Chapter 5: Output and the exchange rate in the short-run

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Objective

- This chapter develops an open macroeconomic model to study the determination of the exchange rate and output in the short-run. This chapter discusses the effects of macroeconomic policies and other economic shocks on the short-run output and exchange rate.

Content

- Aggregate demand in an open economy
- Short-run equilibrium in the output market
- Short-run equilibrium in the asset market
- Short-run equilibrium in an open economy
- Macroeconomic policies and the current account

1. Aggregate demand in an open economy

Aggregate demand

- The aggregate demand is the volume of goods and services demanded by firms and households in an economy
- The aggregate demand consist of private consumption, investment, government consumption and net exports of goods and services (or the current account balance)
- There are various factors that affect the demand for goods and services. For simplicity, we assume that investment and government consumption are exogenous

1. Aggregate demand in an open economy

Private consumption

- The demand for consumers' goods and services depends on disposable income
  - $C = C(Y - T)$
  - The disposable income is the national income subtracted by taxes, which is the income that households and firms can use for savings and daily consumption.
  - Private consumption and income are positively correlated.

1. Aggregate demand in an open economy

The current account

- The current account balance is the difference between exports of goods and services and imports of goods and services.
- $CA = X-M$
- The current account balance is affected by various factors including disposable income and real exchange rates
  - $CA = CA(EP^*/P, Y^d)$

1. Aggregate demand in an open economy

The current account balance and income

- The current account balance and income are negatively correlated.
  - An increase in the disposable income raises the demand for goods and services and the demand for imports.
  - Higher demand for imports worsens the current account balance.

1. Aggregate demand in an open economy

The current account and the exchange rate I

- The change in the real exchange rate reflects the change in the relative price of domestic goods.
  - A real depreciation means that domestically produced goods become cheaper as compared to foreign goods.
  - A real appreciation of domestic currency means that domestically produced goods become more expensive.
- A real depreciation raises the world demand for the country's products, while a real appreciation of domestic currency lowers the world demand for country's products.

1. Aggregate demand in an open economy

The current account and the exchange rate II

- The in the real exchange rate has the following effects:
  - The volume effect: the effect of a change in the real exchange rate on the volume of exports and imports;
  - The value effect: the effect of a change in the real exchange rate on the value of imports in terms of domestic output.
- The impacts of a change in the real exchange rate on the current account balance depend on whether the volume effect or the value effect are dominant.

1. Aggregate demand in an open economy

The aggregate demand I

- The aggregate demand can be written as follows
  - $D = C(Y-T) + I + G + CA(EP^*/P), Y-T)$
  - $D = D(EP^*/P, Y-T, I, G)$
    - Here D is the aggregate demand, C is the private consumption; I and G are investment and government consumption respectively

1. Aggregate demand in an open economy

The aggregate demand II

- The real depreciation of domestic currency raises the demand for domestically produced goods.
- A real appreciation of domestic currency lowers the demand for domestically produced goods.
- An increase in income raises the demand for consumption, including the consumption for domestically produced goods, and thereby leading to a higher aggregate demand.

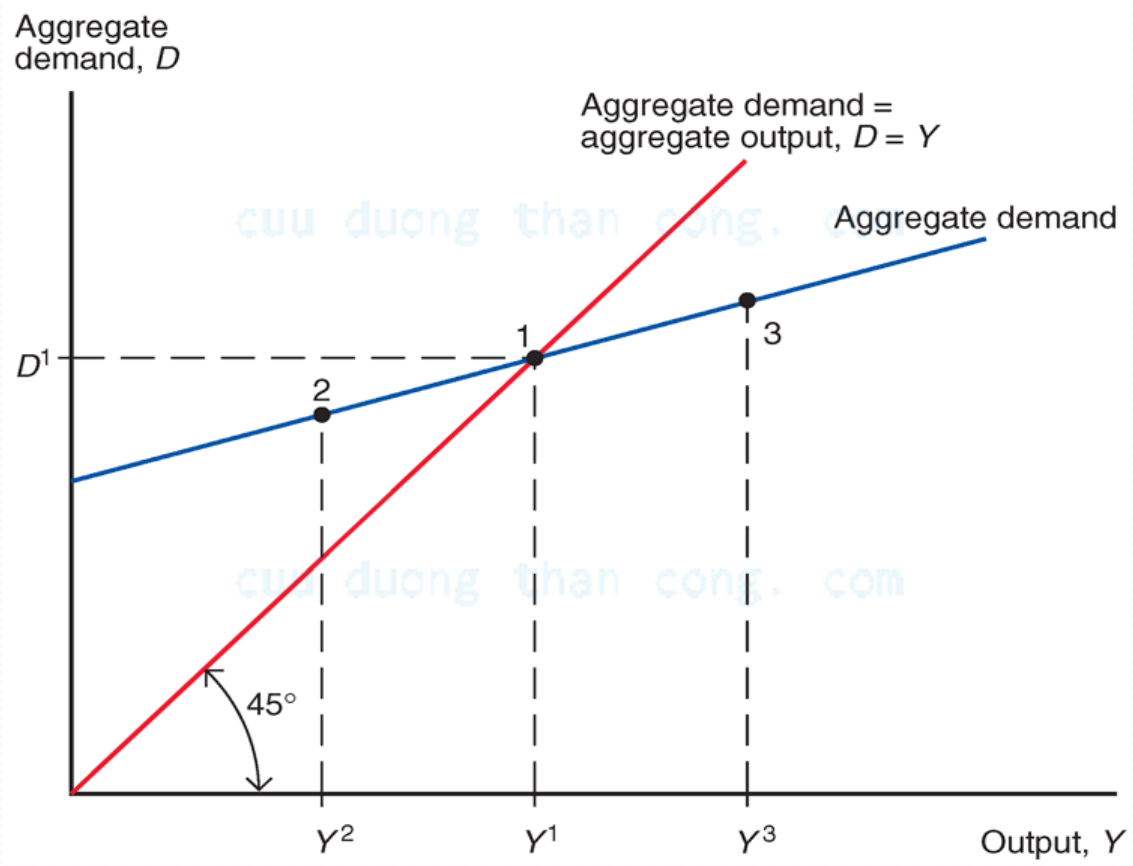
2. Output market equilibrium in the short-run

Short-run determination of output

- Long-term and short-term output
  - The long-term output is determined by the availability of production factors under the assumption of full- employment.
  - Since production factors are not fully employed, the short-term output are determined by the aggregate demand
- The output market is in equilibrium when the real output is equal to the aggregate demand
  - $Y = D(EP^*/P, Y-T, I, G)$

2. Output market equilibrium in the short-run

Determination of output in the short-run



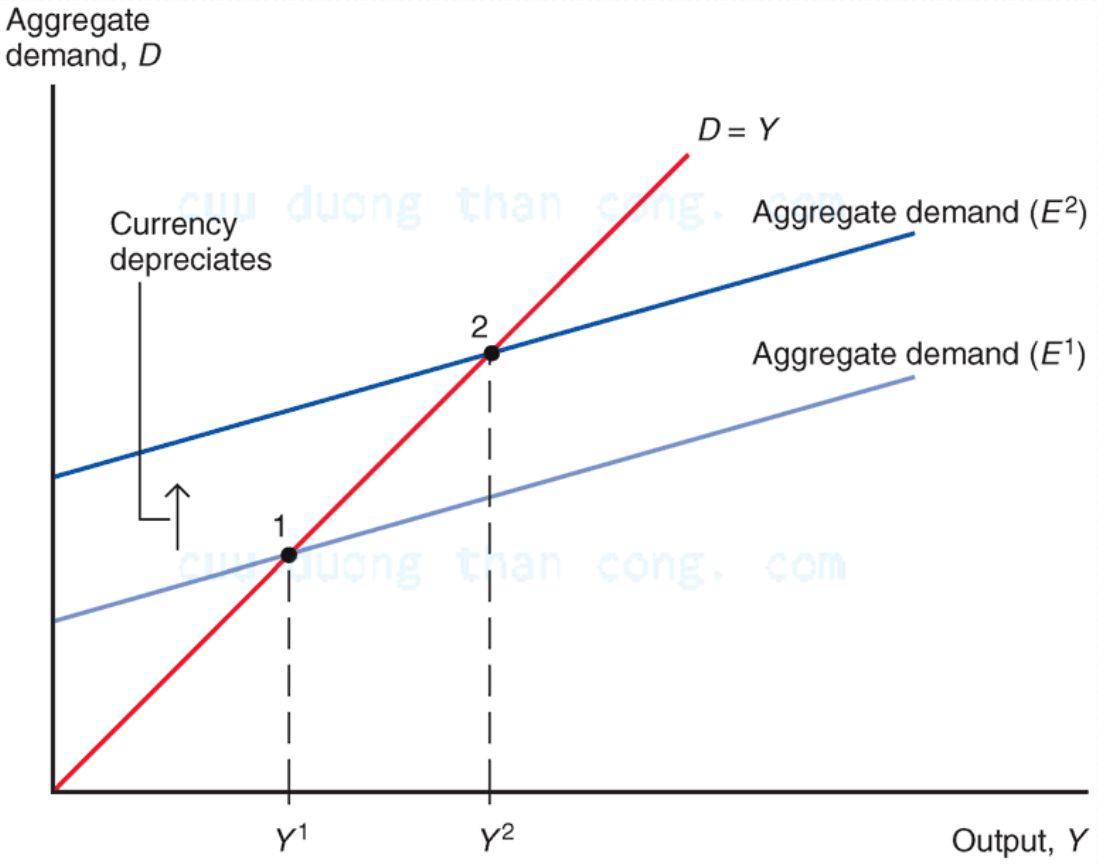
2. Output market equilibrium in the short-run

