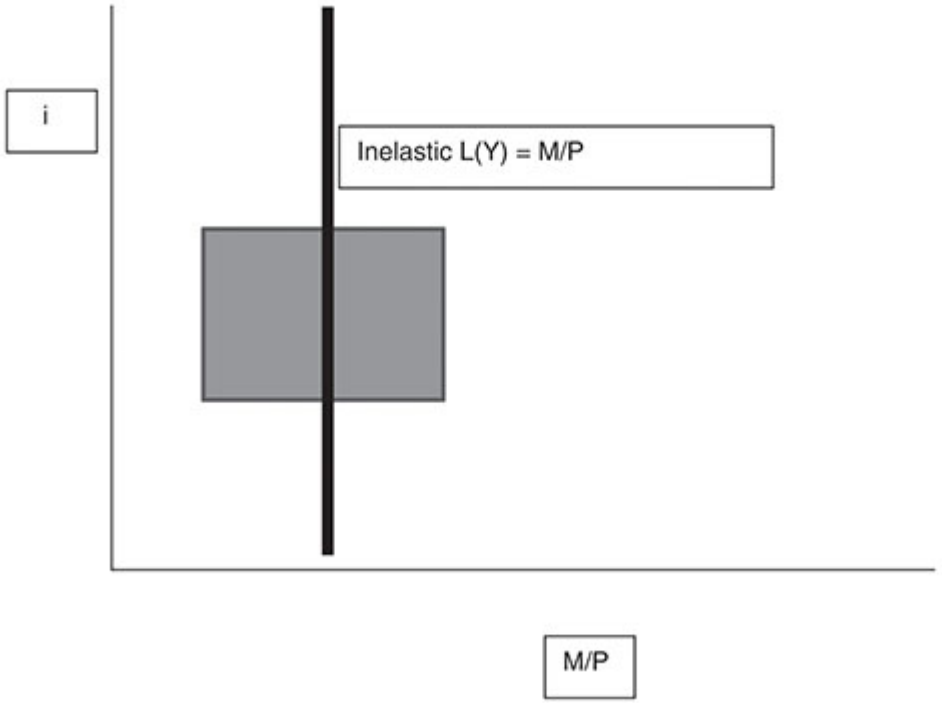




II. The Chopstick Economy and Its Implications for China

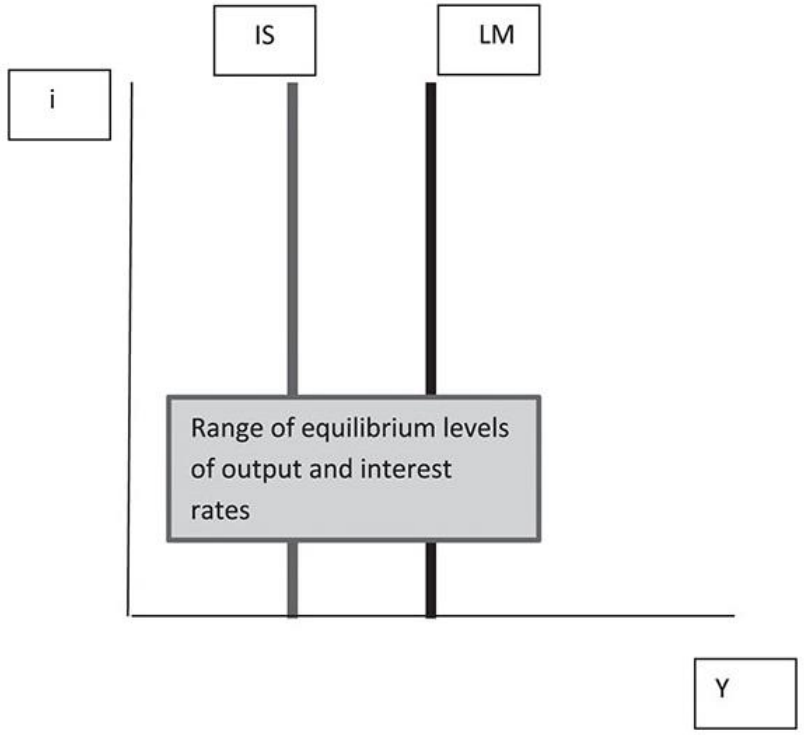
- The current transmission mechanism for monetary policy in China is different from the one that is adopted in advanced economies:
  - In advanced economies, central banks use open market operations to intervene the overnight interbank markets. This in turn affects the overnight interbank interest rates. Then the impact will spillover into long-term lending rates and change the investment demand.
  - This transmission mechanism for monetary policy is not fully operational in China.
  - A mechanism based on interest rate adjustment to control credit is still under construction in China.
- Recall that the effectiveness of the monetary policy depends on the interest rate sensitivity of the economic agents. Current interest rate sensitivity in China is low, implying a very steep money demand curve:
  - The flows in the interbank money market are greatly influenced by the big four banks. Capital market is largely imperfect.
  - State-owned commercial banks are often obliged to lend to SOEs (many of which are owned by local authorities) that enjoy soft budget constraints, may have their debts forgiven and are therefore insensitive to changes in interest rates.

