

Output, macro policies & exchange rate in
the short run.

The flexible exchange rate.

The Mundell-Fleming model, part 1.

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Introduction

- We are now starting the second part of the course, which merges the exchange rate determination with output effects to understand the consequences of fiscal and monetary policy for the macroeconomics equilibrium
- We will start with the short run, then move on to the long run

Introduction

- How do fiscal and monetary policies affect the **exchange rate** AND how do they affect a nation's **real income** under **floating exchange rates**?
- How does (perfect) **capital mobility** influence the relative effectiveness of monetary and fiscal policy actions in a small open economy that permits its exchange rates to float?
- In a two-country setting with a floating exchange rate, to what extent can policy actions in one nation influence economic activity in the other nation?
- **What is the basic economic efficiency trade-off faced in choosing between fixed and floating exchange rates?**

Assumptions of the MF model

- A **short run** Keynesian model: fixed prices, production adjusts to demand (Y is **not** constant & does not have to be equal to full employment output)
- Since this is a short run model: PPP does not hold
- Capital mobility **k**: from zero to perfect
- $Y = C + I + G + CA$ (note: IS curve includes net exports!)
- The model includes goods market (IS); money market (LM) and balance of payments (BP)
- All 3 need to be in equilibrium
- At the end of the day, it is an ISLM model for the open economy
- To keep it easy, we will ignore expectations (we assume that the current exchange rate equals the expected, future exchange rate)

Assumptions

- This time: **exchange rate is floating (!)**;
- It adjusts to equilibrate demand and supply (for/of currency)
- The BP balances ($BP=0$) without central bank interventions: current account must be balanced by net private capital flows
 - Official (international) reserve assets: foreign assets held by central banks to cushion against financial instability.
 - Official reserve assets purchased by the domestic central bank are a debit items (–) (CB buys assets & supplies our currency); official reserve assets sold to foreigners are a credit (+)

ISLM model – a reminder

- A short run Keynesian model that combines the goods market equilibrium (the „IS line”) and money market equilibrium (the „LM line”) equilibrium to model the aggregate demand
- Prices are fixed,
- Whatever is demanded will be supplied (aggregate demand is equal to aggregate supply under fixed prices)
- The ISLM model is a building block of many more complicated macro models (including the dynamic DAD/DAS model)

What are the new elements (compared to closed ISLM)?

- **1.** The position of the **IS** is affected by CA, i.e. by
 - Foreign income changes (Y^* affects imports)
 - Exchange rate changes (nominal and real)
- **2. BP** line: shows the equilibrium of the BoP: $CA+FA=0$ (without official reserves)
 - $CA(Y, Y^*, EP^*/P)$
 - $FA(k, r-r^*)$; where k is capital mobility; r^* is given
 - Capital mobility (k) affects the slope of the BP line

1. Aggregate Desired Expenditures (IS line)

- Aggregate desired expenditures on domestic goods and services are equal to $C + I + G + (EX - IM)$, where:
 $C = c_0 + (MPC \times y_d)$.
- $Y_d = Y - NT$ (net taxes)
- $I = I_0 - br$
- G is given
- $IM = im_0(E) + (MPI \times y_d)$; im_0 depends on exchange rate E
- EX depends on foreign income & exchange rate E : $EX(E; Y^*)$
- An increase in E (home currency depreciation) **decreases** im_0 and **increases** EX ; hence increases $(EX - IM)$ and aggregate demand
- An increase in foreign income increases exports, NX and aggregate demand
 - $Y = C + I + G + (EX - IM)$,

1. IS line

- Let's repeat: home currency depreciation and an increase in foreign income increase aggregate demand and output
- These are the new elements affecting Y , compared to closed economy version of the model

1. IS line

$$Y = C + I + G + EX - IM$$

$$Y = \{c_0 + MPC * (Y - NT)\} + \{I_0 - br\} + G + EX(Y_F; E) - \{im_o(E) + MPI(Y - NT)\}$$

$$0 < MPC < 1; 0 < MPI < MPC$$

$$Y = \alpha [c_0 - im_o(E) + I_0 - br + G + EX(Y_F; E) - (MPC * NT) + (MPI * NT)]$$

$$\alpha = \frac{1}{1 - MPC + MPI}$$

Note:

$$CA = EX - IM = EX(Y_F; E) - \{im_o(E) + MPI(Y - NT)\}$$

BP line

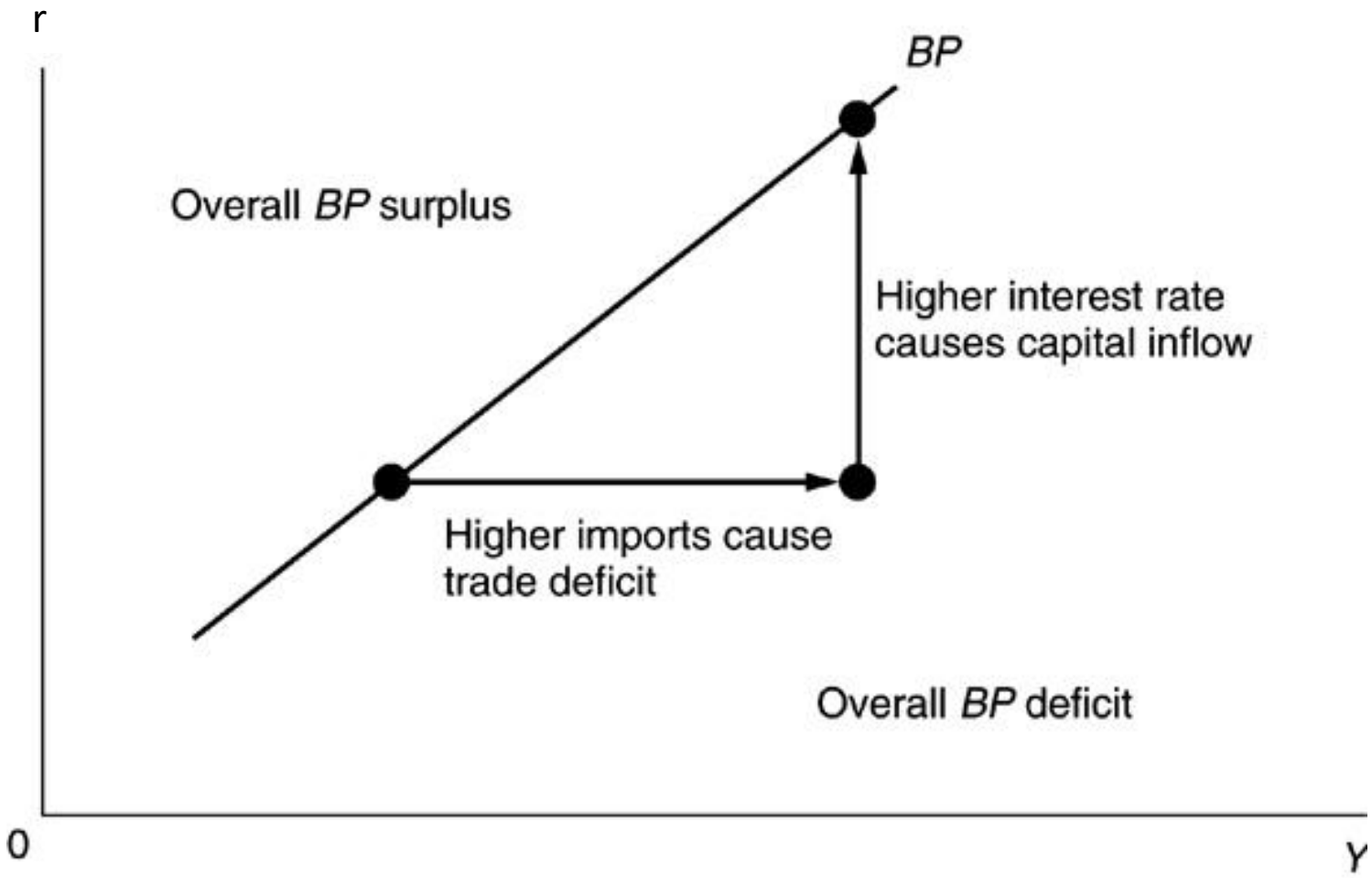
- All points on the BP line denote the BP equilibrium (BP=0; CA=FA)
- Recall that CA<0 denotes a trade deficit and FA>0 denotes a net capital inflow
- Points off the BP line: to the right (left) – BoP deficit (surplus): exchange rate will change to restore the equilibrium
- Financial account (capital flows) are a function of the interest rates differential ($r-r^*$) (recall interest parity condition)