The DD schedule

- The DD schedule shows the combination of output and the exchange rate that maintain the short-run equilibrium in the output market.
  - A real depreciation of domestic currency) raises the demand for domestic goods and short-run output.
  - A real appreciation of domestic currency lowers the demand for domestic goods and leads to a decline in the short-run output

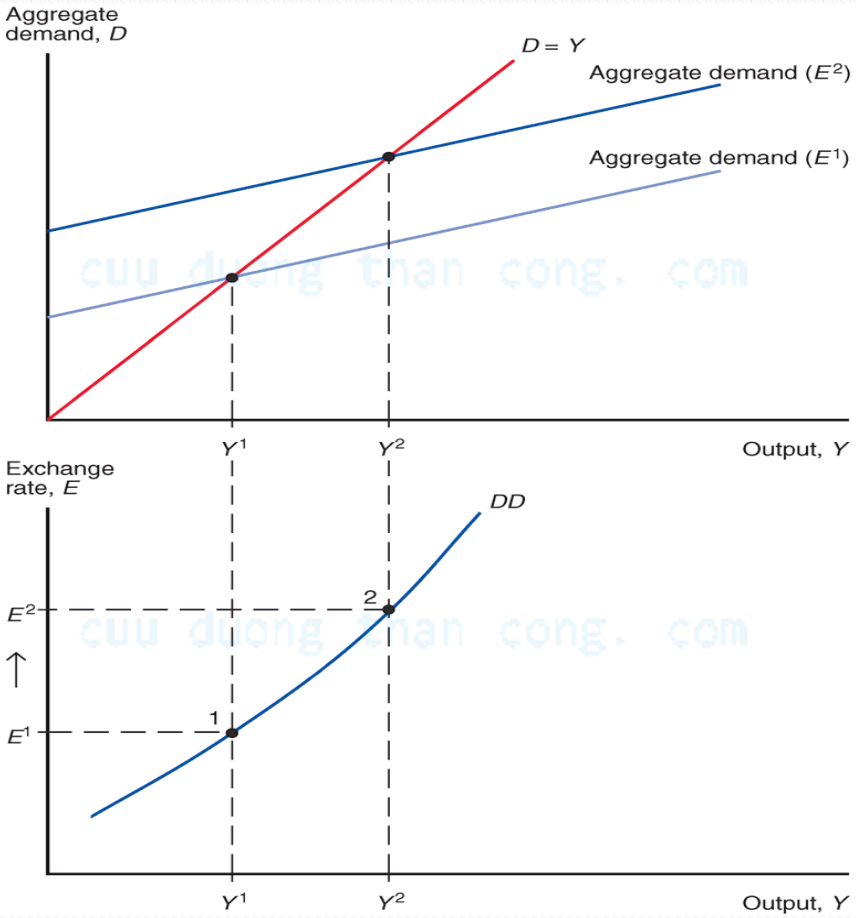
2. Output market equilibrium in the short-run

The DD schedule



2. Output market equilibrium in the short-run

The DD schedule



2. Output market equilibrium in the short-run

The factors that shift the DD schedule I

- The shift in the DD schedule is affected by various factors:
  - Government consumption (G): An increase in the government consumption raises the demand for domestic goods
  - Taxes: a higher tax rate reduces the demand for domestic goods
  - Investment: An increase in the investment raises the demand for domestic goods

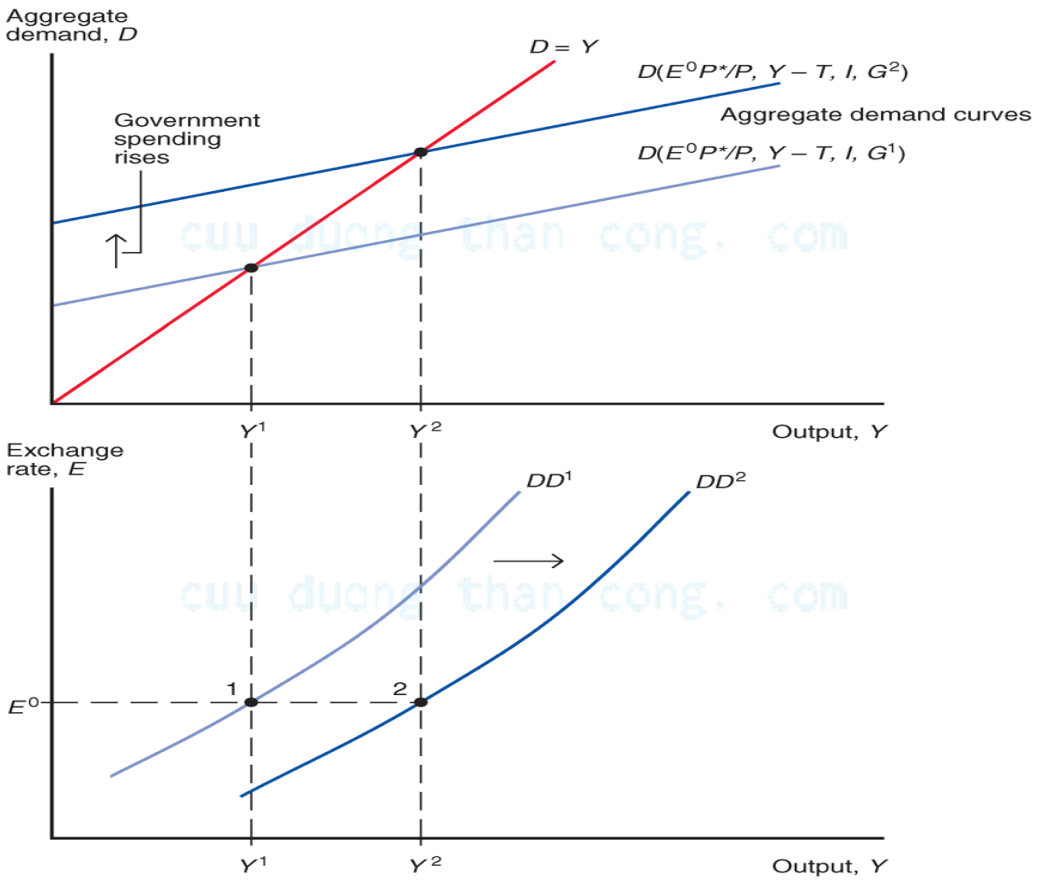
2. Output market equilibrium in the short-run

The factors that shift the DD schedule II

- Domestic prices: a change in domestic prices affects the real exchange rate and aggregate demand.
- Foreign prices: a change in foreign prices affects the real exchange rate and aggregate demand.
- Change in consumer's behaviors: an increase in household saving lowers the demand for goods and services
- Demand shift between domestic and foreign goods: a change in consumers' tastes in favors of domestic goods raises the aggregate demand and short-run output

2. Output market equilibrium in the short-run

Government demand and the DD schedule



3. The short-run equilibrium in the asset market

Equilibrium in the asset market

- The equilibrium in the asset market is derived from the equilibrium in the foreign exchange market and money market
  - $R = R^* + (E^e - E)/E$
  - $M^s/P = L(R,Y)$
- From these two equilibrium conditions, it is possible to determine a level of the exchange rate for any given level of output.

