CHAPTER 7
OPEN ECONOMY MACROECONOMICS: BASIC CONCEPTS

CONTENTS

- This chapter introduces basic concepts of international macroeconomics:
  - The trade balance (trade deficits, surpluses)
  - International flows of assets
  - Exchange rates
  - Foreign Exchange market
  - Foreign Exchange Systems

Closed vs. Open Economies

- A **closed economy** does not interact with other economies in the world.
- An **open economy** interacts freely with other economies around the world.

The flow of Goods & Services

- **Exports:**
  Domestically – produced g&s sold abroad
- **Imports:**
  Foreign- produced g&s sold domestically
- **Net exports (NX):** value of exports – value of imports
  NX are also called the **trade balance**

Trade Surpluses & Deficits

- NX measures the imbalance in a country's trade in goods and services.
  - **Trade deficit:** an excess of imports over exports
  - **Trade surplus:** an excess of exports over imports
  - **Balanced trade:**
    when exports = imports

Factors that Influence Net Exports

- Consumers' preference for foreign and domestic goods.
- Incomes of consumers at home and abroad.
- Prices of goods at home and abroad.
- The exchange rate at which foreign currency trades for domestic currency.
- Transportation costs.
- Govt policies – tax, subsidies, quota, embargo

The flow of Financial Resources

- **Net capital outflow (NCO):** domestic residents' purchases of foreign assets minus foreigners' purchases of domestic assets.

The flow of Financial Resources

- When a U.S. resident buys stock in the Toyota corporation, the Japan car company ---> the purchase raised U.S. net capital outflow.
- When a Mexican buys stock in the Ford Motor corporation, the U.S. car company ----> the purchase reduced U.S. net capital outflow.

The flow of Financial Resources

- **NCO** is also called **net foreign investment**

  The flow of capital abroad takes two forms:
  - **Foreign direct investment:**

    Domestic residents actively manage the foreign investment. Ex: McDonalds opens fast food outlets in other countries.
  - **Foreign portfolio investment:**

    Domestic residents purchase foreign stocks or bonds, supplying "loanable funds" to a foreign firm.

The flow of Financial Resources

NCO measures the imbalance in a country's trade in assets:

- When ***NCO > 0***, "capital outflow"
  Domestic purchases of foreign assets exceed foreign purchases of domestic assets.
- When ***NCO < 0***, "capital inflow"
  Foreign purchases of domestic assets exceed domestic purchases of foreign assets.

Variables that Influence NCO

- Real interest rates paid on foreign assets
- Real interest rates paid on domestic assets
- Perceived risks of holding foreign assets
- Govt policies affecting foreign ownership of domestic assets

The Equality of NX and NCO

- An accounting identify: **NCO = NX**
  - arises because every transaction that affects ***NX*** also affects ***NCO*** by the same amount (and vice versa)
- When a foreigner purchases a good from the U.S.
  - U.S. exports and ***NX*** increase
  - The foreigner pays with currency or assets, so the U.S. acquires some foreign assets, causing ***NCO*** to rise.

The Equality of NX and NCO

- An accounting identify: **NCO = NX**
  - arises because every transaction that affects ***NX*** also affects ***NCO*** by the same amount (and vice versa)
- When a U.S. citizen buys foreign goods,
  - U.S. imports rise, ***NX*** falls
  - the U.S. buyer pays with U.S. dollars or assets, so the other country acquires U.S. assets, causing U.S. ***NCO*** to fall.

International Flows

- Net exports is a component of GDP:

$$Y = C + I + G + NX$$

- National saving is the income of the nation that is left after paying for current consumption and government purchases:

$$Y - C - G = I + NX$$

International Flows

- National saving (*S*) equals *Y* - *C* - *G* so:

$$S = I + NX$$

or

Saving	=	Domestic Investment	+	Net Capital Outflow
S	=	**I**	+	**NCO**

International Flows

- ***When S > I, its NCO is positive,*** the excess loanable funds flow abroad in the form of positive net capital outflow.
- ***When S < I, its NCO is negative,*** foreigners are financing some of the country's investment by purchasing domestic assets.

Table 1 International Flows of Goods and Capital: Summary

Three possible outcomes for an open economy:

Trade Deficit	Balanced Trade	Trade Surplus
X < M	X = M	X > M
NX < 0	NX = 0	NX > 0
Y < C +I+G	Y = C + I+ G	Y > C +I+G
S < I	S = I	S > I
NCO <0	NCO = 0	NCO > 0

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The Nominal Exchange Rate

- **Nominal exchange rate:** the rate at which a person can trade the currency of one country for the currency of another.