$$BP = EX - (im_0 + MPI * (Y - NT) + \bar{K} + k(r - r^*)) = 0$$

$$Y = \beta[EX - im_0 + \bar{K} + k(R - R^*) + MPI * NT];$$

$$\beta = \frac{1}{MPI}$$

Balance of Payments Equilibrium Schedule



Balance of Payments Equilibrium Schedule

- Recall that: in the BoP, all transactions that give rise to **DEMAND** for our currency are recorded with a **PLUS** (like exports or purchases of Home's assets) and all transactions that give rise to a **supply** of our currency are recorded with a **MINUS** (like imports or a purchase of foreign assets by domestic citizens)
- Hence, a higher demand for our currency leads to BoP surplus, what immediately leads to an adjustment and a restoration of BoP equilibrium
- Hence, starting from equilibrium; an increase in interest rate leads to a higher demand for our currency and a balance of payments surplus (*note – capital mobility does not have to be perfect!*)
- This BoP disequilibrium will immediately trigger a reaction – an adjustment of the exchange rate

Balance of Payments Equilibrium Schedule

- To recapitulate – any BoP disequilibrium is equivalent to a disequilibrium between the demand for and supply of domestic currency....
- ...leading to a change in the „price” of currency, i.e.
 - currency depreciation (demand < supply; below the BoP line) or
 - appreciation (demand > supply; above the BoP line)

How does the degree of capital mobility influence the slope of the *BP* schedule?

➤ With low capital mobility, a significant rise in a nation's interest rate is required to generate the capital inflows needed to offset the greater imports that result from a rise in the nation's real income level.

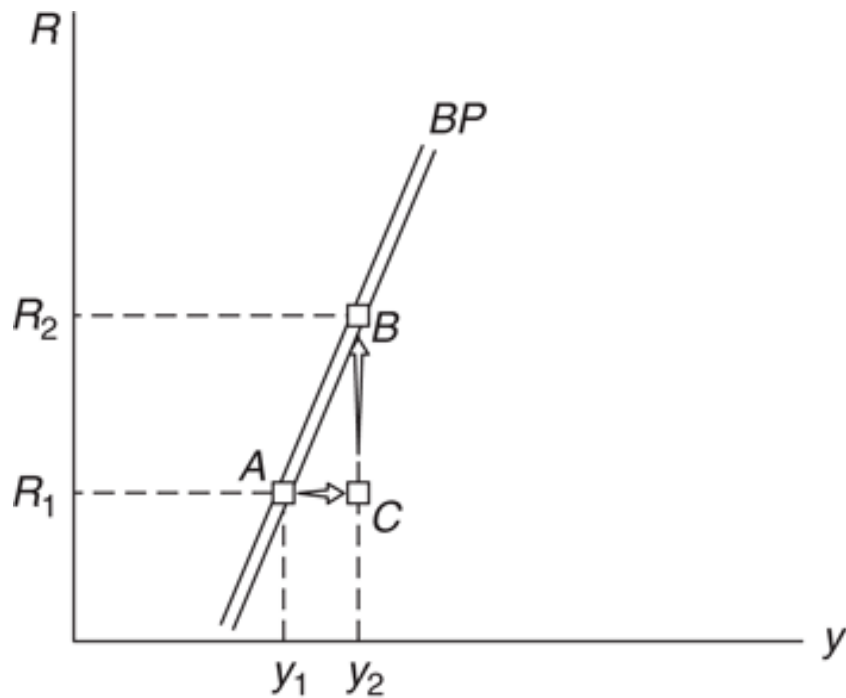
➤ Recall that when we analysed the UIP, we assumed perfect capital mobility. The current approach is richer, as it allows for less than perfect mobility

The Case of High Capital Mobility

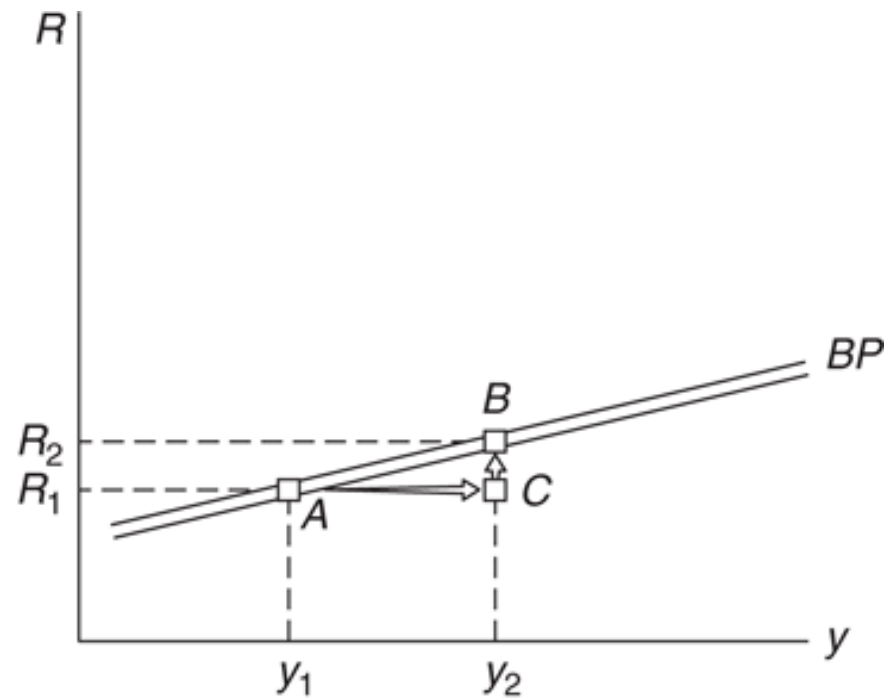
- If capital mobility is high, then a relatively small rise in the nominal interest rate is sufficient to induce other nations' residents to raise their holdings of domestic financial assets in sufficient quantities to improve the capital account balance and reattain balance-of-payments equilibrium.
- A relatively shallow *BP* schedule indicates that the degree of capital mobility is relatively high.

Capital Mobility and the Slope of the *BP* Schedule

With **low capital mobility (a)**, a significant rise in a nation's interest rate is required to generate the capital inflows needed to offset the greater imports that result from a rise in the nation's real income level.



