EE312 Chapter 5
International Financial Markets

Panit Wattanakoon
Faculty of Economics, Thammasat University

1 Balance of Payments

Balance of Payments: records of all foreign economic transactions.

- Trade in goods and services.
- International transfers.
- Capital movements (lending, investment)

Double-entry method:

- Foreign exchange earnings - credit (+).
- Foreign exchange expenditures - debit (-)
- Official reserve transactions - the opposite entry.

1.1 Current Account

		Credit (+)	Debit (-)
	Merchandise Exports	+	
	Merchandise Imports		-
(1)	Merchandise Trade Balance	Surplus	Deficit
(2)	Service Balance	+	-
(3)	Transfer	+	-
	Current Account Balance (1)+(2)+(3)	Surplus	Deficit

1.2 Capital Account

	Credit (+)	Debit (-)
Public Borrowing/Lending	+	-
Private Borrowing/Lending	+	-
Investment/Portfolio Investment/ Direct investment	+	-
Capital Account Balance (1)+(2)+(3)	Surplus	Deficit

Balance of Payments = Current Account (CA) + Capital Account (KA)

1.3 Official reserve transactions

- Changes in official reserve assets at the central bank due to activities in the current account and the capital account.
  - Gold;
  - Special drawing rights (SDRs);
  - Foreign currencies;
  - Foreign government securities.
- Existence of sovereign funds.

2 Foreign Exchange Rate: Nominal V.S. Real

- The nominal exchange rate (e): the price of one unit of foreign currency in terms of domestic currency; rising 'e" means depreciation in local currency.

  P = the price of domestic goods in the unit of domestic currency.

  P^*= the price of foreign goods in the unit of foreign currency.

  eP^* = the price of foreign goods in the unit of domestic currency.

- The real exchange rate (rer: the terms of trade) is the price of foreign goods in terms of domestic goods:

$$\text{Real Exchange Rate } = \frac{eP^*}{P}$$

Exchange Rate Determination

- Long-run v.s. Short-run theory
- Institutional details and how a country run its exchange rate regime: Fix Exchange Rate Regime, Flexible Exchange Rate Regime and Managed Float Regime

3 Exchange Rate Determination

3.1 Long-Run Theory: The Purchasing Power Parity (PPP)

- Accounting for the long-run movement of nominal exchange rate is often referred to the theory of purchasing power parity, i.e. PPP.
- The theorem is founded upon one of the most important concepts in international trade theory so called "the law of one price"
- **Law of One Price**: an identical product should be priced the same across countries. A dollar should buy the same everywhere.
  - Holds under (i) zero transport cost and (ii) no trade barriers.
  - $P = eP^*$
  - If the condition does not hold, we are under the arbitrage condition.
    - If $eP_i^* > P_i$, domestic good-i is cheaper. Foreigners buy more domestic goods; P is rising
    - If $eP_i^* < P_i$, foreign good-i is cheaper. Domestic consumers buy more foreign goods; P is falling
  - The idea is extended to aggregate level.

$$eP^* = P$$
$$e = \frac{P}{P^*}$$

where P and P^* are domestic CPI and foreign CPI

- If domestic inflation rate exceeds the inflation rate of foreign country, domestic currency should be depreciating.
- In the long-run, productivity matters for the exchange rate movement.
  - Fast-growing productive economy (such as China) should have its national currency appreciate.
- The nominal exchange rate implied by PPP is treated as the long-run equilibrium rate.
- Deviation from PPP exchange rate.
  - Example: Goods X is an internationally-traded good.
    The US: the price of X is \$10.
    Thailand: the price of X is THB 200.
    The PPP rate: $\frac{P}{P^*} = \frac{\text{THB } 200}{\$10} = \text{THB20/\$1}$.
    But the nominal rate is THB30/\$1.
    So the Thai baht is undervalued by 33%!
- The Big Mac Index

  "Academic economists are taking burgernomics more seriously, chewing over the Big Mac index in almost a dozen studies. Now a whole book has been written about the index by Li Lian Ong, of the International Monetary Fund. She says it has been surprisingly accurate in tracking exchange rates in the long term. But there are some persistent deviations from PPP. In particular, emerging-market currencies are consistently undervalued.

  Differences in productivity are one explanation of this. Rich countries have higher productivity than poor countries, but their advantage tends to be smaller in non-tradable goods and services than in tradables. Because wages are the same in both sectors, non-tradables are cheaper in poorer countries. Therefore, if currencies are determined by the relative prices of tradables, but PPP is calculated from a basket that includes non-tradables, such as the Big Mac, the currencies of poor countries will always look undervalued."