The Nominal Exchange Rate

- The nominal exchange rate is expressed in two ways:
  - In units of foreign currency per one U.S. dollar.
  - And in units of U.S. dollars per one unit of the foreign currency.

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The Nominal Exchange Rate

- Assume the exchange rate between the Japanese yen and U.S. dollar is 80 yen to one dollar.
  - One U.S. dollar trades for 80 yen.
  - One yen trades for 1/80 (= 0.0125) of a dollar.

Appreciation and Depreciation

- **Appreciation** (or "strengthening"):
  an increase in the value of a currency as measured by the amount of foreign currency it can buy.
- **Depreciation** (or "weakening"):
  a decrease in the value of a currency as measured by the amount of foreign currency it can buy.

The Real Exchange Rate

- **Real exchange rate:** the rate at which a person can trade the g&s of one country for the g&s of another.
- Real exchange rate = $\frac{e \times P}{P_*}$

  Where

  P = domestic price

  P* = foreign price (in foreign currency)

  e = nominal exchange rate, i.e., foreign currency per unit of domestic currency

Example With One Good

- A Big Mac costs $2.50 in U.S., 400 yen in Japan
- e = 120 yen per $
- e x P = price in yen of a U.S Big Mac
  - = (120 yen per $) x ($2.50 per Big Mac)
  - = 300 yen per U.S Big Mac

Example With One Good

- Compute the real exchange rate:

$$\frac{e \times P}{P_*} = \frac{300 \text{ yen per U.S Big Mac}}{400 \text{ yen per Japanese Big Mac}}$$

= **0.75** Japanese Big Macs per US Big Mac

Interpreting the Real Exchange Rate

- "The real exchange rate = 0.75 Japanese Big Macs per U.S Big Mac"
- **Correct interpretation:**
  To buy a Big Mac in the U.S, a Japanese citizen must sacrifice an amount that could purchase 0.75 Big Macs in Japan.

ACTIVE LEARNING
Compute a real exchange rate

- e = 10 pesos per $
- Price of a tall Starbucks Latte

P = $3 in U.S, P* = 24 pesos in Mexico

A. What is the price of a US latte measured in pesos?

B. Calculate the real exchange rate, measured as Mexican lattes per US latte.

ACTIVE LEARNING
Answers

- e = 10 pesos per $
- Price of a tall Starbucks Latte

P = $3 in U.S, P* = 24 pesos in Mexico

A. What is the price of a US latte in pesos?

e x P = (10 pesos per $) x (3$ per US latte)

= 30 pesos per US latte

B. Calculate the real exchange rate.

$$\frac{e \times P}{P*} = \frac{30\ pesos\ per\ U.S\ latte}{24\ pesos\ per\ Mexican\ latte}$$

= **1.25** Mexican lattes per US latte

The Real Exchange Rate With Many Goods

- ***P*** = U.S. price level, e.g., CPI measures the price of a basket of goods
- ***P**** = foreign CPI
- Real exchange rate
  = ***(e x P)/P****
  = price of a domestic basket of goods relative to price of a foreign basket of goods
- ***An appreciation of US real exchange rate means U.S. goods is becoming more expensive relative to foreign goods.***

The Law of One Price

- **Law of one price:** the notion that a good should sell for the same price in all markets.
  - Suppose coffee sells for $4/pound in Seattle and $5/pound in Boston, and can be costlessly transported.
  - There is a chance for **arbitrage**, making a quick profit by buying coffee in Seattle and selling it in Boston.
  - Such arbitrage drives up the price in Seattle and drives down the price in Boston, until the 2 prices are equal.

Purchasing – Power Parity (PPP)

- **Purchasing – Power Parity:** a theory of exchange rates whereby a unit of any currency should be able to buy the same quantity of goods in all countries.
- Based on the law of one price
- Implies that nominal exchange rate adjust to equalize the price of a basket of goods across countries

PPP and Its Implications

- If the purchasing power of the dollar is always the same at home and abroad, then the real exchange rate cannot change.
- According to the theory of PPP, the nominal exchange rate between the currencies of two countries must reflect the different price levels in those countries.

Purchasing – Power Parity (PPP)

- Example: The "basket" contains a Big Mac.

