

EC201 MACROECONOMICS

BUSINESS CYCLE THEORY: THE ECONOMY IN THE SHORT RUN

Main reference: N. Gregory Mankiw, *Macroeconomics* 5/e, Worth Publishers,

Chapter 12, Aggregate Demand in the Open Economy

- **Explaining Fluctuations with the IS-LM Model**

OBJECTIVES

In this lecture we use the IS/LM framework to:

Earlier we examined how the long-run (the classical model) model of the economy is adapted to take account of our trade with other nations. We now carry out the analogous task for the short-run IS-LM model. We will again pay most attention to the case of the **small open economy** and **flexible/floating exchange rates**.

The open economy version of the IS-LM model is called the **Mundell-Fleming Model**. Essentially, the Mundell-Fleming model extends the IS-LM model to take account of international trade.

12-1 THE MUNDELL-FLEMING MODEL

The Key Assumption: Small Open Economy with Perfect Capital Mobility

The interest rate in a small open economy with **perfect capital mobility** is determined by the world interest rate, r^* , so that $r = r^*$. Although the idea of perfect capital mobility is expressed with a simple equation, it is important not to lose sight of the sophisticated process that this equation represents – capital will always flow in or out to bring about $r = r^*$. In a small open economy, r might rise by a little bit for a short time, but as soon as it did, foreigners would start lending to this country (by, for instance, buying the country's bonds). The capital inflow would drive r back towards r^* . Conversely, if r were to decrease, capital would flow out of the country to earn a higher return abroad, and this capital outflow would drive r up towards r^* . *Hence, the $r = r^*$ represents the assumption that the international flow of capital is rapid enough to keep the domestic interest rate equal to the world interest rate.*

The Goods Market and the IS* curve: Derivation of the IS* curve

The M-F model describes the market for goods and services much as the IS-LM model, but it adds a new term (NX) net exports, in order to open the model. The goods market is now,

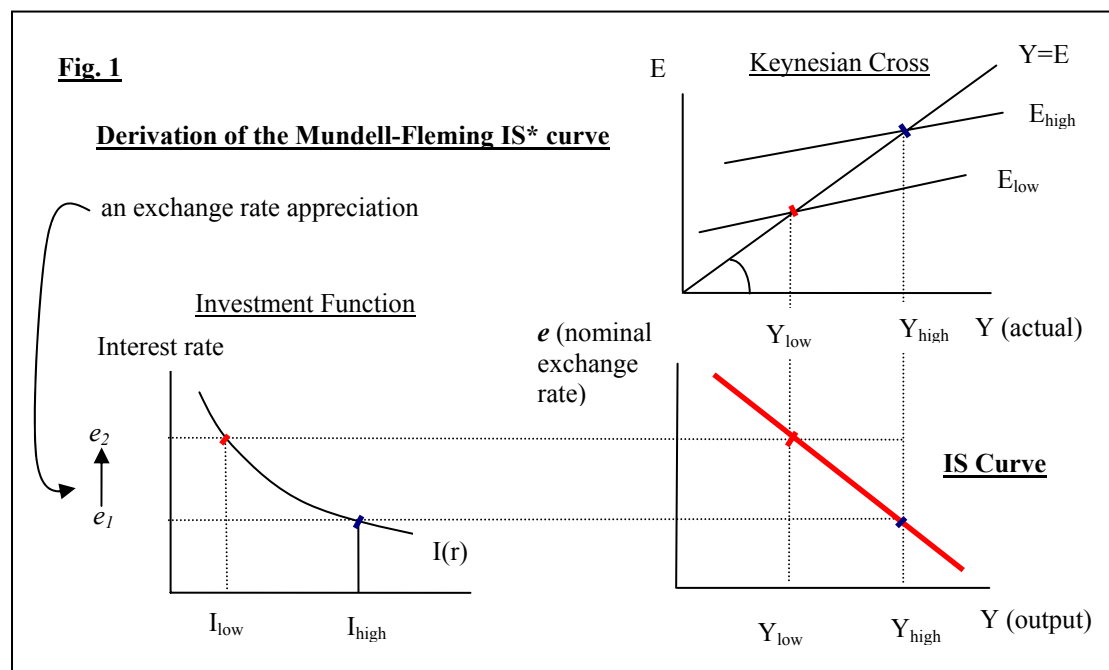
$$Y = C(Y - T) + I(r^*) + G + (NX) \quad \text{Goods Market} \quad \Rightarrow IS^*$$

As before, we define e to be the amount of foreign currency per unit of domestic currency – for example e might be 160 yen to the pound sterling.

