

Fixed Exchange Rate and Foreign Exchange Intervention

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Objective

This chapter studies the short-run determination of the exchange rate and output and the working of macroeconomic policies under a managed floating exchange rate systems.

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Why we need to study the fixed exchange rate system

- The fixed exchange rate system is widely used in developing countries and under regional currency arrangements.
- Regional currency arrangement: under the currency union, member countries fix the exchange rates of their currencies.
- Studying the fixed exchange rate system is useful to understand better the foreign exchange intervention under the managed floating regime.

Contents

- Central Bank intervention and the supply of money
- Foreign exchange intervention under a fixed exchange rate regime
- Stabilization policies under a fixed exchange rate regime
- Balance of payment crisis
- Managed floating regime and sterilized intervention
- Reserve currencies in the world monetary system

1. The central bank's intervention and the supply of money

The Central Bank balance sheets and the money supply

- The balance sheet of the central bank records all assets and liabilities.
- The balance sheet consists of the asset side and liability side.
 - The acquisition of an asset is recorded on the asset side.
 - The increase in the liability is recorded on the liability side.

1. The central bank's intervention and the supply of money

The central bank balance sheet: the asset side

- The asset side of the central bank consists of domestic assets and foreign assets.
- The foreign assets consist of foreign exchange, foreign bonds and other universally acceptable means of making international payments.
 - The central bank's foreign assets constitute the international reserve.
- Domestic assets consist of the central bank holdings of claims to future payment by its own citizens and domestic institutions. The most common domestic assets are government bonds and loans to domestic commercial bank

1. The central bank's intervention and the supply of money

The central bank balance sheet: the liability side

- The central bank's liabilities consist of
 - i) Currency in circulation and
 - ii) Required and other reserves by commercial banks.
- The central bank's assets must be equal to its liability plus its net worth. Since the net worth is low, we assume it is zero.

1. The central bank's intervention and the supply of money

The central bank's intervention and the supply of money

- The central bank's intervention consists of open market intervention and foreign exchange intervention.
- Since the net worth is zero, any change in the asset side must be associated with a corresponding change in the liability side.

1. The central bank's intervention and the supply of money

Open market intervention and the supply of money

- When the central bank sells or purchases domestic assets, it will affect the supply of money.
 - When the central bank purchases government bonds, it makes payment by cash or check, and thereby raising the supply of money.
 - When the central bank sells government bonds, it is paid by cash or check, thus lowering the supply of money.

1. The central bank's intervention and the supply of money

Foreign exchange intervention and the supply of money

- The central bank's intervention in the foreign exchange market is conducted through its purchase or sale of foreign assets
 - When the central bank sells foreign asset, the foreign reserves fall and the supply of money falls.
 - When the central bank purchases foreign assets, the foreign reserves rise and the supply of money also rises.

1. The central bank's intervention and the supply of money

Sterilized intervention I

- The central bank's intervention in the foreign exchange and money markets may have undesired effects on the supply of money.
- The central bank can nullify the impacts of foreign exchange intervention on the supply of money using a mix of the intervention in the foreign exchange and money market.

1. The central bank's intervention and the supply of money

Sterilized intervention II

- The sterilized intervention is the combination of a foreign exchange market intervention and an open market intervention of the opposite direction.
 - When the central bank sells foreign assets, the supply of money falls. The effect on the supply of money can be nullified by purchasing back government bonds.
 - When the central bank purchases foreign assets, the supply of money rises. The effect on the supply of money can be nullified by selling government bonds.

1. The central bank's intervention and the supply of money

The balance of payments and supply of money

- The change in the balance of payment has effects on foreign reserves and the supply of money.
 - If the central bank's intervention is not sterilized, a deficit in the balance of payment would lead to a monetary contraction, while a surplus in the BOP would lead to monetary expansion.
 - The effect of the change in the BOP on the supply of money depends on how the BOP is financed and the degree of sterilized intervention adopted by the central bank.

2. Foreign exchange intervention in a fixed exchange rate regime

Foreign exchange intervention

- The foreign exchange intervention are used to maintain the fixed exchange rate
 - The central bank sells foreign exchange to the market when there is a shortage of foreign exchange
 - The central bank purchases foreign exchange from the market when there is a surplus of foreign exchange.