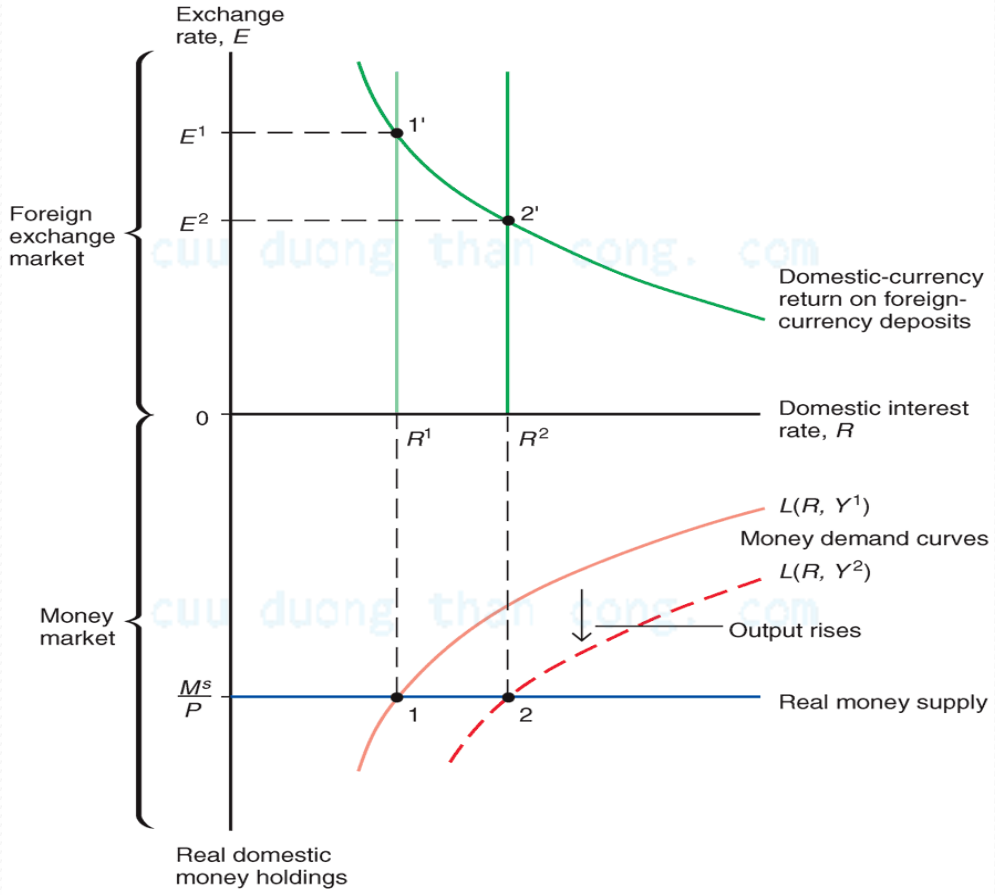
3. The short-run equilibrium in the asset market

Derivation of the AA schedule

- The AA schedule shows the combination of the exchange rate and output that maintain the equilibrium in the asset market
- The AA schedule has a negative slope, showing a negative correlation between the exchange rate and output.

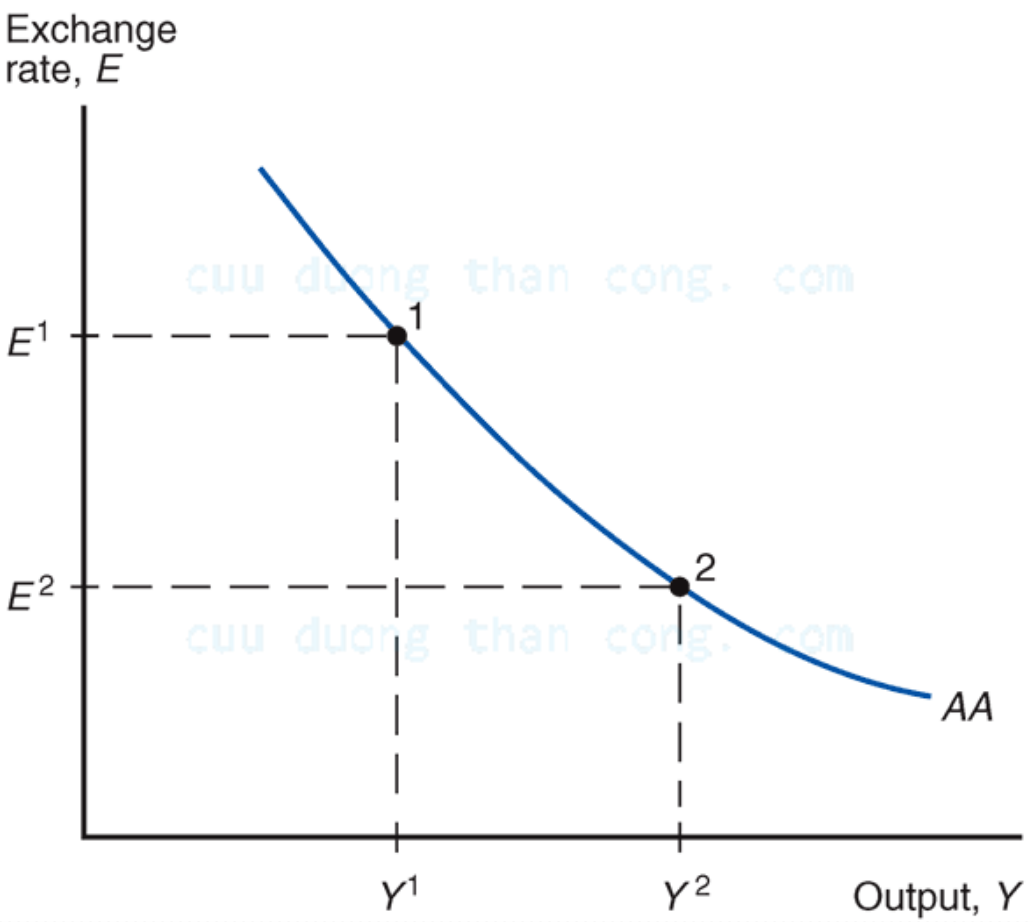
3. The short-run equilibrium in the asset market

Derivation of the AA schedule



3. The short-run equilibrium in the asset market

The AA schedule



3. The short-run equilibrium in the asset market

Factors that shift the AA schedule I

- There are various factors that lead to a shift in the AA schedule:
  - Domestic money supply: Monetary developments affect the nominal exchange rate.
  - Domestic prices: A change in domestic prices affects the real money supply.

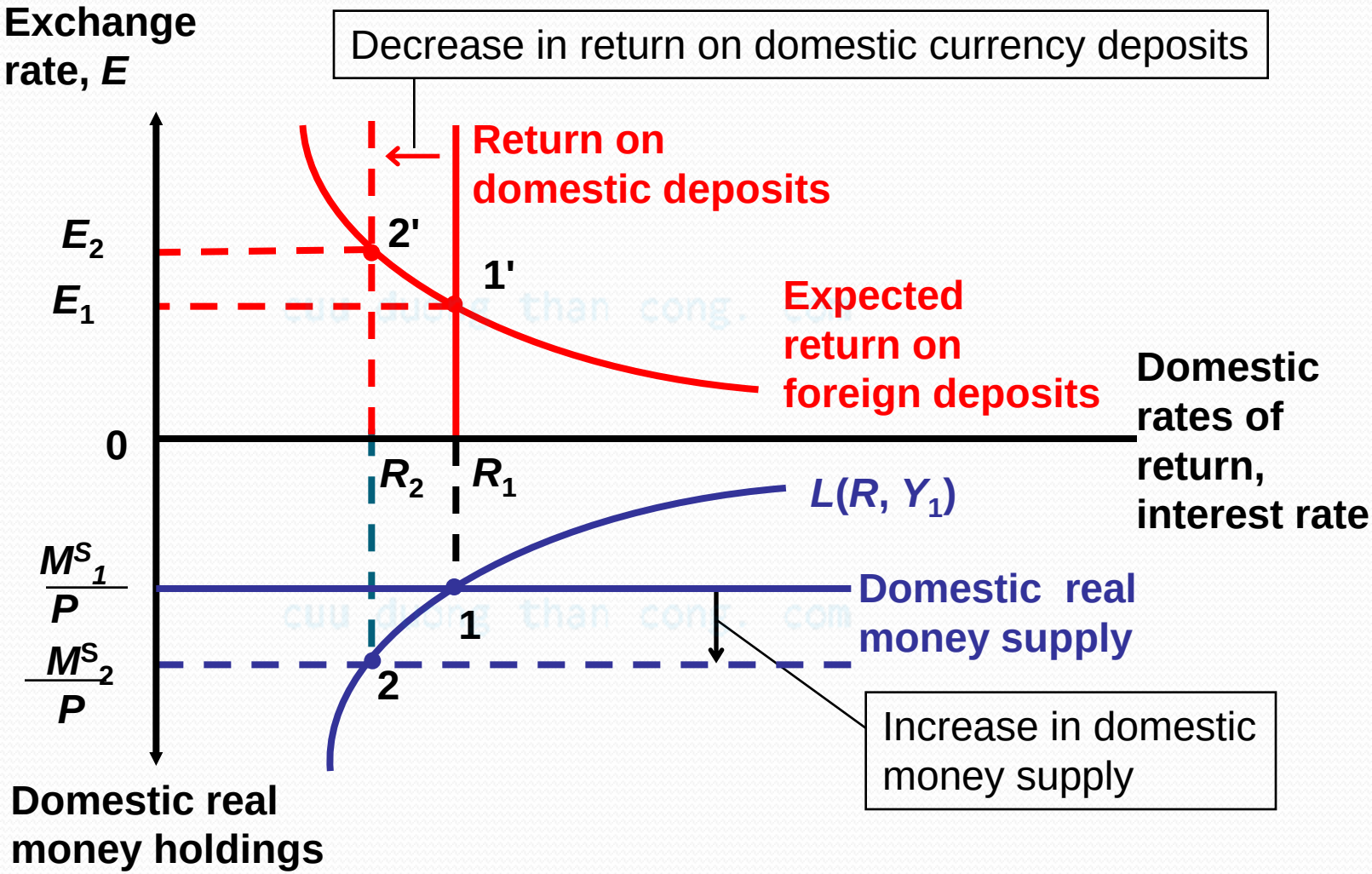
3. The short-run equilibrium in the asset market

Factors that shift the AA schedule II

- Expected exchange rates: A change in the expected exchange rate affects the current exchange rate.
- Foreign interest rates: A change in the foreign interest rate has effects on the exchange rate and asset markets.
- Aggregate money demand: a change in the aggregate money demand has a influences on the exchange rate and asset markets.