Devaluation is a decrease in e where e is the nominal exchange rate.

The real exchange rate, ε , is $\varepsilon = e \left(\frac{P}{P^*} \right)$ and if we assume that P and P^* are fixed then e will be proportional to ε .

One of the first things to realise about the M-F IS* curve is that it is drawn within the e, Y space and not within the r, Y space as in the closed economy case – in fact, for the open economy cases the curves are always drawn within the e, Y space.



We can derive the Mundell-Fleming IS* curve with the aid of a three diagram block as in [Figure 12-1, p.315](#) based on the Keynesian Cross and the Investment Function.

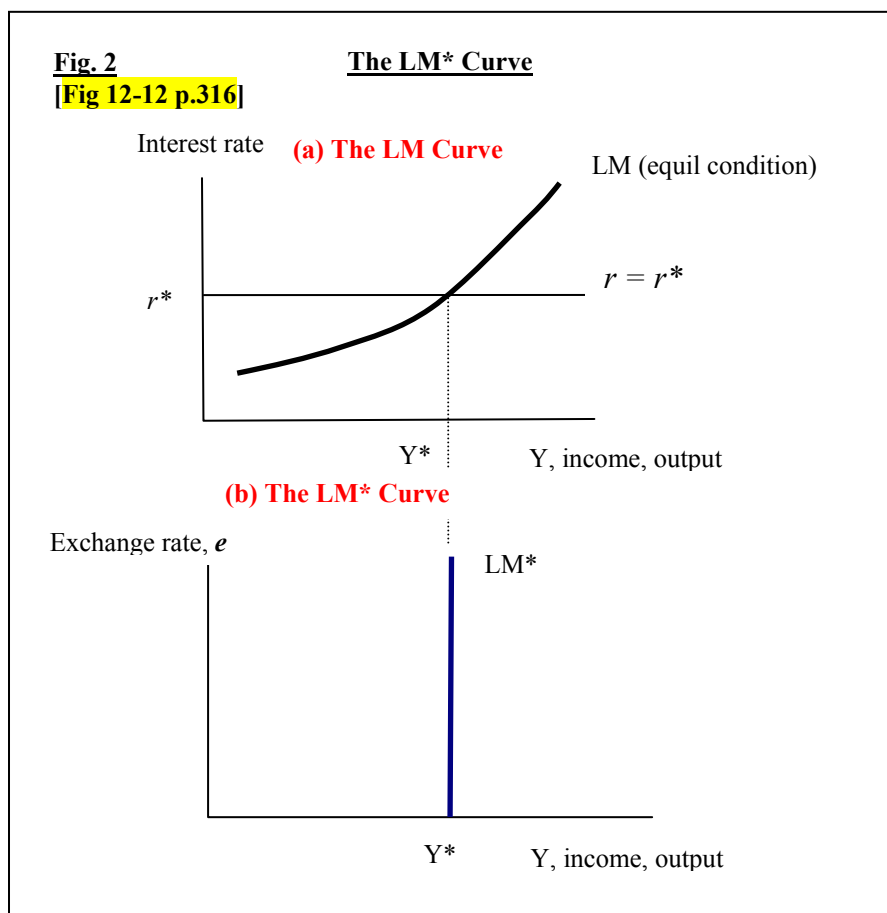
The Money Market and the LM* curve: Derivation of the LM* curve

The M-F model uses a money market equation much like the previous one but with additional assumption of $r = r^*$:

$$\frac{M}{P} = L(r^*, Y) \quad \text{Mundell-Fleming: Money Market} \Rightarrow LM^*$$

This equation states that the supply of real money balances, M/P , equals the demand $L(r, Y)$ with the additional assumption that $r = r^*$. Remember that demand for money is negatively and positively associated with r and Y , respectively. Note, M is exogenous, controlled by the central bank and P is given and fixed.

The LM* curve will be vertical because the exchange rate does not enter into the LM* equation. Fig 2 (a) shows the closed economy LM derived from $M/P=L(r, y)$ along with a world interest rate r^* . The intersection of these two curves determines the level of income (Y^*) regardless of the exchange rate. Therefore, graphed on e, Y in (b) the LM* curve will be vertical since any e can be associated with the particular r^* and Y^* .



Putting the pieces together

According to the Mundell-Fleming model, a small open economy can be represented by the two following equations.