2. Foreign exchange intervention in a fixed exchange rate regime

Equilibrium in the foreign exchange market under a fixed exchange rate

- The foreign exchange market is in equilibrium when the interest parity condition holds.
 - $R = (E^e - E)/E + R^*$
- Since the exchange rate is fixed by the central bank, the interest parity condition implies the equality between domestic interest rate and foreign interest rate.
 - $R = R^*$

2. Foreign exchange intervention in a fixed exchange rate regime

Equilibrium in the foreign exchange market under a fixed exchange rate

- Given a price level and an exchange rate, the equilibrium condition in the money market determines the volume of the money supply.
 - $M^s/P = L(Y,R) = L(Y,R^*)$
- When the central bank intervenes in the foreign exchange market, the supply of money is automatically adjusted to maintain the equilibrium in the money market.

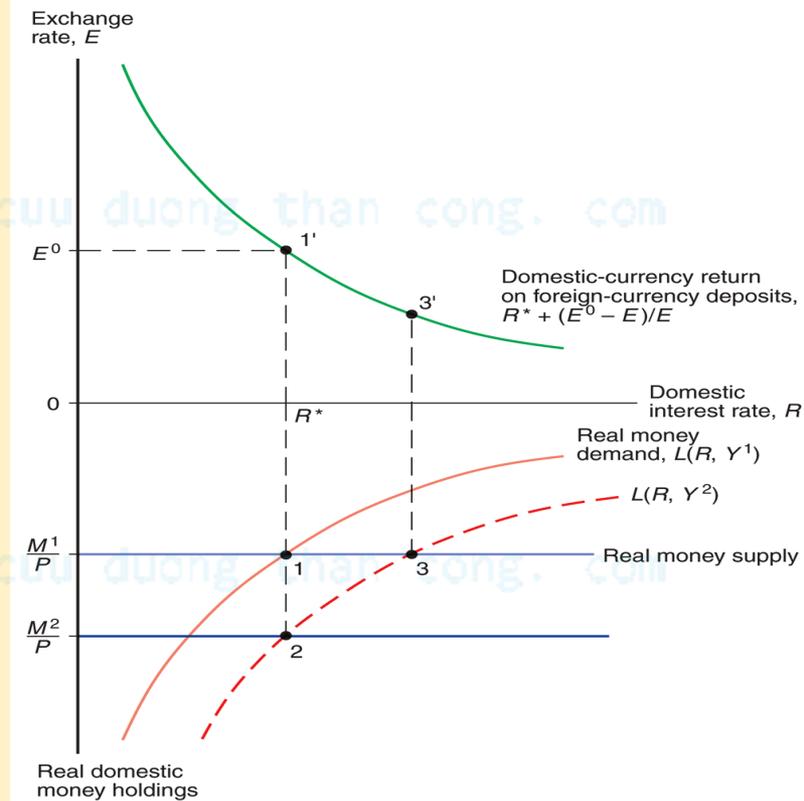
2. Foreign exchange intervention in a fixed exchange rate regime

Equilibrium in the foreign exchange market under a fixed exchange rate: An increase in income

Figure 17-1

Asset Market Equilibrium with a Fixed Exchange Rate, E^0

To hold the exchange rate fixed at E^0 when output rises from Y^1 to Y^2 , the central bank must purchase foreign assets and thereby raise the money supply from M^1 to M^2 .



3. Stabilization policies under a fixed exchange rate regime

Monetary policies under the fixed exchange rate regime

- Under a fixed exchange rate regime, monetary policies have no effects on output and the exchange rate. Any increase in the supply of money puts a downward pressure on domestic currency and the central bank needs to intervene to maintain the fixed exchange rate. The initial increase in the supply of money is eventually offset by the fall in foreign reserves.