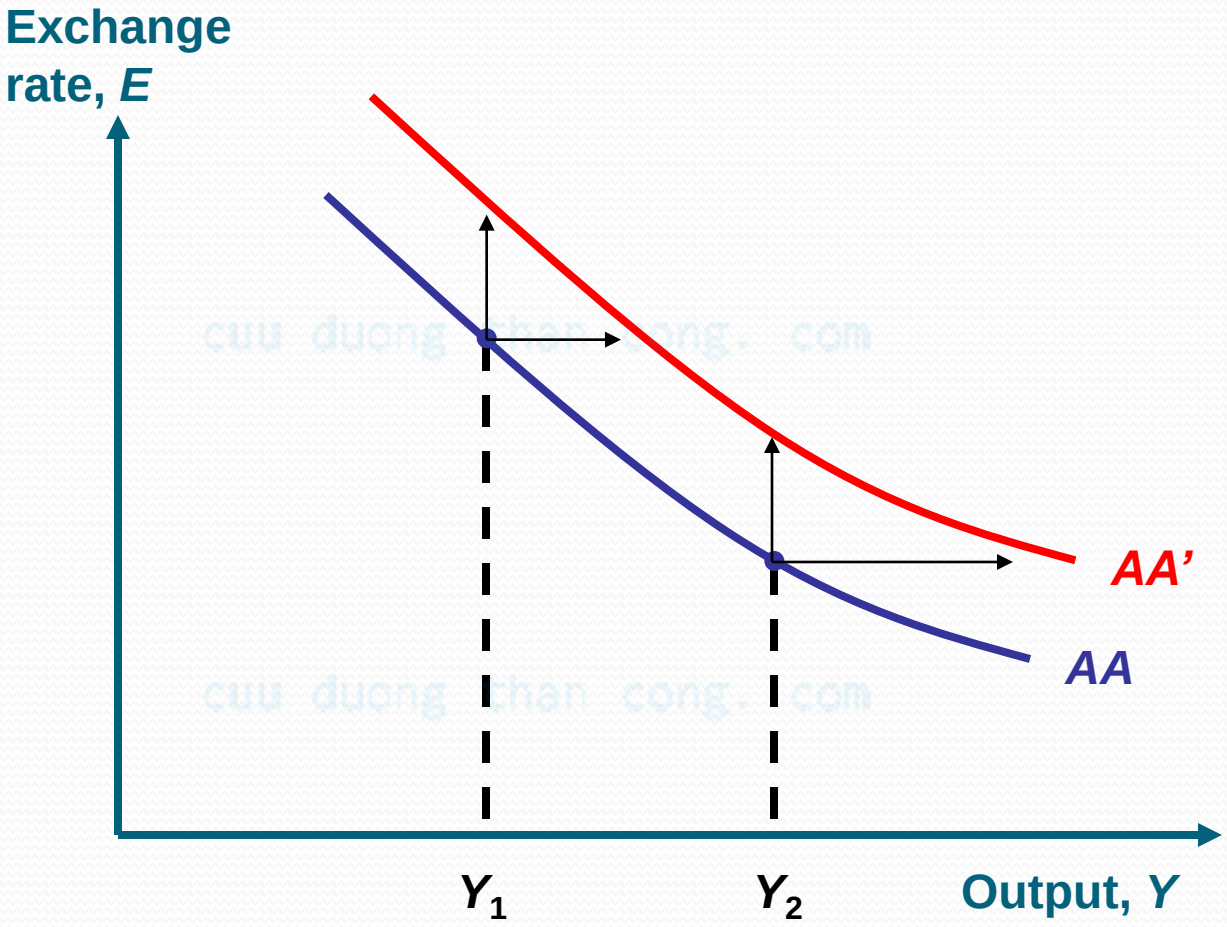
3. The short-run equilibrium in the asset market

Shifting the AA curve



3. The short-run equilibrium in the asset market

Shifting the AA curve



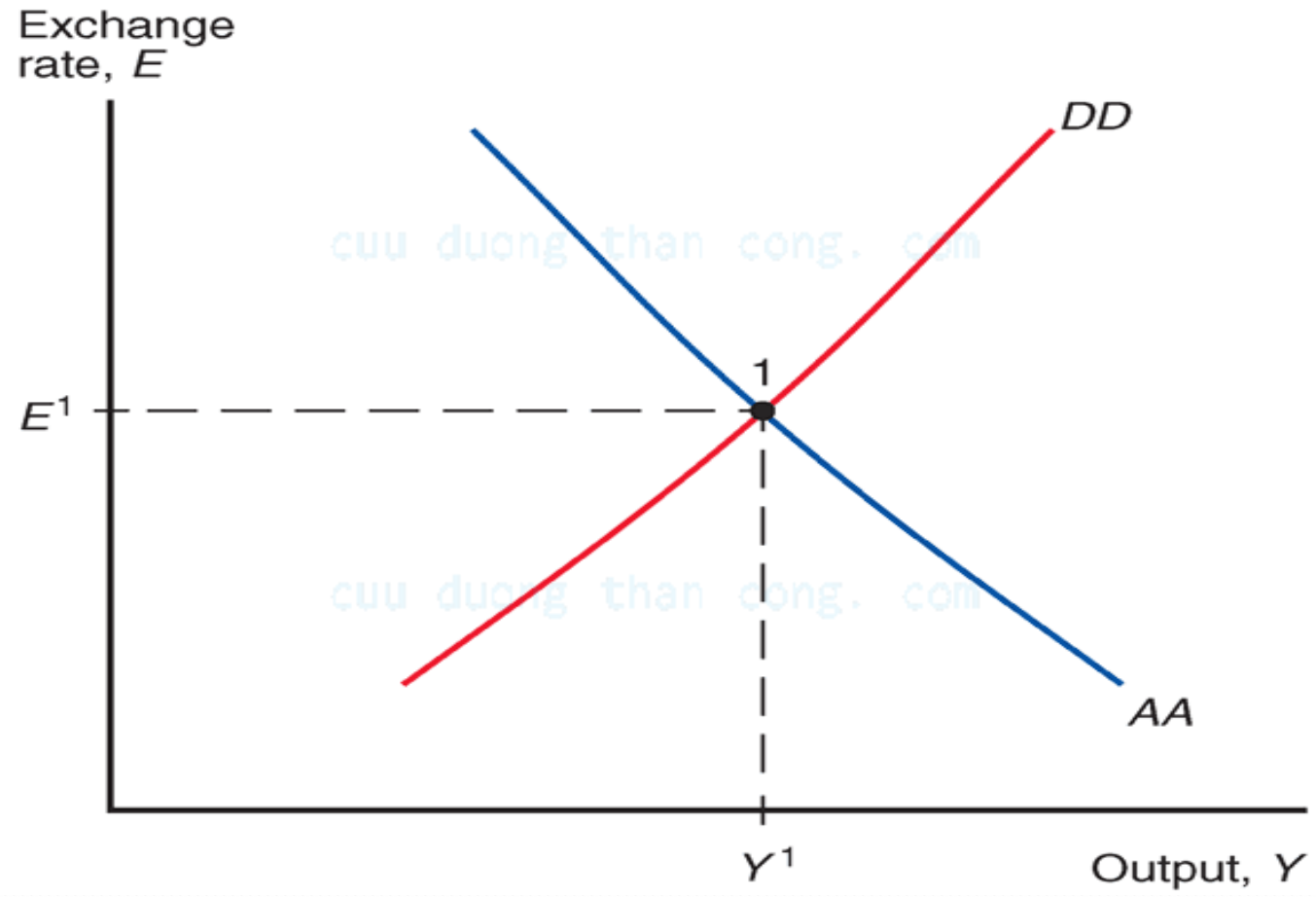
4. Short-run equilibrium in an open economy

Short-run equilibrium

- The economy is in the short-run equilibrium if there is simultaneous equilibrium in the asset market and the output market.
- The short-run equilibrium determines the combination of the exchange rate and output that maintain the equilibrium in the asset and product market.
- The short-run equilibrium assumes; i) prices are temporarily fixed; ii) no change in the expected exchange rate; iii) output is not at full-employment equilibrium.