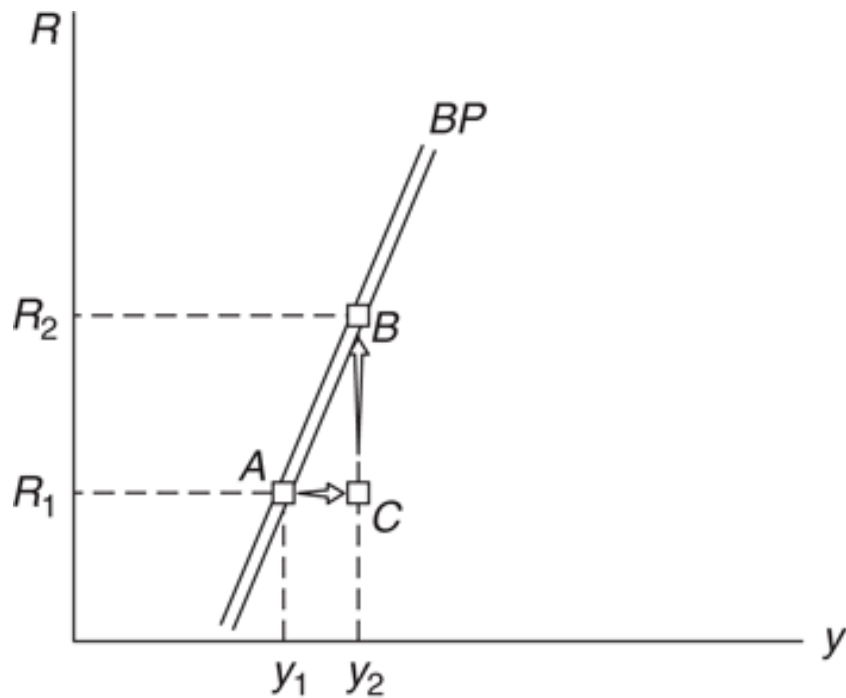
(a)



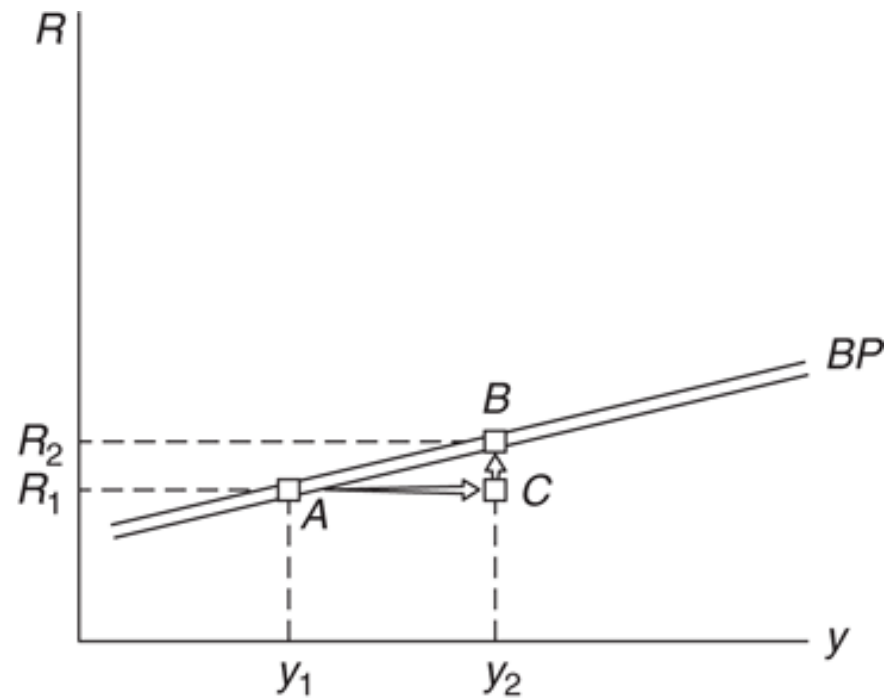
(b)

Capital Mobility and the Slope of the *BP* Schedule

With **high capital mobility (b)**, a small rise in a nation's interest rate is enough to generate the capital inflows needed to offset the greater imports that result from a rise in the nation's real income level.

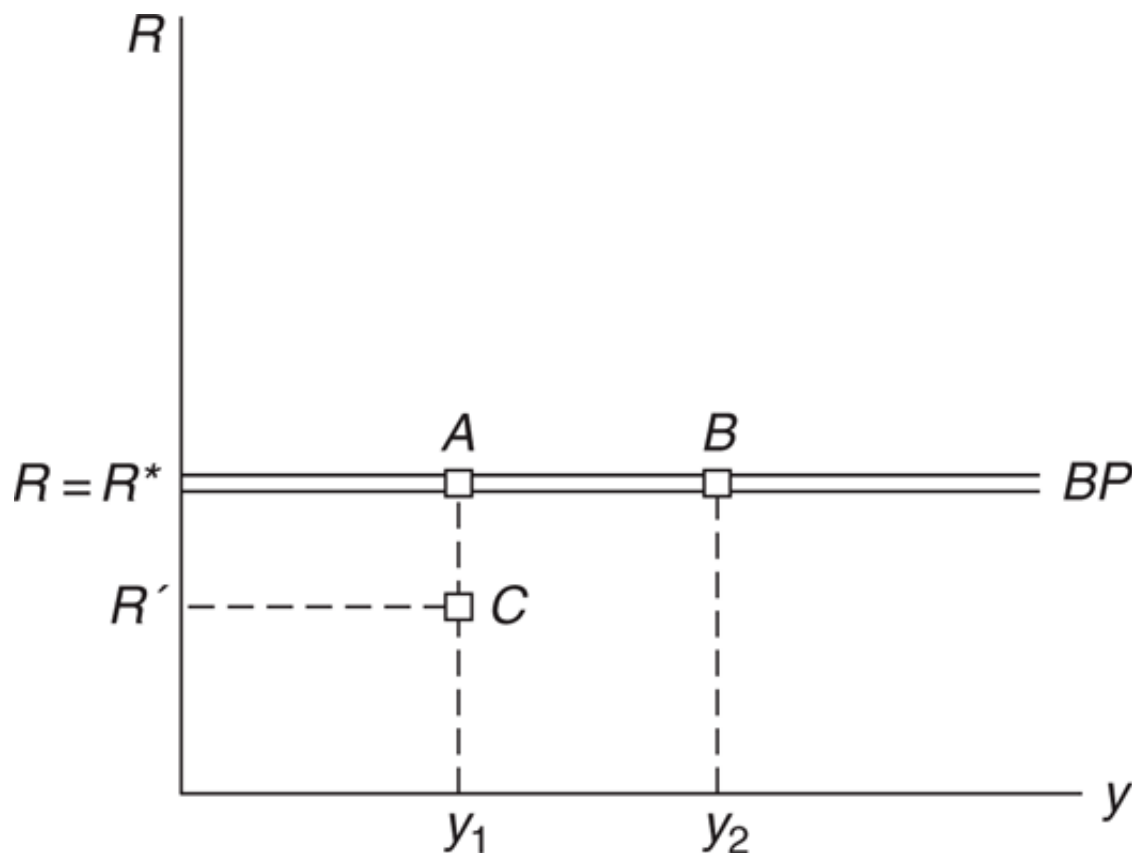


(a)



(b)

The *BP* Schedule with Perfect Capital Mobility



Note: to make the model easier, we disregard the difference between the current and the future exchange rate

Capital Mobility and the *BP* Schedule

- The degree of capital mobility and the resulting slope of the *BP* schedule determine how monetary and fiscal policy actions ultimately influence a nation's economic performance.
- **The Case of Low Capital Mobility**
- Low capital mobility requires a very sizable increase in the nominal interest rate to induce residents of other nations to circumvent capital controls and increase their holdings of domestic financial assets in amounts sufficient to improve the capital account balance to re-attain balance-of-payments equilibrium.

