

## MONEY IN THE OPEN ECONOMY

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## Goals

- What are nominal exchange rates?
- Does the exchange rate regime matter?
- Does monetary policy matter in an open economy?
- Are capital controls useful?

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## Exchange Rates

- Definition: The nominal exchange rate ( $e$ ) is defined as the value of domestic currency in terms of a unit of foreign currency ( $D/F$ ).
- Definition: The real exchange rate is the price adjusted nominal exchange rate.

$$re = e(P^F/P^D)$$

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## Purchasing Power Parity(PPP)

- This is the classic theory of the nominal exchange rate
- This theory says that if the price of goods in terms of domestic currency should be that same.

$$P^D = eP^F$$

Or

$$e = P^D/P^F$$

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### Table 14.1 Purchasing Power Parity and the Big Mac Index

Country	$P^*$	$e$	$e^{**}$ $\frac{P^*}{P}$
Argentina	4.10	0.347	0.525
Australia	3.00	0.621	0.686
Brazil	4.55	0.326	0.547
Britain	1.99	0.633	0.465
Canada	3.20	0.690	0.814
Chile	1400	0.0014	0.722
China	9.90	0.121	0.441
Czech Republic	56.57	0.035	0.722
Denmark	27.75	0.147	1.510
Euro Area	2.71	0.909	0.909
Japan	262	0.0083	0.806
Mexico	23	0.095	0.806
New Zealand	3.95	0.562	0.819
Russia	41	0.032	0.486
Sweden	30	0.120	1.327
Thailand	59	0.023	0.510

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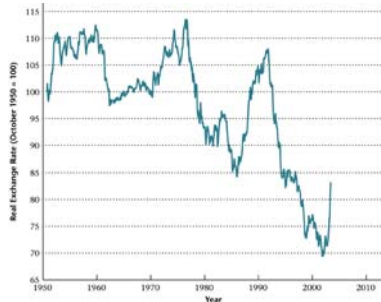
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### Figure 14.1 The Real Exchange Rate for Canada vs. the United States




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## Why might PPP not hold?

- Transportation costs
- The existence of nontrade goods
- Differences in consumption bundles

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## Exchange Rate Regimes

- Flexible Exchange Rates – the nominal exchange is determined by demand and supply with no government intervention.
- Fixed Exchange Rates – the nominal exchange rate is set by one country.

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- Types of Fixed Exchange rates
  - soft peg – no long term commitment to a conversion rate
  - hard peg – a country commits to a fixed rate indefinitely
    - dollarization
    - currency board (an institution that stand ready to accept domestic currency for for foreign currency at a specified rate)
    - hard peg (EMU)

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## A Monetary Small Open Economy Model: The Flexible Exchange Rate Case

- Goods Market
- Labor market
- Money Market
- Fixed Exchange Rate

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## Goods Market

- The real interest rate is determined in world capital market.
- The current account surplus adjusts so that output demand and output supply intersect at world real interest rate

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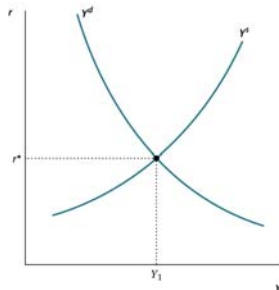
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**Figure 14.2** The Goods Market in the Monetary Small Open-Economy Model



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## Exchange Rate Market

- Exchange Rate determined by PPP
- Foreign prices are exogenous
- With a flexible exchange rate system, the the exchange rate and domestic prices are endogenous.

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## The Money Market Diagram

- Money Demand  
 $M^D = PL(Y, r^*)$   
 $= P^*eL(Y, r^*)$

With  $P^*, r^*$  given

- Money Market Equilibrium  
 $M^S = P^*eL(Y, r^*)$

This tells us that  $e$  will be on the vertical axis in the money market diagram

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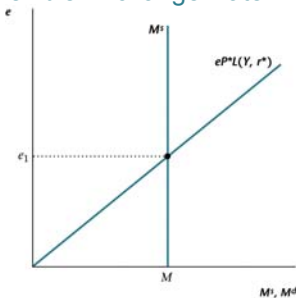
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**Figure 14.3** The Money Market in the Monetary Small Open-Economy Model with a Flexible Exchange Rate



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## What happens if the money supply increases?

- Equilibrium Condition  
 $M^S > P^*eL(Y, r^*)$
- The exchange rate will increase(D/F). This means the domestic currency depreciates.
- Since output doesn't change, money is neutral when exchange rates are flexible.