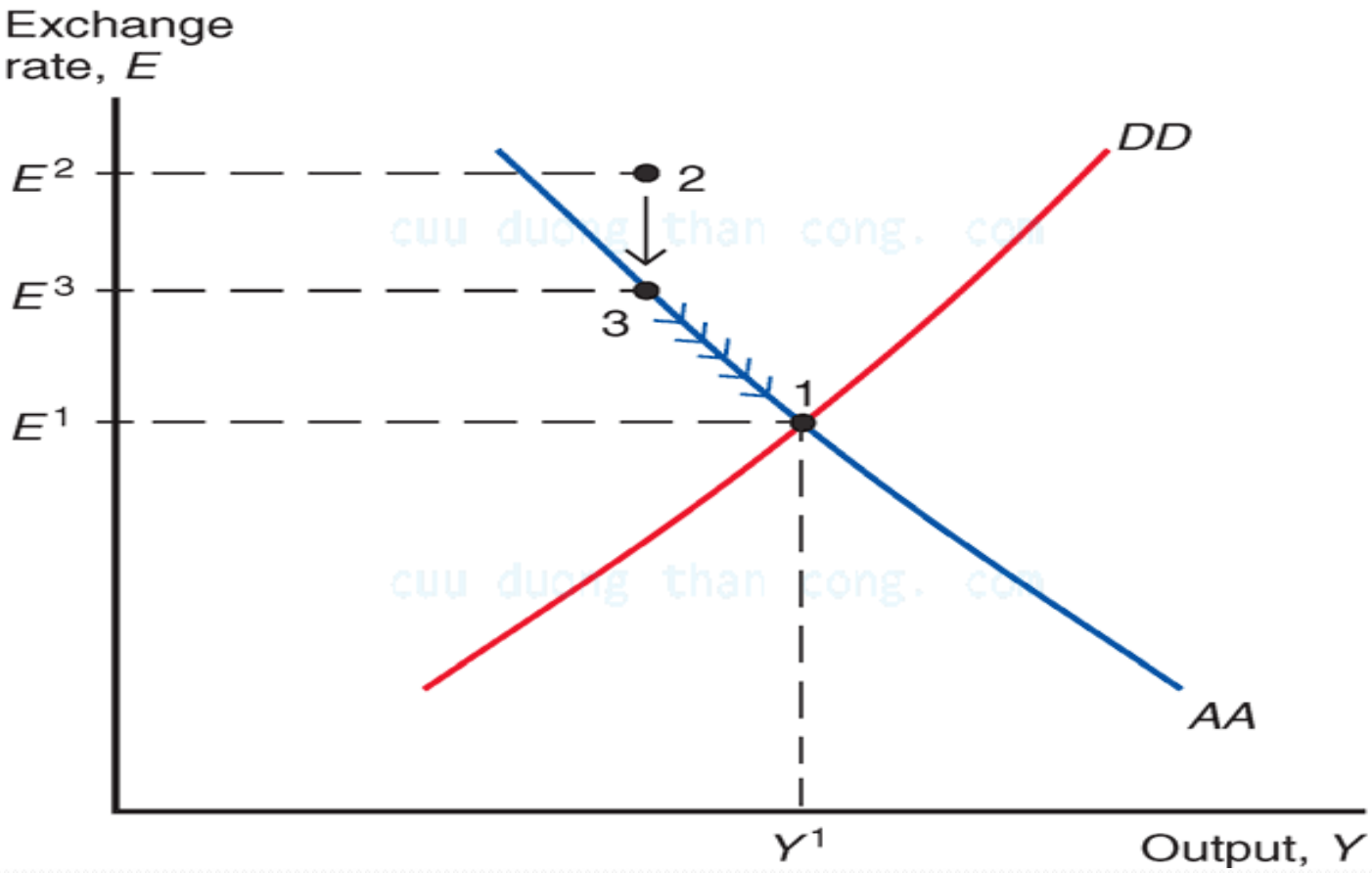
4. Short-run equilibrium in an open economy

Short-run equilibrium



4. Short-run equilibrium in an open economy

Adjustment to the short-run equilibrium



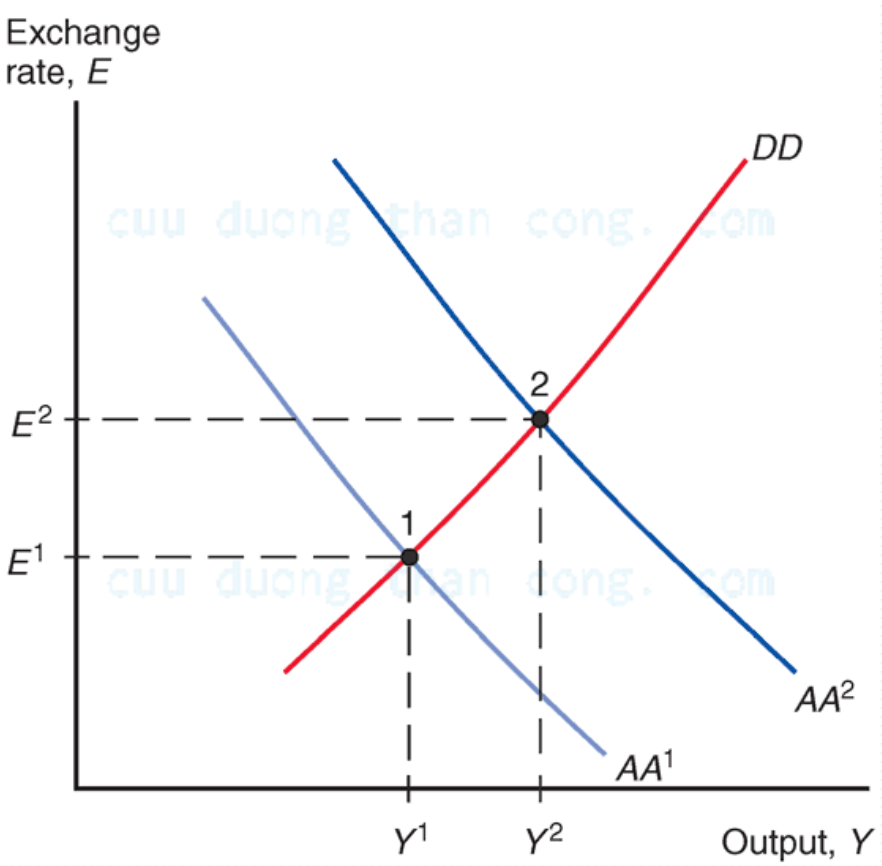
4. Short-run equilibrium in an open economy

Temporary changes in monetary policy

- Monetary policy: policy in which the central bank influences the supply of monetary assets.
  - Monetary policy is assumed to affect the asset markets first.
- The short-run effect of a temporary increase in the supply of money is to reduce the interest rate. It also causes an expansion in the domestic output and a depreciation of domestic currency.

4. Short-run equilibrium in an open economy

Temporary changes in monetary policy



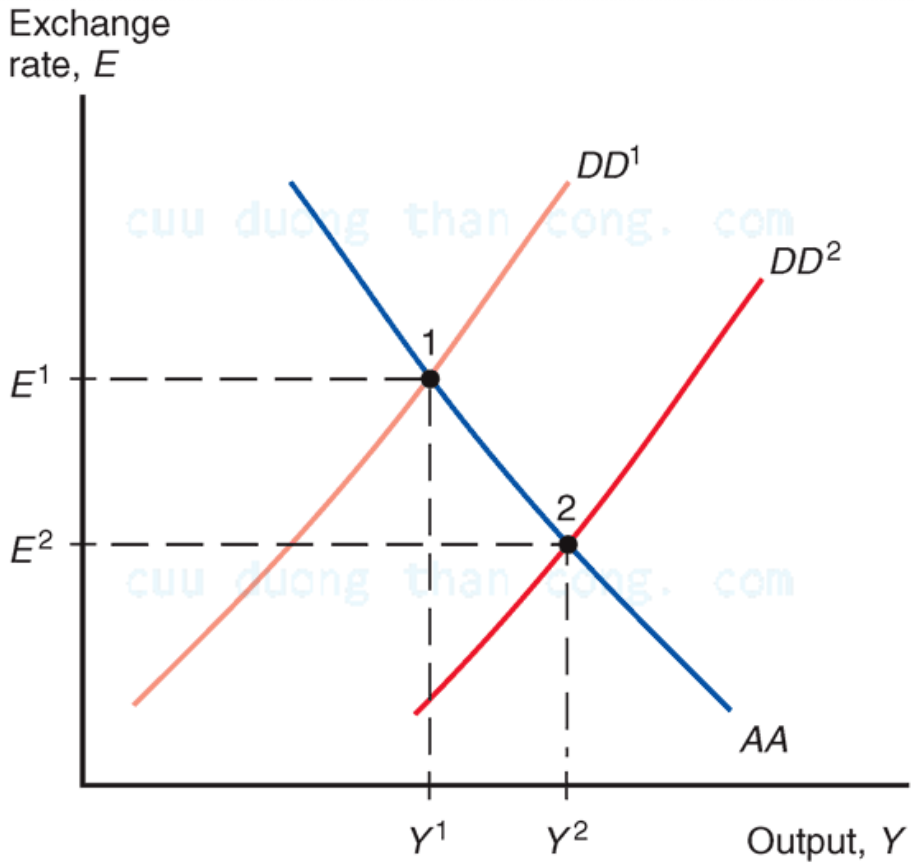
4. Short-run equilibrium in an open economy

Temporary changes in fiscal policy

- Fiscal policy: policy in which governments (fiscal authorities) influence the amount of government purchases and taxes.
  - Fiscal policy is assumed to affect aggregate demand and output first.
- Temporary changes in fiscal policy
  - The fiscal expansion can be conducted through the increase in government spending or tax cuts.
  - The effect of a temporary fiscal expansion are: i) higher demand for domestic products; Higher interest rate; and iii) the appreciation of domestic currency.