- As shown below, the grey box represents a range of possible interest rates a money supplies in which market disequilibrium is possible given imperfect capital markets in China. The upper and lower boundaries of the box represent the constraints set by the sticky exchange rate regime. Setting i outside the boundary of the box invites capital flows or flights (recall the Uncovered Interest Parity approximation below).

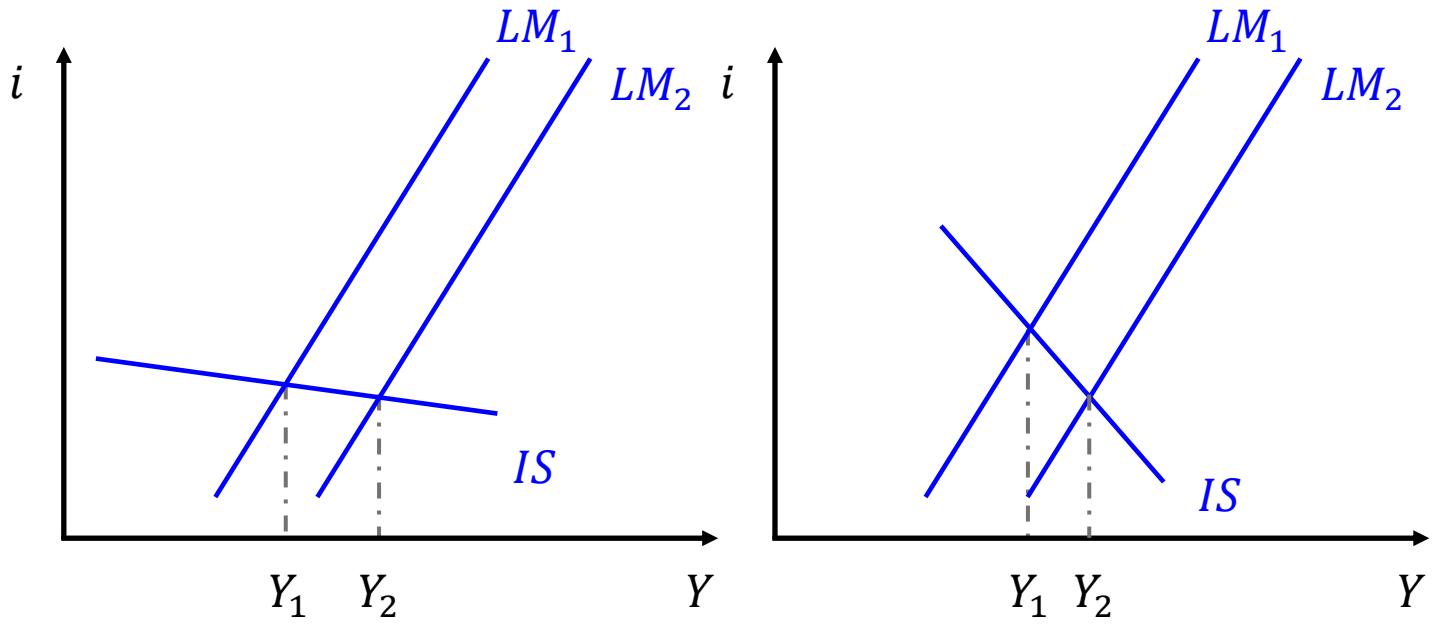


$$\underbrace{R_{RMB}}_{\substack{\text{Deposit Returns in China}\\ \text{(Home Return)}}} = \underbrace{R_{USD} + \text{Expected USD appreciation}}_{\substack{\text{Deposit Returns in the US}\\ \text{(Foreign Return)}}}$$