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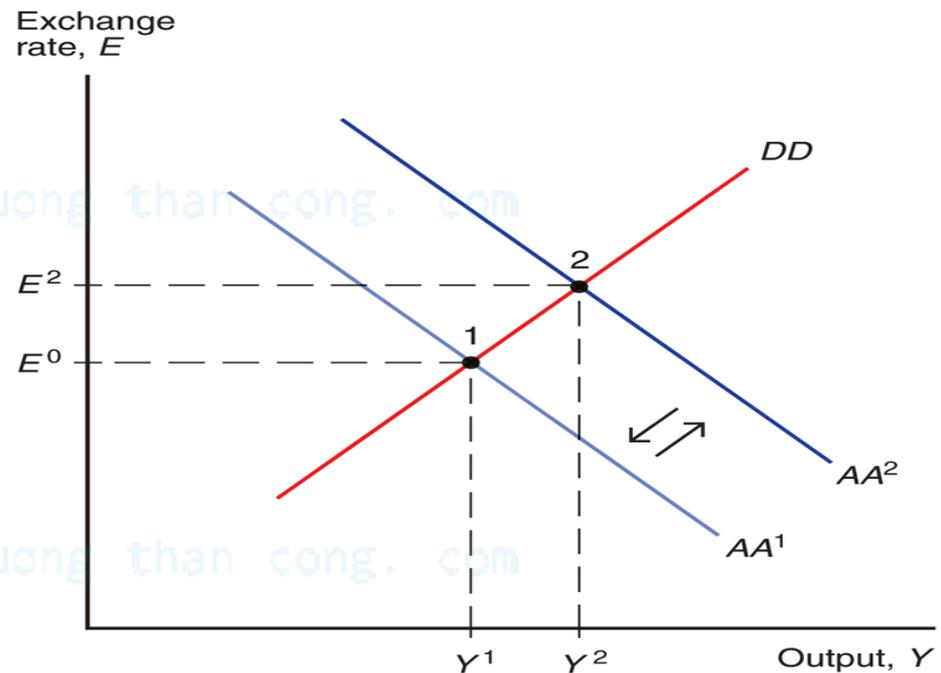
3. Stabilization policies under a fixed exchange rate regime

Monetary policies under the fixed exchange rate regime

Figure 17-2

Monetary Expansion Is Ineffective Under a Fixed Exchange Rate

Initial equilibrium is shown at point 1, where the output and asset markets simultaneously clear at a fixed exchange rate of E^0 and an output level of Y^1 . Hoping to increase output to Y^2 , the central bank decides to increase the money supply by buying domestic assets and shifting AA^1 to AA^2 . Because the central bank must maintain E^0 , however, it has to sell foreign assets for domestic currency, an action that decreases the money supply immediately and returns AA^2 back to AA^1 . The economy's equilibrium therefore remains at point 1, with output unchanged at Y^1 .



3. Stabilization policies under a fixed exchange rate regime

Fiscal policies under the fixed exchange rate regime

- When output is under full employment level, fiscal policies have effects on output and employment. An increase in government spending will lead to the output expansion and increase in foreign reserves and money supply.
- When output is at the long-run full employment equilibrium, the fiscal policies would have no effect on output. Higher government spending is totally offset by the increase in prices.

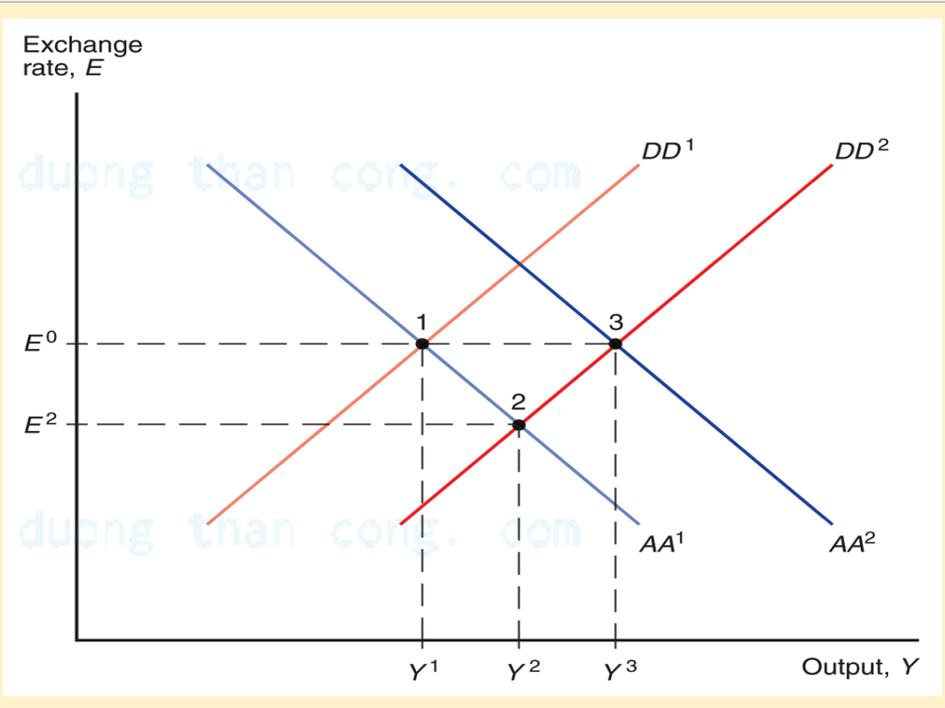
3. Stabilization policies under a fixed exchange rate regime