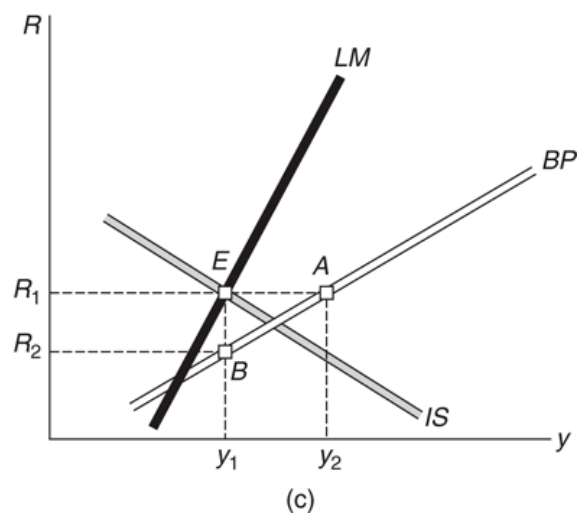
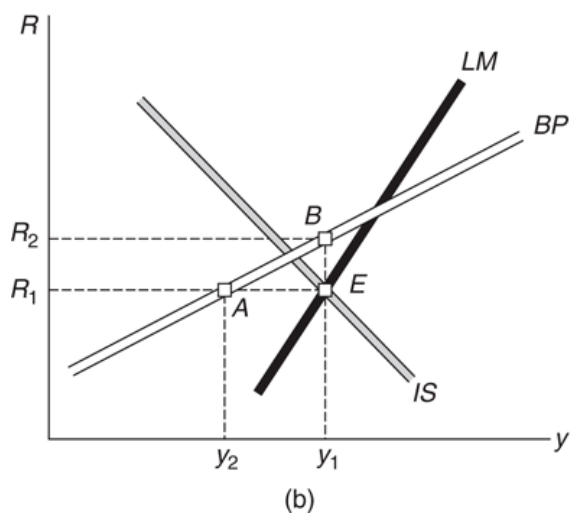
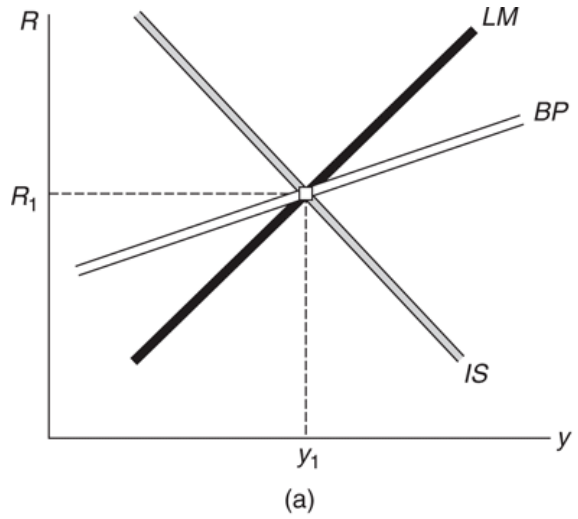
Perfect Capital Mobility, the *BP* Schedule and the interest parity condition

- Imperfect capital mobility, therefore, is a common explanation for the failure of the uncovered interest parity condition to be met in a number of nations.
- This means that for a nation with *perfect* capital mobility, we would expect that the uncovered interest parity condition should be satisfied.

BP (dis)equilibrium

- How can we use the *IS–LM–BP* model to determine a nation's balance-of-payments status?
- If an *IS–LM* equilibrium occurs at a point on the *BP* schedule, then a balance-of-payments equilibrium results.
- An *IS–LM* equilibrium above or below the *BP* schedule results in a balance-of-payments surplus or deficit, respectively:
- **A BP disequilibrium will result in exchange rate change**

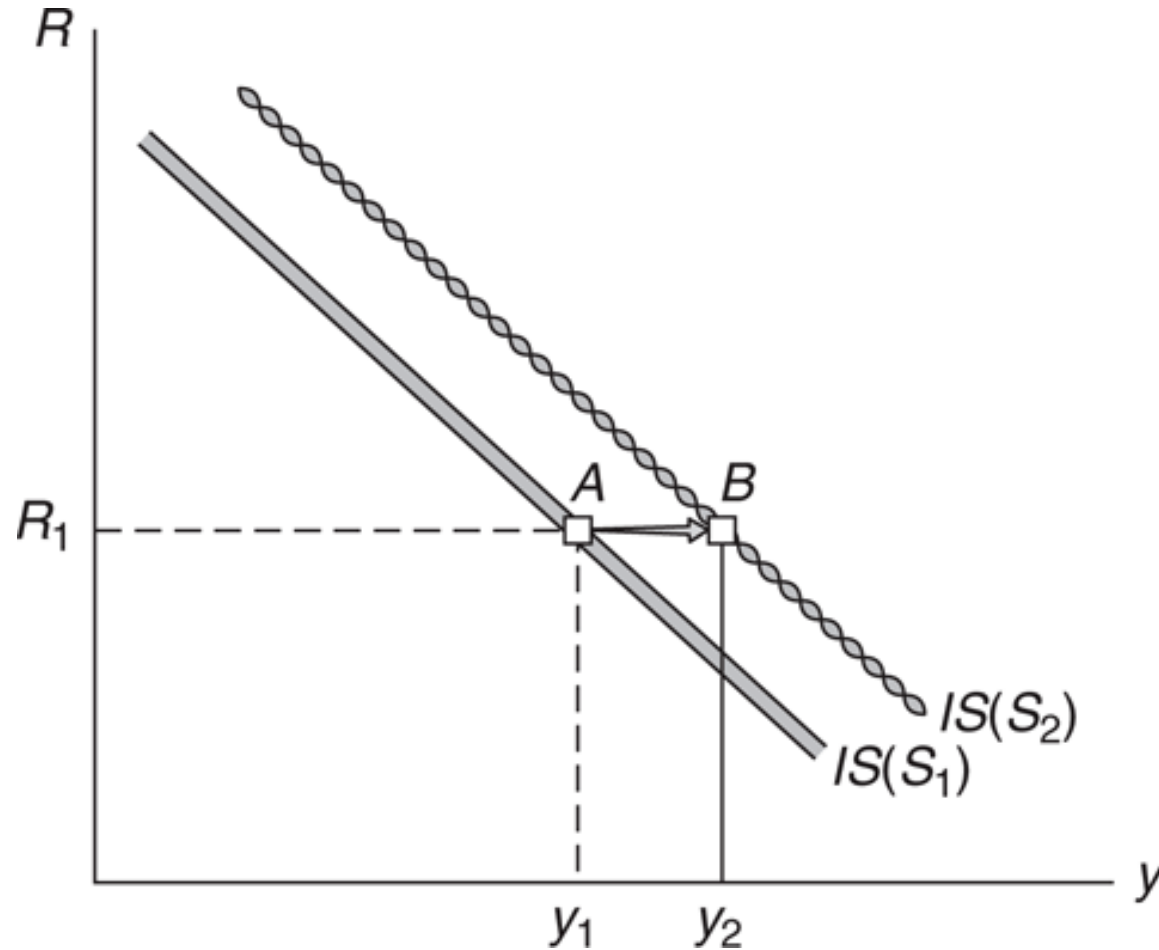
IS-LM Equilibrium and the BP Schedule



Exchange-Rate Variations and the *IS* Schedule

- A BoP deficit causes an immediate depreciation of Home currency.
- We assume that:
- A **depreciation** of a nation's currency makes imports more expensive, inducing the nation's residents to reduce their import spending.
- Simultaneously, the effective prices of the nation's export goods faced by other nations' residents decline.
- Consequently, expenditures on the nation's exports increase.
- Both of these effects shift the **IS curve to the right**.