- China's IS curve is also quite steep as investments are not sensitive to changes in interest rates. Because of the imperfection of both the money and goods markets.
- The right and left boundaries of the box in the graph below represent the output constraints facing China. On the left, the output is political infeasible. On the right, it is constrained by the resources.
- Schramm (2015) believed that interest rate and output can be anywhere in the grey box due to the imperfections of the money and goods markets (i.e., where common interest rates exist).



- Chopstick economy helps to establish a theoretical platform based on which we could take it further to discuss policy implications. The actual IS or LM curve might not be perfectly inelastic. The effectiveness of monetary and fiscal policy hence depends on the sensitivities of goods and money markets in respond to interest rate changes. As an example, the following graphs compare the effectiveness of monetary and fiscal policies when the investment becomes more sensitive to the interest rate changes.



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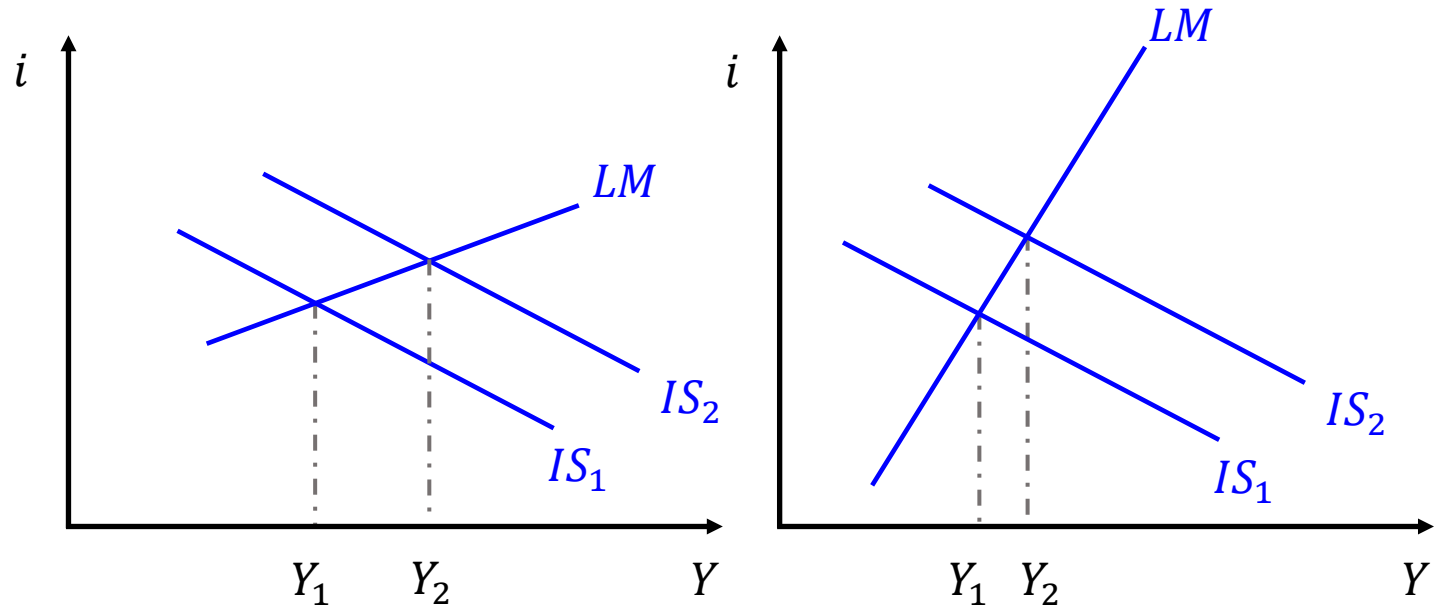

Reference:

Ronald M. Schramm (2015), *The Chinese Macroeconomy and Financial System: A U.S. Perspective*, Taylor and Francis, London.