Fiscal policies under the fixed exchange rate regime

Figure 17-3

Fiscal Expansion Under a Fixed Exchange Rate

Fiscal expansion (shown by the shift from DD^1 to DD^2) and the intervention that accompanies it (the shift from AA^1 to AA^2) move the economy from point 1 to point 3.



3. Stabilization policies under a fixed exchange rate regime

Exchange rate policies

- When output is under full employment level, devaluation has effects on output and employment. Devaluation will lead to the output expansion and increase in foreign reserves and money supply.
- When output is at the long-run full employment equilibrium, devaluation would have no long-run effect on the output as the effect of devaluation is offset by the increase in prices

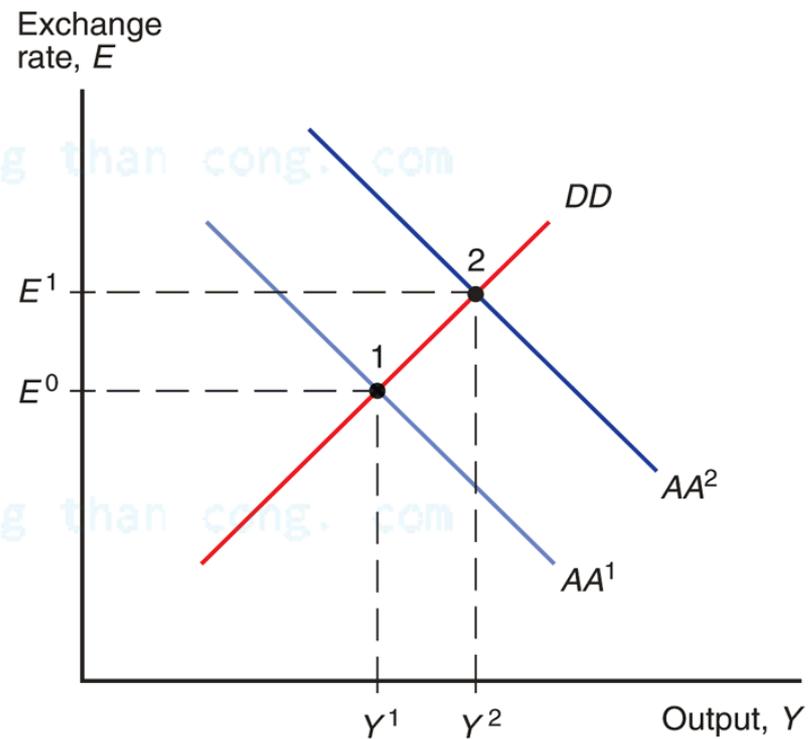
3. Stabilization policies under a fixed exchange rate regime

Exchange rate policies

Figure 17-4

Effect of a Currency Devaluation

When a currency is devalued from E^0 to E^1 , the economy's equilibrium moves from point 1 to point 2 as both output and the money supply expand.



4. Balance of Payment Crisis and Capital Flight

The balance of payment crises

- The balance of payment crisis refers to a sharp change in foreign reserves caused the sudden change in the market belief and the expected exchange rate.
 - In the previous section, we assume that market agents don't change their expectation on the exchange rate under the fixed exchange rate regime.
 - Under the fixed exchange rate regime, market agents may change their expectation on the exchange rate when unemployment rises or foreign reserves run out.