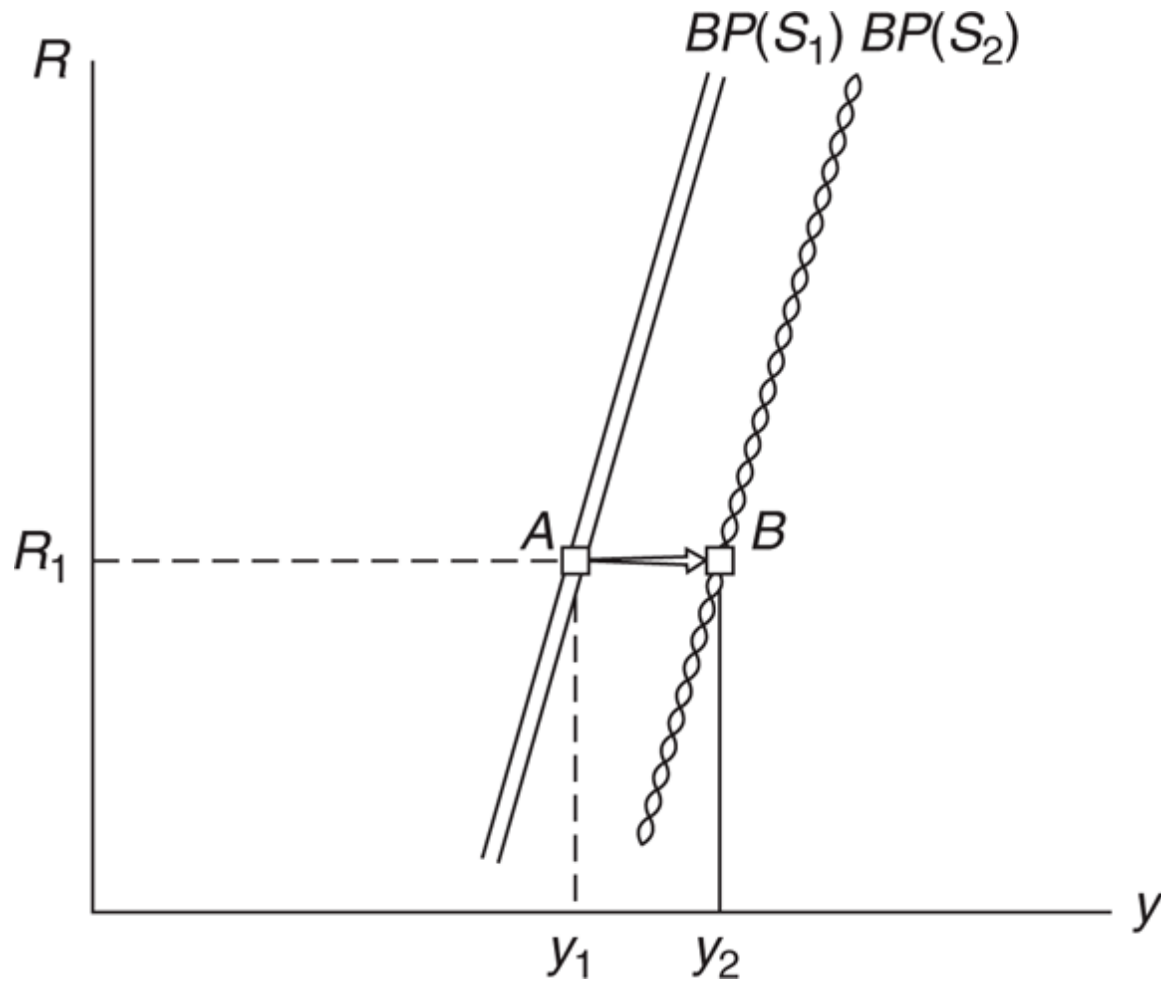
The Effects of a Currency Depreciation on the IS Schedule



Exchange-Rate Variations and the *BP* Schedule

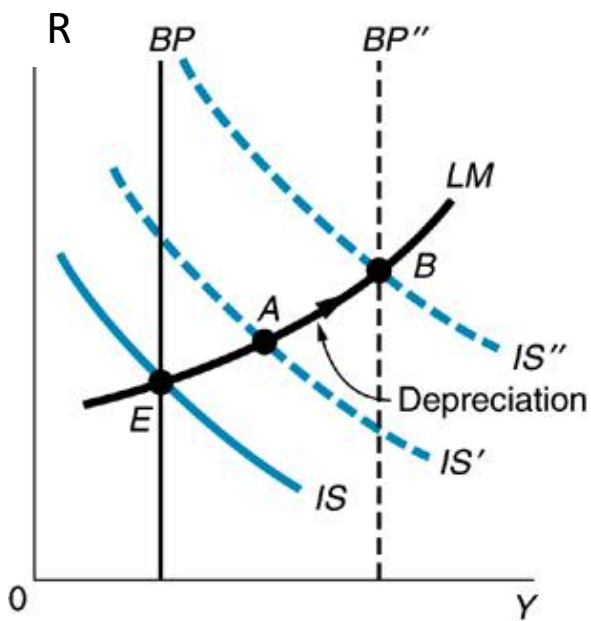
- A currency depreciation causes a nation's exports to rise and its imports to fall at any given real income level and at any given nominal interest rate.
- A currency depreciation causes the *BP* schedule to shift to the right.