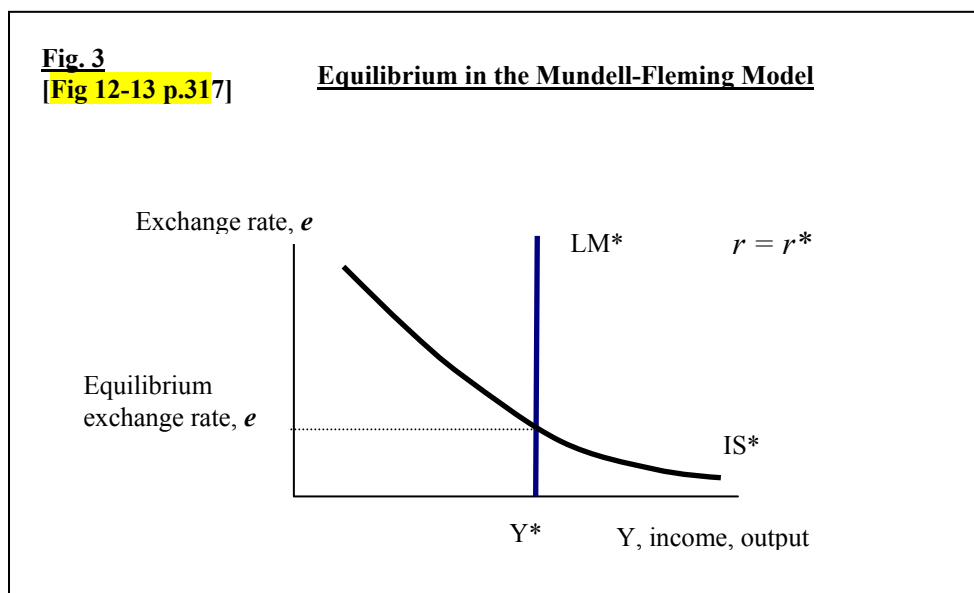
$$Y = C(Y - T) + I(r^*) + G + (NX) \quad \text{Mundell-Fleming: Goods Market} \quad \Rightarrow IS^*$$

$$\frac{M}{P} = L(r^*, Y) \quad \text{Mundell-Fleming: Money Market} \quad \Rightarrow LM^*$$

They say that the total output in the goods market in equilibrium is equal to the summation of consumption, investment, government and net export expenditures. And, the money supply (stock of real money balances) in equilibrium will be equal to the demand for money arising from speculative and transaction demands.

[Note: G, T, M, P, r^* are exogenous. Y and e are endogenous.]

The Mundell-Fleming IS*/LM* model is stated in terms of e and Y . Given the world interest rates, the LM* equation determines aggregate income, regardless of the exchange rate. Consequently, the LM* curve in the M-F model is vertical – i.e., the e does not enter in the LM relationship.



The intersection of IS* and LM* shows the level of e that will keep the goods market and money market simultaneously into equilibrium at a given output level. We can use this diagram to show how Y and e respond to different policies but we must specify the exchange rate regime – we will start our examination with a flexible exchange rate regime.

12-2 The Small Open Economy under Floating Exchange Rates

Fiscal Policy

Suppose G increases and/or T declines, this would cause the IS* curve to shift out. As a result e would appreciate¹. Notice, in a closed economy this policy would have increased Y , but here Y is constant and e appreciates and that will cause a fall in net exports – possibly leading to balance of payments problems.

Why is the fall in net exports so great as to render fiscal policy powerless to influence income?

The answer lies in considering the money market equation $M/P=L(r, Y)$. In the closed economy an increase in fiscal policy will increase r and this reduces the demand for money and Y increases to increase demand to bring about equilibrium with a fixed M/P . But with $r=r^*$, domestic interest rate cannot change in response to fiscal policy. So, when G increases and/or T decreases, the appreciation in e and the fall in NX must be large enough to keep Y constant.

Monetary Policy

Suppose the central bank increases M , with a given P , M/P real balances will increase and will as a consequence shift the vertical LM* curve to the right. Hence, with the IS* constant, Y will increase and e will fall thus increasing NX .

In a closed economy an increase in M would decrease r , increase investment and output. In a small open economy, the increase in M causes r to fall and this will induce capital outflow, this will increase the supply of domestic currency on the

¹ T the opposite of depreciates ~ a devaluation of the currency.

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foreign exchange market and so decreases its price, e . The decline in e will increase NX which will increase Y .

It is noteworthy that both the fiscal and the monetary explanations (of the transmission mechanism) take place through the money market function.