  Source: McCurrencies, The Economist, 2003

- PPP holds in the case of traded goods with low transport cost: e.g. crude oil.
- PPP may not hold with non-traded goods (due to physical and legal barriers): e.g. services.
- In the long-term, strong market forces push foreign and domestic prices towards PPP.
  - Physical and legal barriers tend to be overcome by consumers and firms.

3.2 Short-Run Theory: Exchange Rate Market

- e is exchange rate quoted as domestic currency per unit of foreign currency.

	Demand for FX	Supply for FX
Source	Rising e 1. $rer = \frac{eP^*}{P}$ 2. $(1+r) > (1+r^*)\frac{e_{t+1}}{e_t}$	Rising e 1. $rer = \frac{eP^*}{P}$ 2. $(1+r) > (1+r^*)\frac{e_{t+1}}{e_t}$
Slope	Downward sloping in $e_{B/\$}$	Upward sloping in $e_{B/\$}$
FX Intervention		
e	- Unclear effect of changes in 'e' on the capital outflow - Higher exchange rate causes a drop in the quantity of imports at the same FX price, so the FX value of imports falls	- Effects of changes in 'e' on exports depend on the elasticity of foreign demand for exports - Effects of changes in 'e' on exports depend on the elasticity of foreign demand for exports

- Demand for FX:

  $e \uparrow$

- Supply for FX:

  $e \uparrow$

- If $|\epsilon_P^X| > 1$, then $\%\Delta Q_X$ ..... $\%\Delta P$
  $\Rightarrow$ Total value of \$ of export .....
  $\Rightarrow$ Supply of FX .....
- If $|\epsilon_P^X| < 1$, then $\%\Delta Q_X$ ..... $\%\Delta P$
  $\Rightarrow$ Total value of \$ of export .....
  $\Rightarrow$ Supply of FX .....

- Equilibrium in foreign exchange market
  - Change in Exchange Rate ⇒ Movement Along D and S curve
  - Change in the other factors determining D and S for FX ⇒ Shift in D and S curve
  - In the equilibrium, $Q^s_{FX} = Q^d_{FX}$

$$\begin{aligned} X + F_{in} &= M + F_{out} \\ (X - M) + (F_{in} - F_{out}) &= 0 \\ CA + KA &= 0 \end{aligned}$$

  - When $e = e^*$, Balance of Payments (BOP) = 0 and FX market is in the equilibrium.
  - When $e > e^*$, $CA + KA > 0$ or $BOP > 0$. Surplus BOP
  - When $e < e^*$, $CA + KA < 0$ or $BOP < 0$. Deficit BOP

3.3 Exchange Rage Regime

- Institutional details and how a country run its exchange rate regime affect the way exchange rate is actually determined.
- Three regimes:
  - Flexible Exchange Rate
  - Fixed or Pegged Exchange Rate (Exchange rate anchor)
  - Managed Float

3.3.1 Flexible Exchange Rate System

- The exchange rate can freely move because of the shift/variation in the D_{fx} and S_{fx}.
- What are the factors that cause a shift in the demand and supply of foreign exchange?

- A shift of D_{FX}
  - Change in the demand for foreign goods (imports): foreign price, domestic income
  - Change in the demand for foreign asset (outflows): relative returns, relative risks

  - At the original e_1^*, Demand for FX = Supply of FX. Balance of Payments ..... 0. FX flows in ..... FX flows out.
  - Suppose Demand for FX shifts to the right, caused by i.e. More Thai tourists travel abroad and spend more money

    Quantity demanded for FX increases for all levels of e.

    At the original e^*, there is excess demand for FX. Balance of Payments ..... 0. FX flows in ..... FX flows out.
  - There is excess demand for FX at e_1. Competition in the market will drive e to e_2.
  - As e increases,
    - Demand for dollars (DFX) ..... and
    - Supply of dollars (SFX) ..... ; hence,
    - Excess demand for FX .....
  - At new e_2^*, D_{FX} ..... S_{FX}. Balance of Payments ..... 0. FX flows in ..... FX flows out.