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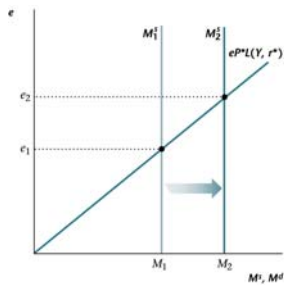
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**Figure 14.4** An Increase in the Money Supply in the Monetary Small Open-Economy Model with a Flexible Exchange Rate




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## What happens if foreign prices, $P^*$ , increases?

- An increase in  $P^*$  causes money demand to rotate clockwise,
- The exchange rate falls which means the domestic currency **appreciates**.
- Domestic real variables do not change.
- Under flexible exchange rates, the economy is insulated from foreign price increases.

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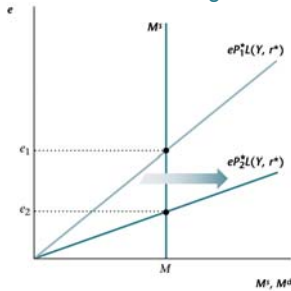
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**Figure 14.5** An Increase in the Foreign Price Level in the Monetary Small Open-Economy Model with a Flexible Exchange Rate




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**What happens if the foreign country has a negative TFP shock?**

- A foreign decrease in  $z^*$  causes  $r^*$  to increase.
- Labor supply increases and the output demand curve shift to the right because exports increase.  $Y$  increases.
- Money demand shifts down, and the exchange rate falls.
- Flexible exchange rates do not insulate the economy from real shocks.

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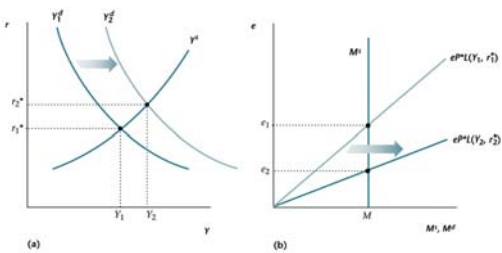
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**Figure 14.6** An Increase in the World Real Interest Rate with a Flexible Exchange Rate




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## A Monetary Small Open-Economy Model with Fixed Exchange Rates

- Under a fixed exchange rate system, the country's government must be prepared to support the exchange rate.
- This is called exchange rate intervention policy.
- How does a country do this and what are the implications?

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## Exchange rate intervention

- Suppose the money supply is increased. The exchange will tend to rise.
- The government can't allow this. It must remove the excess demand using foreign exchange reserves. It sells foreign currency and receives domestic currency. The money supply falls.

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- Under fixed exchange rates, a country loses control of the money supply.

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### What happens if foreign prices(a nominal shock) increase?

- If  $P^*$  increases, the demand for money shifts counterclockwise.
- This creates excess demand in the money market.
- To avoid an increase in the exchange rate, the country intervenes. The buying of foreign currency increases the money supply

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- If  $P^*$  increases and  $e$  is fixed, then  $P$  increases by PPP.
- Under fixed exchange rates, the economy is not insulated from foreign nominal shocks.

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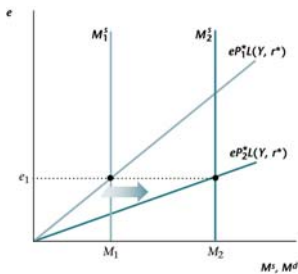
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**Figure 14.8** An Increase in the Foreign Price Level in the Monetary Small Open-Economy Model with a Fixed Exchange Rate




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## What are the implications of a foreign real shock?

- Suppose the real interest rate increases because of a negative TFP shock in the US. What happens?
- The increase in  $r^*$  causes labor supply to increase which increases output supply (movement along the curve)
- The increase in  $r^*$  creates an excess supply which is solved by an increase in exports.

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- The increase in  $Y$  (even with  $r^*$  increase) causes the money demand curve to rotate counterclockwise.
- The excess demand in the money market put upward pressure on the exchange rate. Intervention results in an increase in  $MS$ .
- $P$  does not change.
- Money demand shifts to left, but less than no capital control case. The exchange rate depreciates by a smaller amount.

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- A Fixed exchange rate system can insulate the domestic price level from foreign real shocks.

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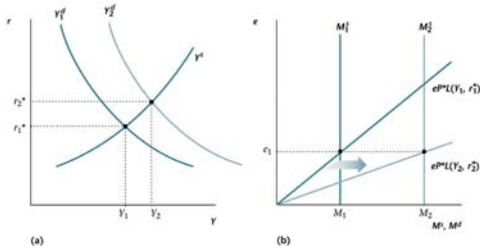
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**Figure 14.9** An Increase in the World Real Interest Rate with a Fixed Exchange Rate




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**What are the implications of a devaluation?**

- If a country does not have enough foreign reserves to support the fixed exchange rate, then it can change the exchange rate (**devaluation or revaluation**)
- Suppose this country suffers a fall in  $z_1$ .
- This causes the output supply curve to shift to the left.