4. Short-run equilibrium in an open economy

Temporary changes in fiscal policy



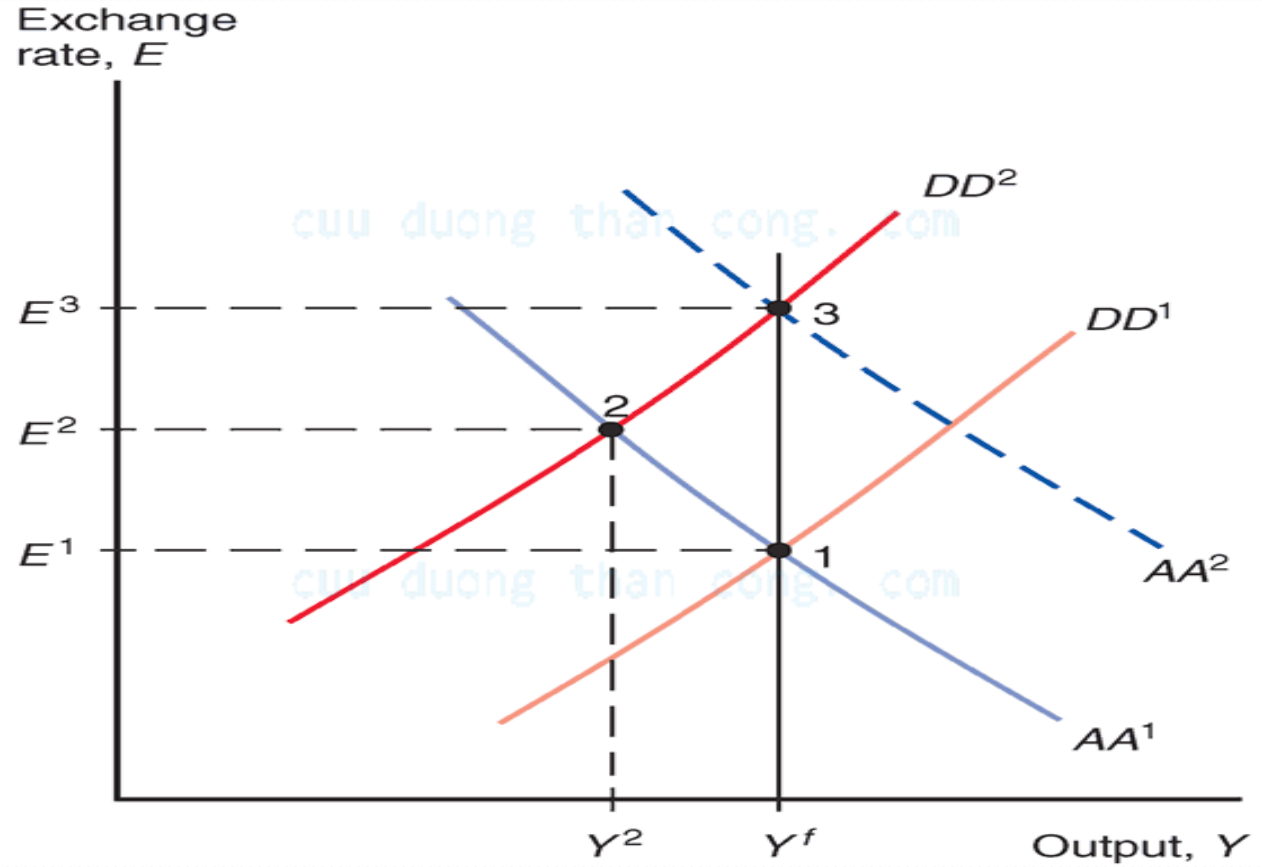
4. Short-run equilibrium in an open economy

Policies to maintain full employment

- If a external or internal shock causes domestic output to fall below the full employment level, the monetary and fiscal policies can be used to restore (or maintain) the full employment in the economy
  - The expansionary fiscal policy would raise the demand for domestic products and brought the output back to its full employment level;
  - The expansionary monetary policy leads to a reduction in the interest rate and the depreciation of domestic currency, which in turn lead to higher domestic demand and output

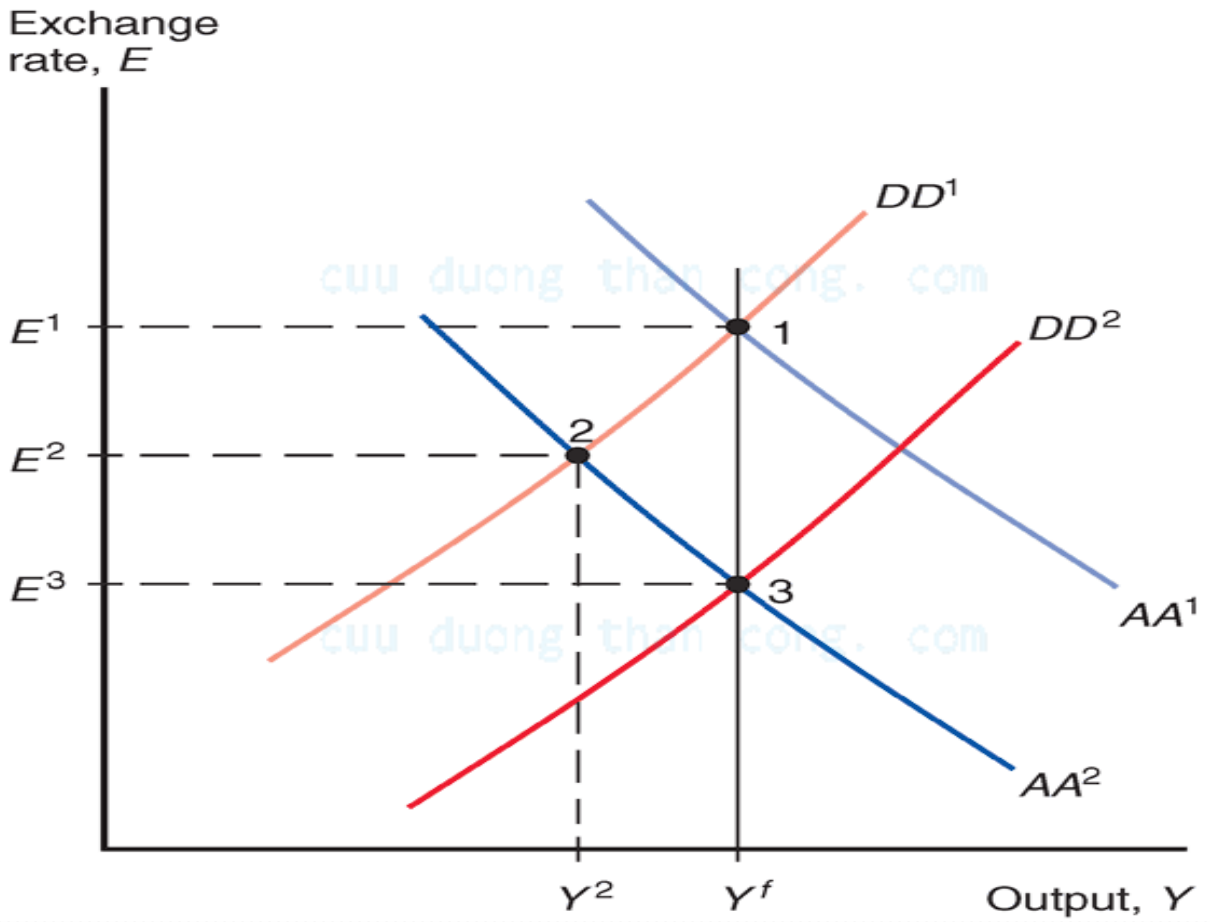
4. Short-run equilibrium in an open economy