P = price of US Big Mac (in dollars)
P* = price of Japanese Big Mac (in yen)
e = exchange rate, yen per dollar

- According to PPP, **e x P = P***

Price of US Big Mac, in yen

Price of Japanese Big Mac, in yen

- Solve for e: **e = P*/P**

PPP and Its Implications

- PPP implies that the nominal exchange rate between two countries should equal the ratio of price levels. **e = P*/P**
- If the 2 countries have different inflation rates, then e will change over time:
  - If inflation in Japan is higher than in US, then P* rises faster than P, so e rises – US dollar ***appreciates*** against the yen.
  - If inflation in US is higher than in Japan, then P rises faster than P*, so e falls – US dollar ***depreciates*** against the dollar.

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PPP and Its Implications

- When the central bank prints large quantities of money, the money loses value both in terms of the goods and services it can buy and in terms of the amount of other currencies it can buy.

THE FOREIGN CURENCY MARKET
Supply of Foreign Currency

- **The supply of foreign currency** originates from all international transactions of Vietnam which create the income of foreign currency.
  - Foreigners without VND but they want to buy Vietnamese G&S.
  - Foreigners buy stocks, shares and real estates in Vietnam.
  - Export.

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Supply of Foreign Currency

- **The FC supply curve:**
  - Slope upward
  - Reflect when the foreign currency appreciates against VND, there will be more foreign currencies supplied to convert into VND.

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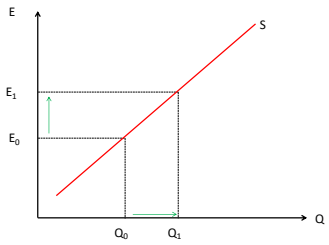
Supply for Foreign Currency



Demand for Foreign Currency

- **Demand of foreign currency:** originates from all international transactions of Vietnam in which a settlement in foreign currency is made to foreigners.
  - Import.
  - Domestic citizens want to transfer money to abroad to buy financial assets there.
  - Travel, study abroad…

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Demand for Foreign Currency

- **The FC demand curve:**
  - Slope downward
  - Reflect an inverse relationship between the exchange rate and the demand for foreign currency.

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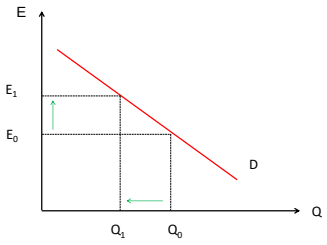
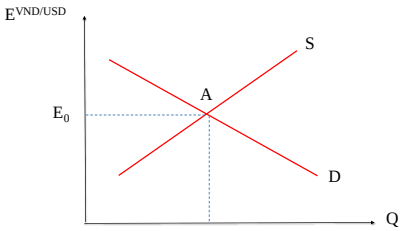
Demand for Foreign Currency



Determine the Equilibrium Exchange Rate



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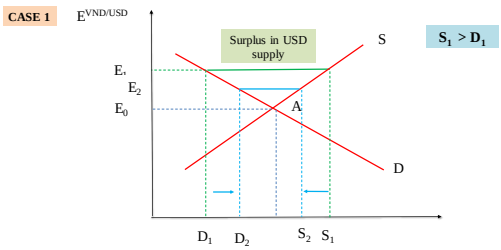
Determine the Equilibrium Exchange Rate



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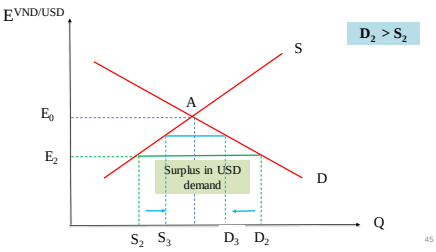
Determine the Equilibrium Exchange Rate

CASE 2



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Determinants of Exchange Rate changes

- The direct cause to the change in exchange rate is the change in supply and demand in the foreign market.
- ***So,***

What determines the movement in the supply curve and the demand curve?

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Determinants of Exchange Rate changes

- **An increase in the domestic price of export.**
- **Ex:** due to Coronavirus disease 2019, the price in VND of *face mask* has increased. With other factors unchanged, how will it affect the demand for USD?

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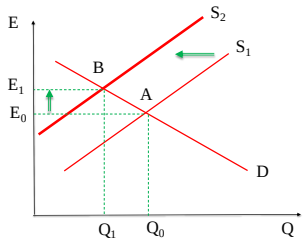
An increase in the domestic price of export

- CASE 1:

If D_{china} for this goods strongly elastic
→ Buy less from China
→ S_{USD} falls



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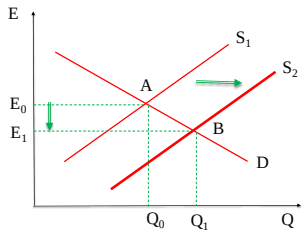
An increase in the domestic price of export

- CASE 2:

If D_{china} for this goods less elastic

→ Buy still more from China
→ S_{USD} rises



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Determinants of Exchange Rate changes

- An increase in the international price of import.
- Ex: due to Coronavirus disease 2019, the price in USD of respirator has increased. With other factors, how will it affect

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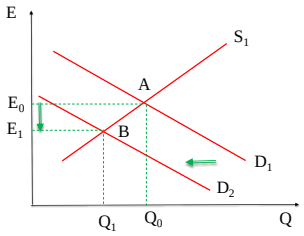
An increase in the international price of import

- CASE 1:

If D_{VN} for this goods strongly elastic
→ Buy less from VN
→ D_{USD} falls
→ E falls, VND appreciates against USD



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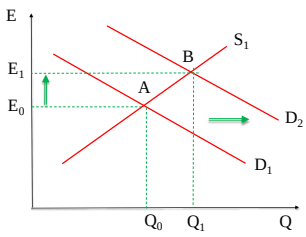
An increase in the international price of import

- CASE 2:

If D_{VN} for this goods less elastic

→ Buy more from VN
→ D_{USD} rises
→ E rises, VND depreciates against USD



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Determinants of Exchange Rate changes

- The movement of the international capital flow

i_{VN} -> i_{world} -> capital inflow -> S_{USD} rises -> E falls

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Determinants of Exchange Rate changes

- The speculation

  If USD is predicted to rise in the future -> D_{USD} rises

  ->E rises

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EXCHANGE RATE SYSTEMS

- Floating exchange rate system
  - A system in which the exchange rate is determined by the law of S-D in the foreign currency market without any intervention of State Bank.

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EXCHANGE RATE SYSTEMS

- Floating exchange rate system
  - ***Strength:*** flexible and easily adapt to the frequently fluctuating global and domestic market.
  - ***Weakness:*** frequent fluctuation of the exchange rate causes risks and uncertainty to transactions in global trade and finance.

=> export-import firms can reduce risks in the short-term by buying option contracts for exchange rate.

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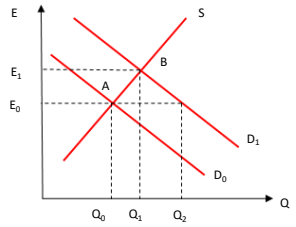
Floating exchange rate system



EXCHANGE RATE SYSTEMS

- Fixed exchange rate system
  - A system in which Central Bank announces and commits to interfering to remain a fixed exchange rate.
  - **Advocate:** this system reduces risks related to the fluctuation in the exchange rate.

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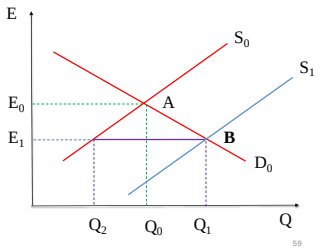
Fixed exchange rate system

- **Case 1:**

E_1 : $Q_D = Q_1 > Q_S = Q_2$

E_1 : shortage of USD

E_1 : CB sells out ($Q_1 - Q_2$) USD



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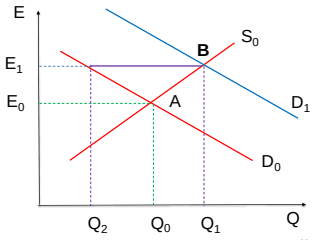
Fixed exchange rate system

- **Case 2:**

$E_1 : Q_S = Q_1 > Q_D = Q_2$

E_1 : surplus in USD

E_1 : CB buys $(Q_1 - Q_2)$ USD



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EXCHANGE RATE SYSTEMS

- Controlled Floating exchange rate system
  - A system in which the exchange rate is decided by the law of S-D in the market. However, CB will have some intervention to limit or narrow the swinging amplitude of the exchange rate.

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Summary

- Net exports equal exports minus imports.
- Net capital outflow equals domestic residents' purchases of foreign assets minus foreigners' purchases of domestic assets.
- Every international transaction involves the exchange of an asset for a good or service, so net exports equal net capital outflow.

Summary

- Saving can be used to finance domestic investment or to buy assets abroad. Thus, saving equals domestic investment plus net capital outflow.
- The nominal exchange rate is the relative price of the currency of two countries.
- The real exchange rate is the relative price of the goods and services of the two countries.

Summary

- According to the theory of purchasing-power parity, a unit of any country's currency should be able to buy the same quantity of goods in all countries.
- This theory implies that the nominal exchange rate between two countries should equal the ratio of the price levels in the two countries.
- It also implies that countries with high inflation should have depreciating currencies.