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- The demand curve shifts to the left because net exports fall. (Why?)
- Output in the economy falls.
- The money demand curve rotates counter-clockwise.
- Now you increase the exchange rate to the point where money supply and demand are equal.

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- Role of Foreign Exchange Speculators
- The devaluation has no further effect on the current account!
- Usually policymakers believe that a devaluation makes your goods cheaper and foreign goods more expensive, thus causing an improvement in the current account.
- Because of PPP, the real exchange rate doesn't change.
- The current account is a real problem.

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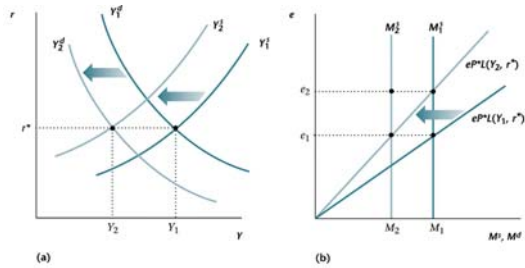
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**Figure 14.10** A Devaluation in Response to a Temporary Total Factor Productivity Shock




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### Fixed vs. Floating Exchange Rates

- If you want to stabilize prices and you are subject to nominal shocks, then used a flexible regime.
- If you want to stabilize prices and you are subject to real shocks, then used a flexible regime.
- A flexible system allows the country to control its own money supply.

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## Capital Controls

- Definition: Capital Controls are restrictions on the trade of assets across international borders.
- China uses capital controls.
- Why use capital controls?

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## Balance of Payment Accounting

- The balance of payment accounts keeps track of all economic transactions between a country and the rest of the world
- $BP = CA + KA$   
CA = current account(goods)  
KA = capital account(assets)

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- A capital inflow occurs when foreign funds flow to a country so that an asset in that country can be purchased.
- A capital outflow occurs when domestic funds flow to another country so that an asset in that country can be purchased.

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- By definition  $BP = 0$ .
- $KA = -CA$
- The idea of capital controls is to influence  $KA$  so that you get desired  $CA$ .

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### What are the effects of capital controls? – Flexible Exchange Rates

- Suppose  $z_1$  declines and no capital controls. The output supply curve shifts left. Given  $r^*$ , the output demand curve shifts left as the current account surplus falls. Output falls.
- With  $Y$  declining, the money demand curve shifts left. The exchange rate depreciates, but domestic prices do not change.

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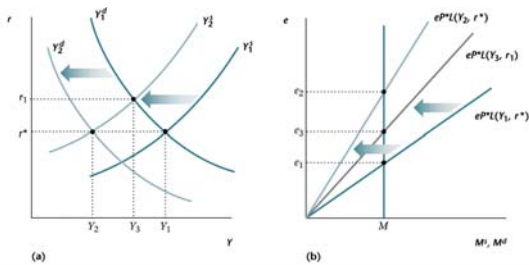
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**Figure 14.11** A Temporary Total Factor Productivity Shock, With and Without Capital Controls




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- A decline in  $z_1$  and capital controls(no capital inflows or outflows)
- A fall in TFP causes the output supply curve to shift left. With no capital flows, the real interest rate increase to  $r_1$ . (capital inflows would have kept  $r^*$ )
- Output falls, but not as much as without capital controls.

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## Summary

- Benefit: Capital controls tend to dampen aggregate fluctuations in output.
- Costs: Misallocations as a result of the fact real interest rates are higher.

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## What are the effects of capital controls? – Fixed Exchange Rates

- Suppose  $z_1$  falls and no capital controls
- Output supply shifts left and output demand shifts left due to a fall in net exports. Output falls to  $Y_2$ .
- The money demand curve rotates left. With a fixed rate the money supply must fall.

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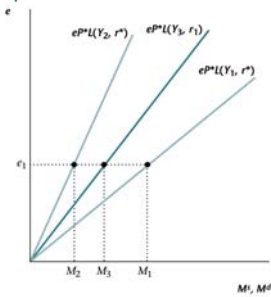
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**Figure 14.12** A Total Factor Productivity Shock Under a Fixed Exchange Rate, With and Without Capital Controls




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- Suppose  $z_1$  falls and capital controls
- Output supply shifts left. Output falls to  $Y_3$ .
- The money demand curve rotates left, but not by as much. With a fixed rate the money supply must fall.
- With capital controls, a government can better support a fixed exchange rate system.

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