The Effects of a Currency Depreciation on the *BP* Schedule

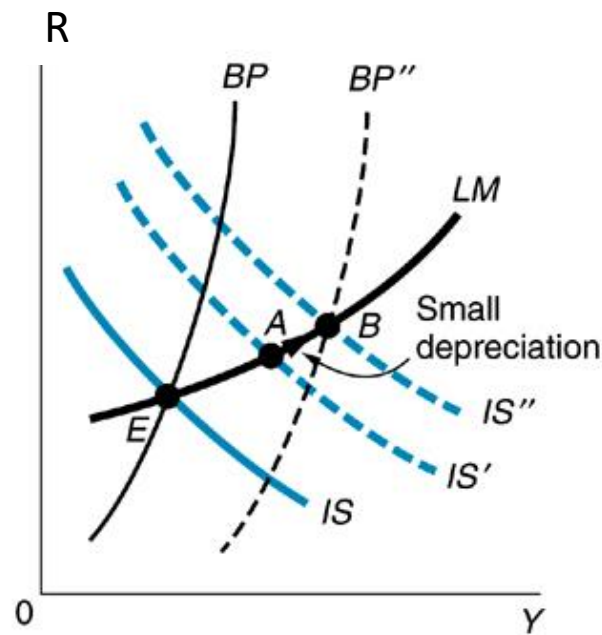


Fiscal Expansion under Floating Exchange Rates

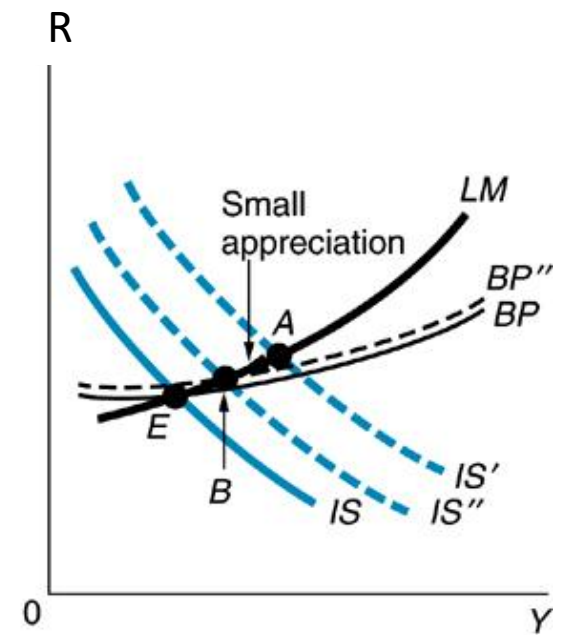
(a) Zero Capital Mobility



(b) Low Capital Mobility



(c) High Capital Mobility



Fiscal Expansion under Floating Exchange Rates

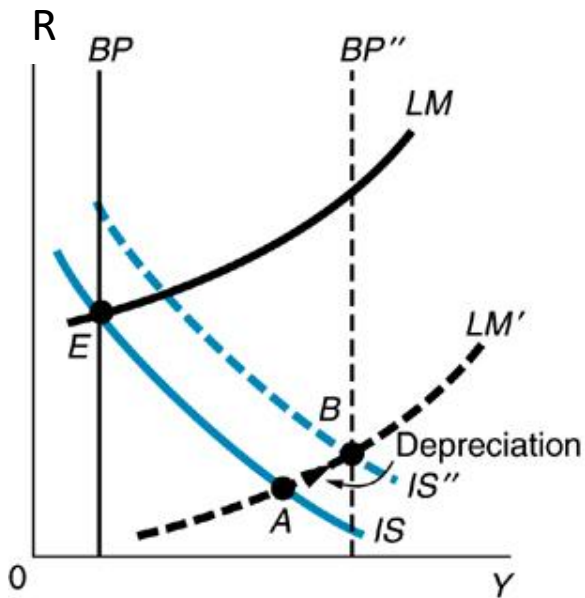
- A fiscal expansion shifts the IS to the right (point A)
- This causes a BoP disequilibrium...
- ...and a change of the exchange rate – a depreciation in case of zero or small capital mobility and an appreciation in case of big capital mobility
- This shifts the IS and BoP schedules and...
- ...the final equilibrium is in point B

Fiscal policy

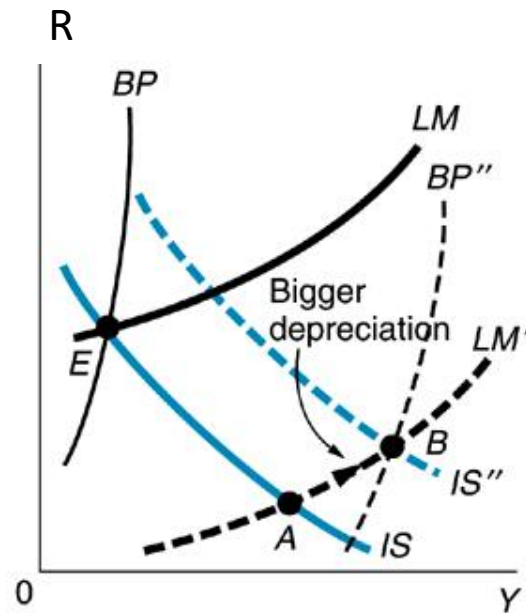
- **Higher capital mobility decreases the effectiveness of fiscal policy**
- Higher capital mobility – a given increase in interest rate causes a bigger capital inflow, hence smaller depreciation or even an appreciation
- Note that the shift of the BP line due to exchange rate change is bigger than that of the IS line – the difference is due to the multiplier
 - $1/\text{MPI}$ vs.
 - $1/(1-\text{MPC}+\text{MPI})$

Monetary Expansion under Floating Rates

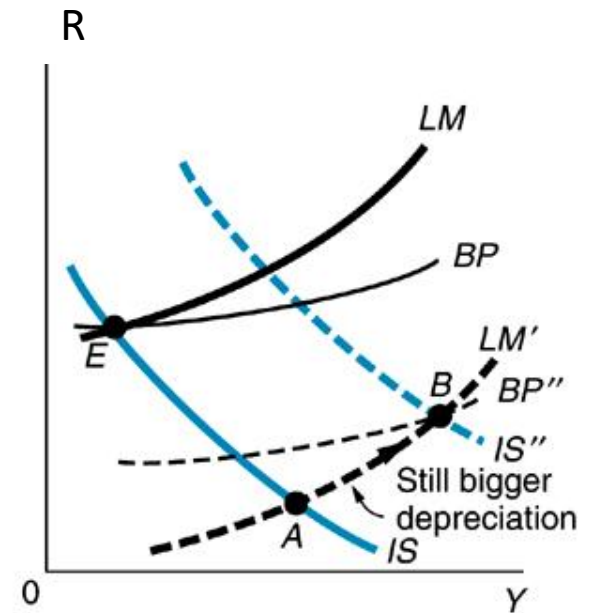
(a) Zero Capital Mobility



(b) Low Capital Mobility



(c) High Capital Mobility



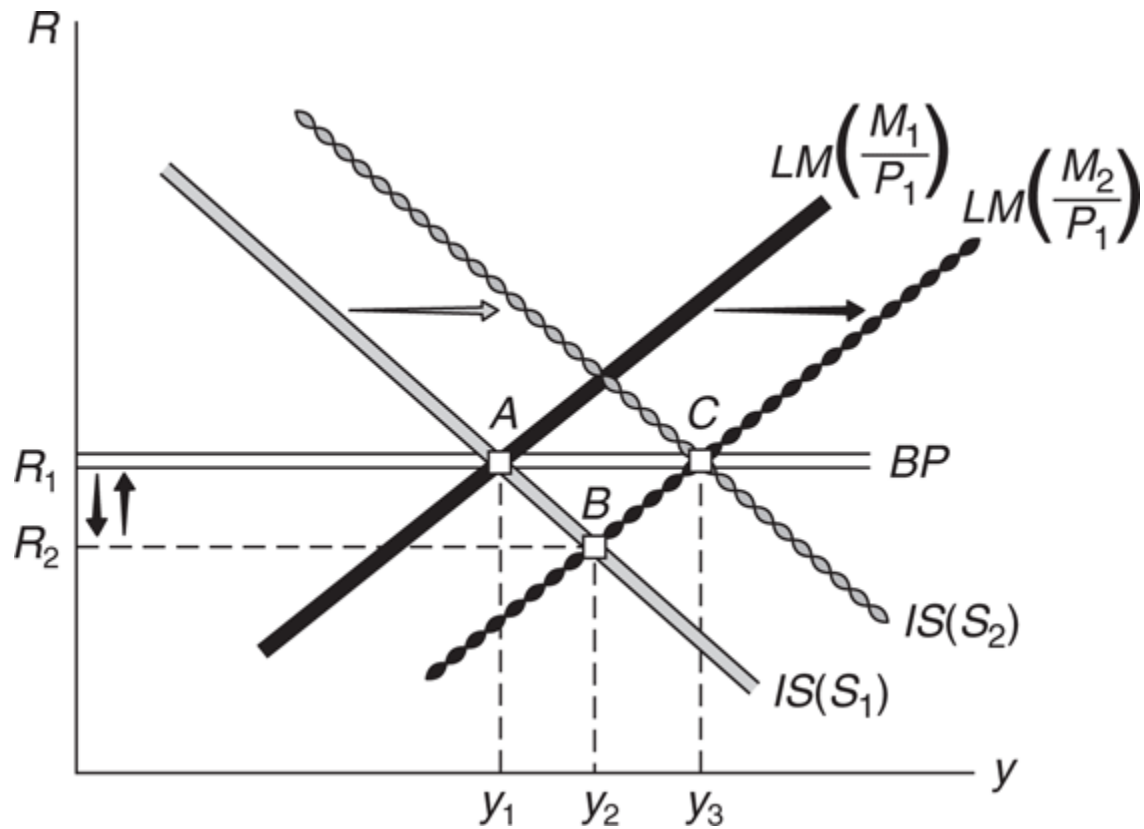
Monetary Policy with Perfect Capital Mobility and a Floating Exchange Rate

- An increase in the money stock causes the *LM* schedule to shift rightward.
- The resulting balance-of-payments deficit places downward pressure on the value of the nation's currency, and the resulting increase in net expenditures on the nation's goods causes the *IS* schedule to shift to the right.
- **The effectiveness of monetary policy increases with capital mobility**
- Monetary policy will have the largest possible immediate effect on real income with a floating exchange rate and perfect capital mobility.