4. Balance of Payment Crisis and Capital Flight

BOP crises under the fixed exchange rate regime

- Suppose there is serious deterioration in the current account, causing an expectation on the devaluation of domestic currency and a downward pressure on domestic currency.
- An expected devaluation can lead to a BOP crisis, and the resulting fall in foreign reserves and rise in the interest rate.
 - The sale of foreign assets by central banks leads to a decline in the supply of money and an increase in the interest rate

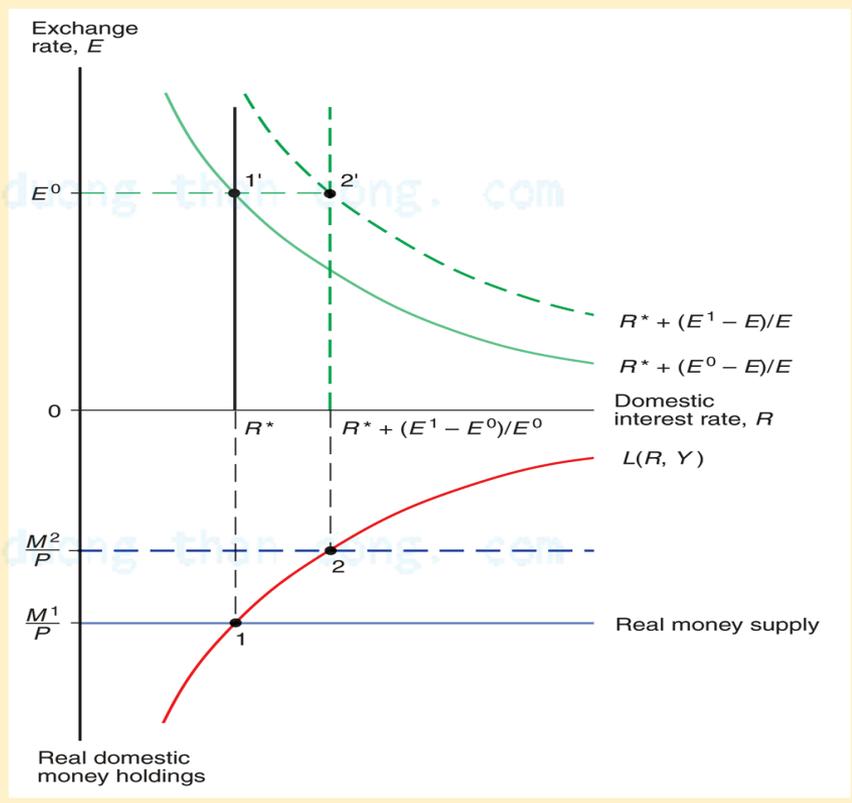
4. Balance of Payment Crisis and Capital Flight

BOP crises under the fixed exchange rate regime

Figure 17-5

Capital Flight, the Money Supply, and the Interest Rate

To hold the exchange rate fixed at E^0 after the market decides it will be devalued to E^1 , the central bank must use its reserves to finance a private financial outflow that shrinks the money supply and raises the home interest rate.



4. Balance of Payment Crisis and Capital Flight

Capital flight and currency crisis

- Capital flight is the loss of foreign reserves caused by an expected devaluation of domestic currency
- Capital flight may cause a currency crisis especially in the case foreign reserves are low and the expected devaluation is large.
- There are several causes for a currency crisis: i) the inconsistency of macroeconomic policies with the fixed exchange rate regime; ii) The volatility of capital inflows or iii) The speculative attacks

5. Managed floating regime and sterilized intervention

Sterilized intervention

- Central banks can employ sterilized intervention or non-sterilized intervention
- In the case of unsterilized intervention, monetary policy is ineffective as the change in the supply of money is nullified by the foreign exchange intervention.
- In the case of sterilized intervention, the central bank could prevent undesired effect of foreign exchange intervention on the supply of money.

5. Managed floating regime and sterilized intervention

Perfect Asset Substitutability

- In the previous section, we assume domestic and foreign assets are perfect substitutes.
- Under the assumption of perfect asset substitutability investors don't care how their portfolio is divided between domestic assets and foreign assets provided both yield the same expected rate of return.
- Under the assumption of perfect asset substitutability, the equilibrium in the foreign exchange market requires the equality between domestic and foreign asset or the interest parity condition must hold.