A fall in the world demand for home products



4. Short-run equilibrium in an open economy

An increase in the money demand



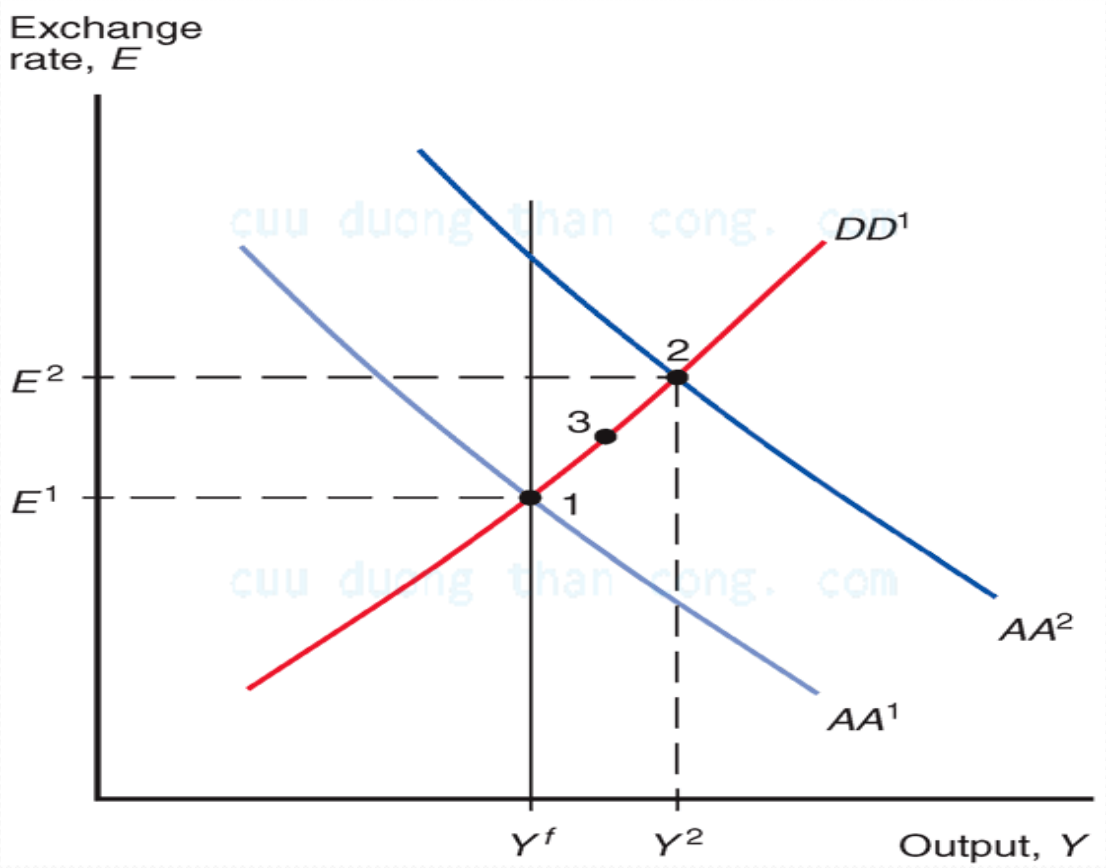
4. Short-run equilibrium in an open economy

Permanent changes in money supply

- In the short-run, a permanent increase in the supply of money causes an expansion in domestic output and a depreciation of domestic currency (to a greater extent as compared to the case of a temporary increase)
- Over time, domestic prices rise at the same rate as the supply of money, causing an appreciation of domestic currency. Domestic output falls back to its full employment level.

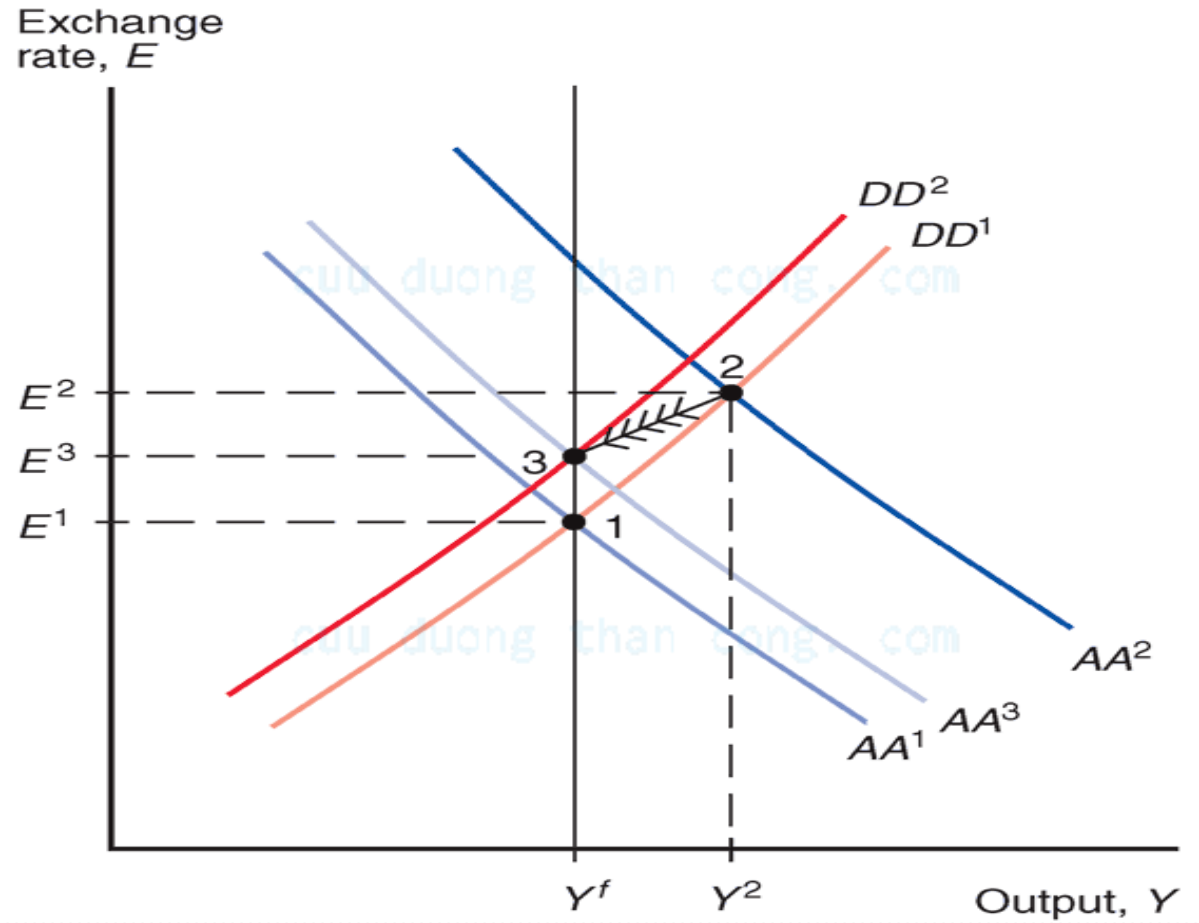
4. Short-run equilibrium in an open economy

Permanent changes in money supply: short-run effects



4. Short-run equilibrium in an open economy

Permanent changes in money supply: long-run adjustment



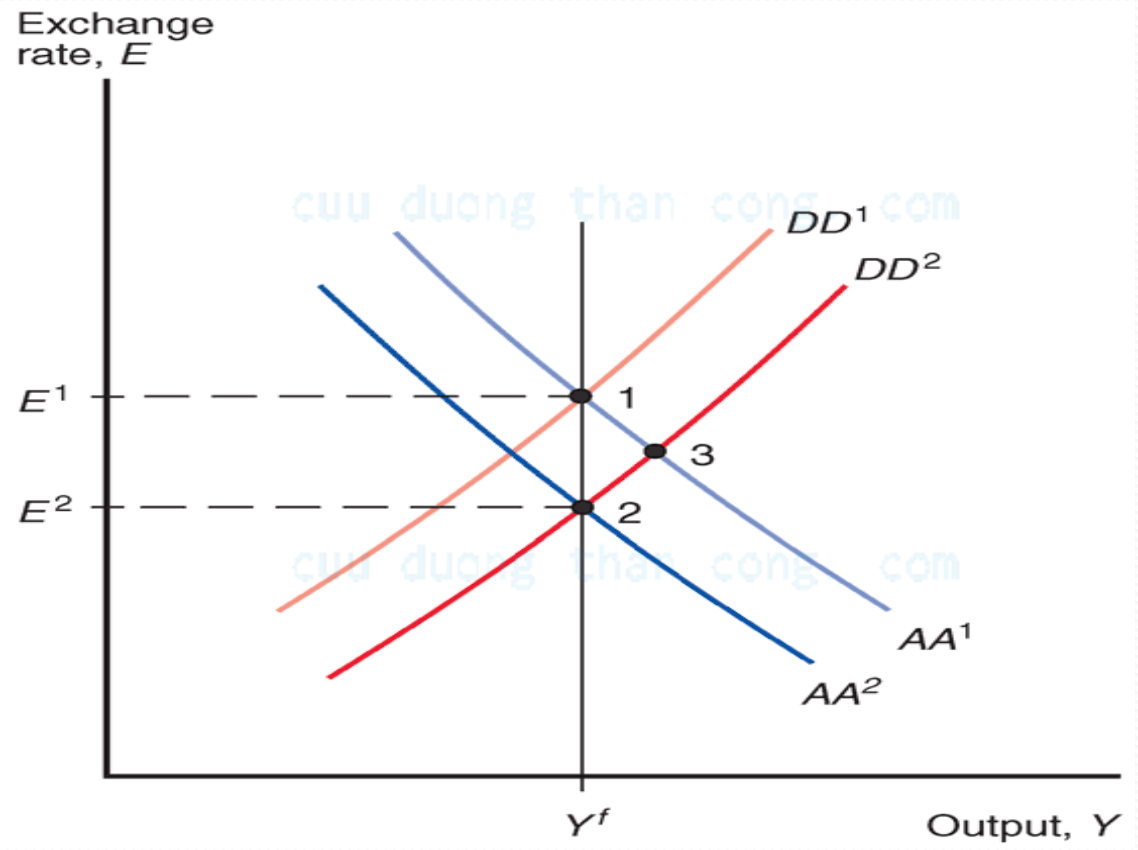
4. Short-run equilibrium in an open economy

Permanent changes in fiscal policy

- A permanent increase in government spending leads to a rise in the demand for domestic products and domestic output. Domestic currency appreciates to a greater extent as compared to the case of a temporary increase in the short-run.
- In the long-run, domestic output would fall back to the initial level as the increase in government spending is crowded out by the appreciation of domestic currency.