Perfect capital mobility

- The BoP line is flat – the interest rate has to be ALWAYS equal to the world interest rate (r^*)
- Since k is infinite, any deviation of r from r^* causes an infinite capital inflow/outflow
- The only way for $BP=0$ is when $r=r^*$
- Note that under perfect capital mobility the BP line does not shift as a result a currency depreciation/appreciation!
- Naturally, note that the assumption here is that differences among country risks do not exist

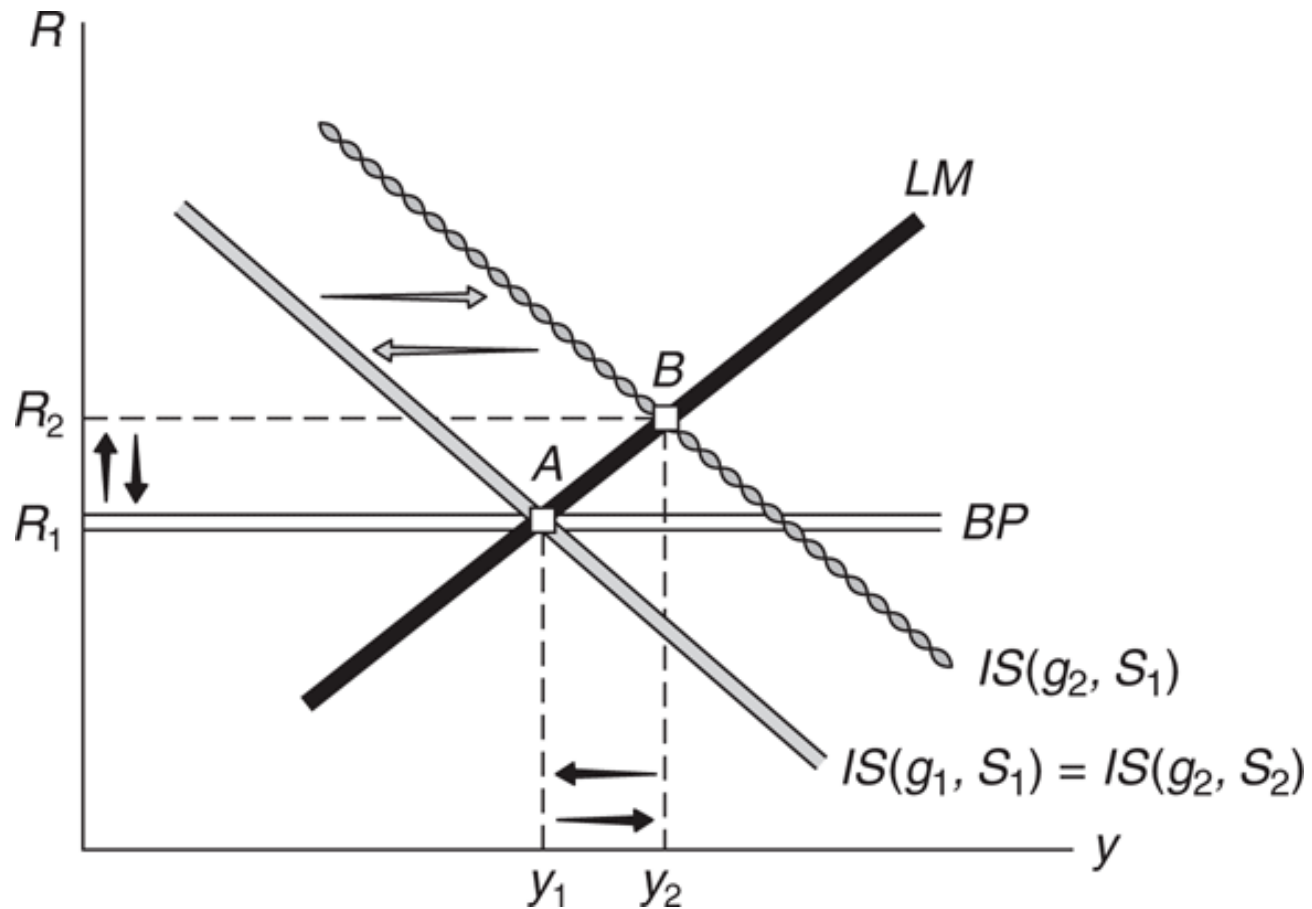
The Effects of an Increase in the MONEY Stock with a Floating Exchange Rate and PERFECT Capital Mobility



FISCAL Policy with Perfect Capital Mobility and a Floating Exchange Rate

- With perfect capital mobility, fiscal policy actions have *complete crowding-out effects*.
- Any increase in government spending crowds out an equal amount of net export spending by foreign residents because of the currency appreciation that the fiscal policy action causes.
- On net, therefore, equilibrium real income is unaffected by the fiscal policy action!
- Fiscal policy is ineffective as far as output goes, but it does change the composition of aggregate demand

The Effects of an Increase in GOVERNMENT SPENDING with a Floating Exchange Rate and Perfect Capital Mobility



Effectiveness of macro policies

How does perfect capital mobility influence the relative effectiveness of monetary and fiscal policy actions in a small open economy that permits its exchange rates to float?

- With perfect capital mobility and floating exchange rates, the monetary policy actions exert their greatest possible effects on equilibrium real income in a small open economy.
- In contrast, fiscal policy actions have no short-run real income effects under floating exchange rates and perfect capital mobility.

Lessons about monetary policy under floating exchange rates

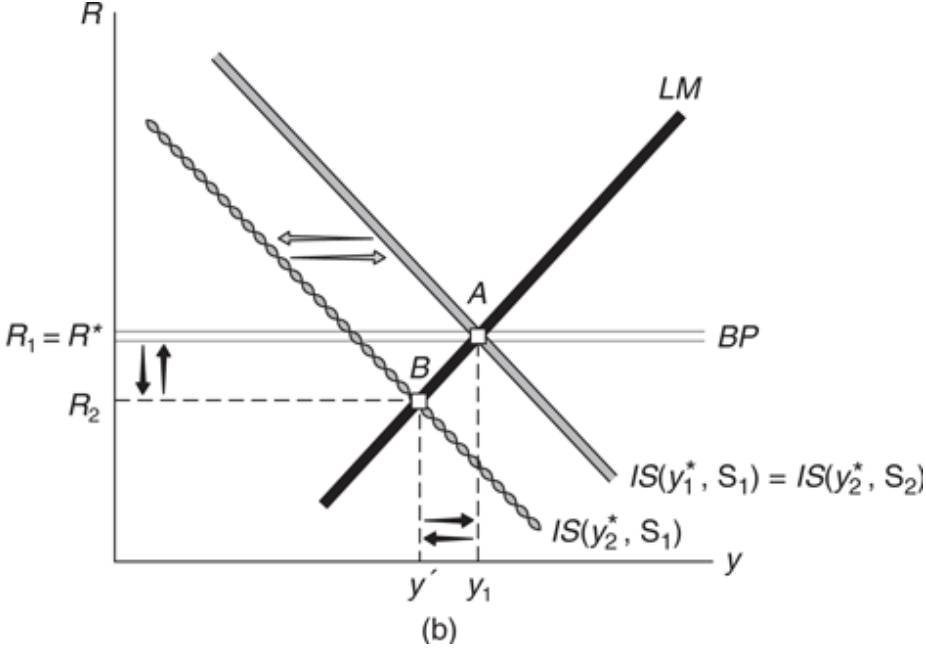
- Monetary policy affects output by affecting the components of aggregate demand:

closed economy: $\uparrow \mathbf{M} \Rightarrow \downarrow \mathbf{R} \Rightarrow \uparrow \mathbf{I} \Rightarrow \uparrow \mathbf{Y}$

small open economy: $\uparrow \mathbf{M} \Rightarrow \downarrow \mathbf{e} \Rightarrow \uparrow \mathbf{NX} \Rightarrow \uparrow \mathbf{Y}$

- Expansionary mon. policy does not raise world agg. demand, it merely shifts demand from foreign to domestic products. So, the increases in domestic income and employment are at the expense of losses abroad (in the short run).