5. Managed floating regime and sterilized intervention

Equilibrium in the foreign exchange market with imperfect asset substitutability

- Domestic and foreign assets are imperfect substitutes since they have different degrees of risk and liquidity, and other characteristics.
- Under the imperfect asset substitutability, the interest parity condition must be modified as follows:
 - $R = R^* + (E^e - E)/E + \rho$
 - here ρ is risk premium

5. Managed floating regime and sterilized intervention

Risk premium

- Risk premium depends on the stock of domestic government debt and domestic assets held by the central bank
 - $\rho = \rho(B-A)$
 - here B is the stocks of government bonds, and A is domestic assets of the central bank.
- When the stock of government bond rises, this risk of holding domestic currency rises.

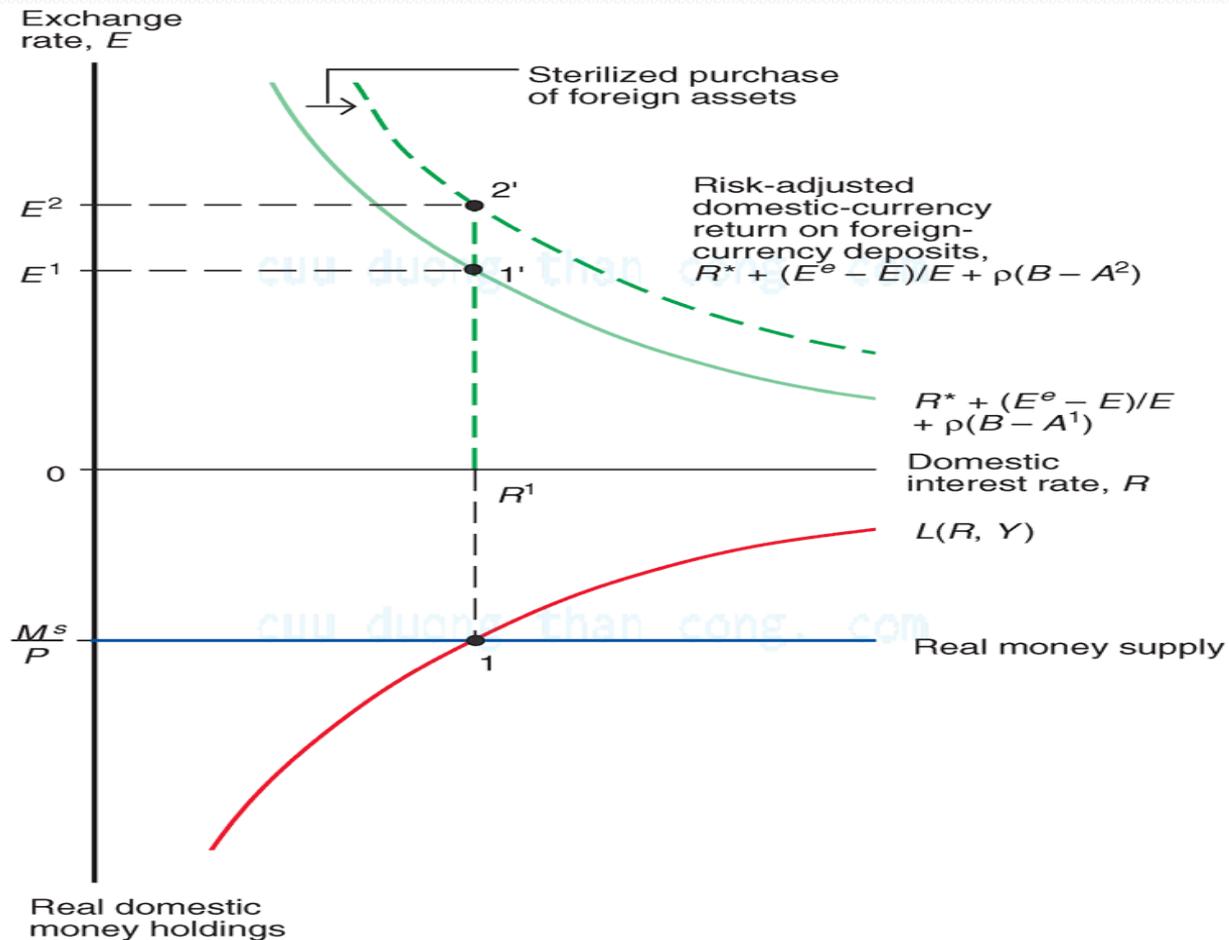
5. Managed floating regime and sterilized intervention