4. Short-run equilibrium in an open economy

Permanent changes in fiscal policy



5. Macroeconomic policies and the current account

The current account balance

- The current account balance schedule (XX schedule) shows the combination of the exchange rate and output that maintain the current account balance at the desired level.
  - The XX schedule is upward sloped, and is always flatter than the DD schedule.
  - In the short-run, the current account balance may not be at the desired level and the economy is not necessarily at the XX schedule.

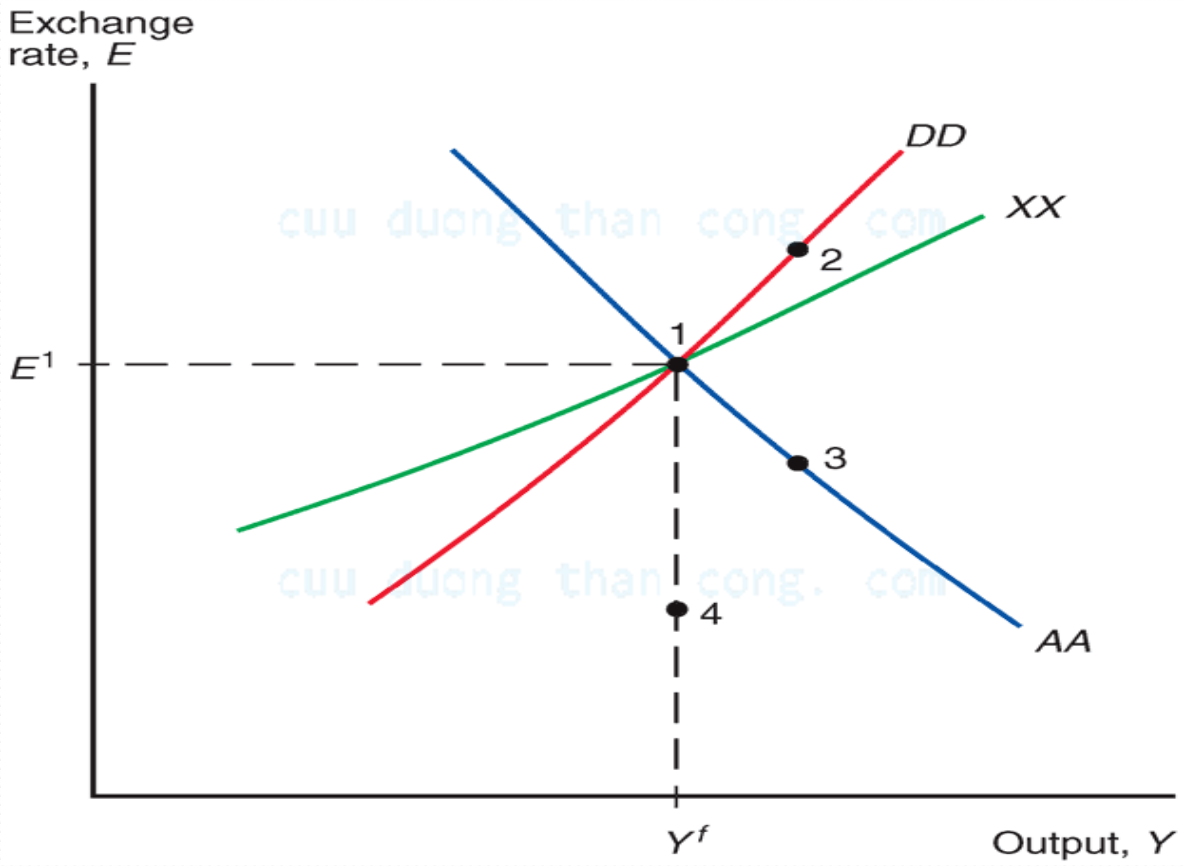
5. Macroeconomic policies and the current account

The current account balance and macroeconomic policy

- Macroeconomic policies have an effect on the current account balance
  - Monetary expansion raises the short-run output and improves the current account balance.
  - Fiscal expansion leads to higher output but worsens the current account balance in the short-run.

5. Macroeconomic policies and the current account

The current account balance and macroeconomic policy



5. Macroeconomic policies and the current account

Current account adjustment and J-curve

- The AA-DD model assumes that currency devaluation always improve the current account balance. In reality, however, the effect of currency devaluation on the current account varies over time and between countries. Due to the existence of the production and consumption lags, trade flows gradually adjust to the change in the exchange rate.
- Empirical studies show that the current account deteriorates initially after currency devaluation, and the adjustment in the current account may last from 6 months to one year.

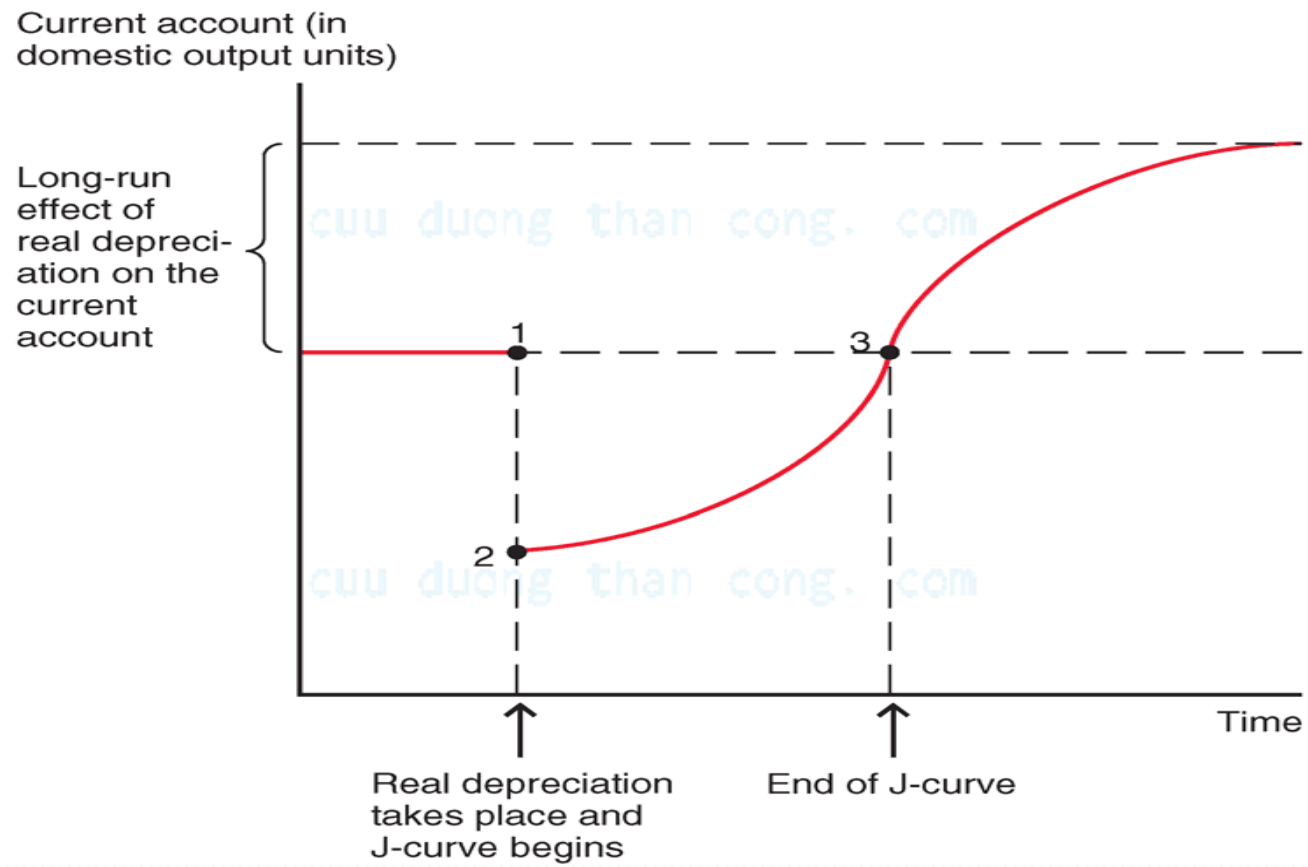
5. Macroeconomic policies and the current account

J-curve, production and consumption lags

- The J-curve theory postulates that the adjustment of the current account follows a J-curve. The current account worsens immediately after a depreciation of domestic currency, and it starts to improve later.
  - Export and import contracts: the volume and price of export and import are determined in advance
  - Lags in production: firms need time to expand production in response to currency devaluation.
  - Lags in consumption: it takes time to switch from foreign products to domestic products

5. Macroeconomic policies and the current account

J-curve, production and consumption lags



5. Macroeconomic policies and the current account

Exchange rate pass-through

- The exchange rate pass-through refers to the change in the price of imports caused by a given change in the exchange rate.
- In the AA-DD model, we assume acomplete pass through (100% pass through)
- The exchange rate pass-through may not be complete due to the presence of imperfect competition and differentiated pricing.
- Incomplete pass-through makes the adjustment of the current account more complicated.

- Thank You