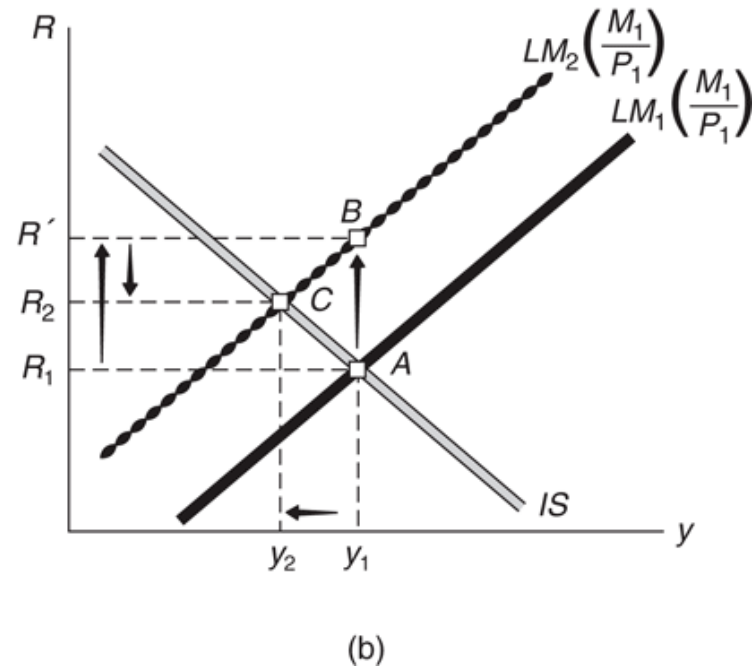
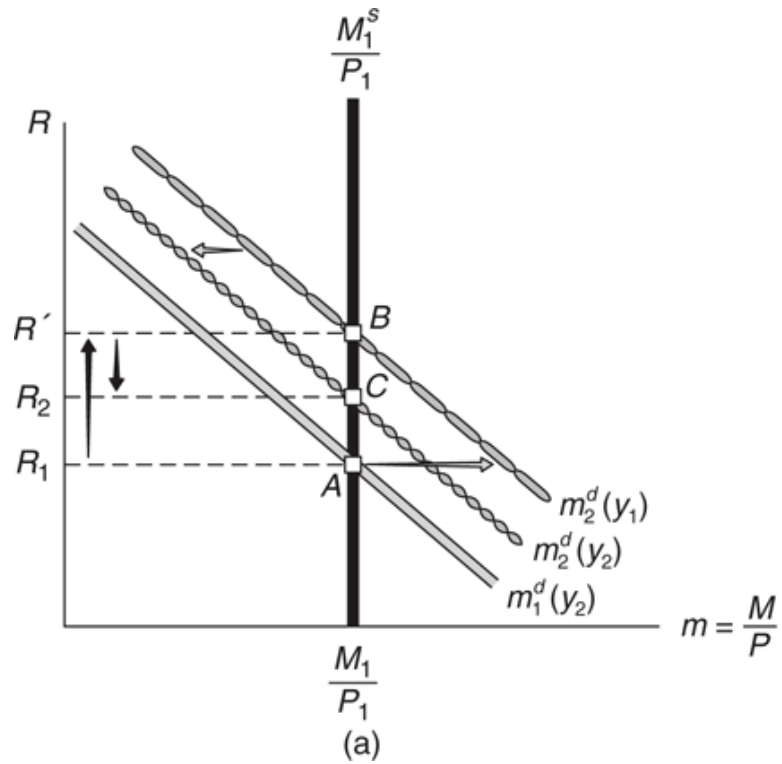
Real-Income Stability in the Face of a Decline in Aggregate Autonomous Expenditures with Perfect Capital Mobility



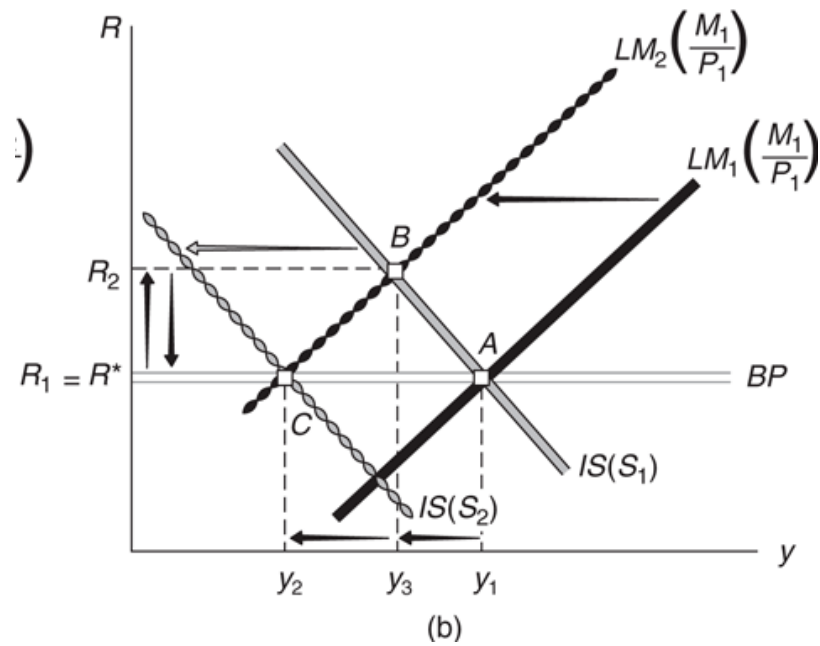
Financial Volatility and Floating Exchange Rates

- A floating exchange rate shields the economy from external demand shocks
- A floating exchange rate does not always promote real income stability, however.
- Under certain conditions, a nation's policymakers thereby expose real income to greater instability as a result of money demand variations by adopting a system of floating exchange rates.

The Effects of a Rise in the Demand for Real Money Balances or other LM shocks



Real-Income Stability in the Face of a Rise in the Demand for Real Money Balances with Perfect Capital Mobility



The Stability Trade-Off

1. Permitting the exchange rate to float automatically reduces real-income instability stemming from changes in aggregate desired expenditures
 2. Variations in the demand for real money balances contribute to real-income instability under a floating-exchange-rate system.
- A nation should opt for a floating rates if there is considerable volatility in desired expenditures.

SUMMARY

- The Mundell-Fleming model teaches us several lessons:
 - The effects of fiscal & monetary policy are strongly affected by the degree of capital mobility.
 - Fiscal and monetary policies will affect the exchange rate
 - Floating exchange rate can „protect” the country from external shocks.