The effect of sterilized intervention under the imperfect asset substitutability

- When domestic and foreign assets are imperfect substitutes, sterilized intervention can influence the exchange rate.
 - Assume the central bank purchases foreign assets and sells domestic assets. This sterilized intervention raises the risk premium, causing the depreciation of domestic currency.
 - When the central bank sells foreign assets and purchases domestic assets, the risk premium would fall, causing an appreciation of domestic currency.

5. Managed floating regime and sterilized intervention

The effect of sterilized intervention under the imperfect asset substitutability



6. Reserve currency in the world monetary system

Fixed exchange rate systems

- There are several fixed exchange rate systems in reality
 - i) Reserves currency standard: one currency is singled out as a reserve currency and is held as international reserves;
 - ii) Gold standard: prices of all currencies are pegged in terms of gold, and gold is held as international reserves
 - iii) Bimetallic standard
 - iv) Gold exchange standard

6. Reserve currency in the world monetary system

Mechanism of a reserve currency standard

- Under the reserve currency system, every central banks fix the exchange rate of its own currency to the reserve currency.
- Exchange rates between other currencies rather than the reserve currency are automatically fixed by the market.
- The reserve currency is used as international reserves, and central banks intervened in the foreign exchange market to maintain the fixed exchange rate.

6. Reserve currency in the world monetary system

The asymmetric position of the reserve center

- In the reserve currency system, the reserve-issuing country has a privileged/special position
 - The reserve-issuing country don't need to intervene in the foreign exchange market to maintain the fixed exchange rate
 - The reserve-issuing country can maintain the autonomy of monetary policies under the fixed exchange rate regime.
- Basic asymmetry: reserve country has a power to affect its own economy and foreign economies using monetary policies.

6. Reserve currency in the world monetary system

Gold standard

- Prices of all currencies are fixed in terms of gold.
Under the gold standard:
 - i) Gold is used as international reserve; and gold is exported or imported across borders without restrictions.
 - ii) No country issues reserve currency, and no country has a privileged position.

6. Reserve currency in the world monetary system

Symmetric adjustments under a gold standard

- Under a gold standard, countries share equally the burden of the balance of payment adjustment.
 - The expansion of the domestic supply of money puts a downward pressure on the interest rate and a portfolio shift toward foreign assets. The home reserves of gold fall and the domestic supply of money shrinks. This causes the domestic interest rate back up.
 - The foreign reserves of gold rise, causing a monetary expansion in the foreign country and a decline in foreign interest rate.

6. Reserve currency in the world monetary system

Benefits and drawbacks of the gold standard

- The gold standard has several potential benefits:
 - i) International monetary adjustments are symmetric and no country has a special position;
 - ii) The fixed exchange rate under the gold standard places automatic limits on monetary policies.

6. Reserve currency in the world monetary system

Benefits and drawbacks of the gold standard

- The gold standard also has some drawbacks:
 - i) The supply of money is tied to the reserve of gold and the supply of gold;
 - ii) The gold standard places undesirable constraints on the use of monetary policies to fight unemployment;
 - iii) The stability of domestic prices requires the stable price of gold;
 - iv) Large gold production countries have ability to influence macroeconomic conditions in other countries.

6. Reserve currency in the world monetary system

Bimetallic standard

- Under a bimetallic standard, the value of currency is based on both silver and gold.
- The US used a bimetallic standard from 1837–1861.
- Banks coined specified amounts of gold or silver into the national currency unit.
 - 371.25 grains of silver or 23.22 grains of gold could be turned into a silver or a gold dollar.
 - So gold was worth $371.25/23.22 = 16$ times as much as silver.

6. Reserve currency in the world monetary system

Gold Exchange Standard

- The central banks' international reserves consist of gold and the currencies with fixed prices with gold. The exchange rates are fixed to the currency with a fixed gold price.
- The gold exchange standard operates like a gold standard, but it allows more flexibility in the growth of international reserves.
- The Bretton-Woods system established after the Second World War was a gold exchange system.



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