- A shift of S_{FX}:
  - Change in the demand for domestic goods (exports): domestic price, ROTW income
  - Change in the demand for domestic assets (inflows): relative return, relative risks

- Examples:
  - Thailand imports more US products
  - Foreigners invest more in Thai stock market
  - Domestic price of export goods (such as rice) decreases and Thailand rice export increase (export more rice).
  - Foreign price of import goods (such as machine) decreases and Thailand value of machine import increase (import more machines).
  - Changes in overall price level
    - Case of equal inflation in both countries
    - Case of inflation in only one country
    - Case of inflation at unequal rates
  - Interest rate in Thailand increases so that it is more than interest rates in other ASEAN countries
  - Interest rate in Thailand decreases so that it is more than interest rates in other ASEAN countries

3.3.2 Fixed Exchange Rate System

- Authority makes an announcement in advance for a targeted level of exchange rate, which is called the "official exchange rate", $\bar{e}$.
- The rate can be different from the rate the would arise under the flexible exchange rate regime, i.e. shadow rate.
- To make a public commitment, the authority (central bank) must be standing ready to intervene/support the market so that the targeted rate can be attained.
- Three possible scenarios could happen

1. Equilibrium exchange is equal to the official exchange rate.

   If equilibrium exchange rate is equal to the official exchange rate, everything is fine. The central bank needs not to do anything to intervene the foreign exchange market.

2. Equilibrium exchange rate is more than the official exchange rate.
   - At $\bar{e}$
     * there is excess ..... FX.
     * Balance of Payments ..... 0.
     * FX flows in ..... FX flows out.
     * Domestic currency is overvalued

   - The official exchange rate ($\bar{e}$) is below e^*.
   - Hence, the Central Bank need to ..... FX $\Rightarrow$ Loss of foreign exchange reserve.
   - ..... of Dollars increases. ..... shifts to the right.
   - Exchange rate ..... to $\bar{e}$.

3. Equilibrium exchange rate is less than the official exchange rate.
   - At $\bar{e}$
     * there is excess ..... FX.
     * Balance of Payments ..... 0.
     * FX flows in ..... FX flows out.
     * Domestic currency is undervalued

   - The official exchange rate ($\bar{e}$) is above e^*.
   - Hence, the Central Bank need to ..... FX $\Rightarrow$ Accumulation of foreign exchange reserve.
   - ..... of Dollars increases. ..... shifts to the right.
   - Exchange rate ..... to $\bar{e}$.

Example: Suppose that the economy is at the equilibrium where equilibrium exchange rate (e^*) is equal to the official exchange rate ($\bar{e}$). $e = e^* = \bar{e}$. Initially, the Balance of Payments is equal to zero. Then "Thailand's most popular resorts, Pattaya and Phuket, have been particularly suffering from the discernible drop in Chinese visitors." How does this affect exchange rate market and Thailand?s Balance of Payments position? How does the central bank intervene the exchange rate market? Make the analysis under fixed exchange rate regime.

- Initially, $e = e^* = \bar{e}$. CA+KA=0. Balance of Payments = 0
- After the situation happens,
  - Supply of dollars ....., shifts to the .....
  - Equilibrium exchange rate (e^*) is now ..... the official exchange rate.
  - Hence, the Central Bank need to ..... FX.
  - ..... of foreign exchange reserve.
  - ..... for Dollars increases, ... shifts to the right.
  - Exchange rate ..... to $\bar{e}$.
  - At $\bar{e}$,
    - there is excess ..... FX.
    - Balance of Payments ..... 0.
    - FX flows in ..... FX flows out.
    - Domestic currency is ..... (compare to the market equilibrium without intervention).

- Spectrum of the fixed exchange rate system
  - Hard pegs: the value of domestic currency is fixed relative to foreign currency for the indefinite future.

    Dollarization: use foreign currency as the national medium of exchange (East Timor, Ecuador, El Salvador, Panama).

    Currency board: central bank fixes the nominal exchange rate, then buys and sells foreign-denominated assets to maintain the rate (Bosnia, Bulgaria, Denmark, Hong Kong, Lithuania)
  - Soft pegs: no permanent fixed rate.

    The nominal rate is fixed for a long time period.

    Periodic adjustment to correct imbalances: devaluation (raising e) or revaluation (reducing e).

- Advantages and disadvantages of fixed and flexible exchange rate systems:

	Fixed exchange rate	**Flexible exchange rate**
Advantage	No uncertainty in exchange rate.	Reflecting fundamental of the economy
Disadvantage	Likely to invite a financial crisis; Slow to respond to imbalances	Prone to subject to high volatility, resulting in unnecessarily high cost for hedging the exchange rate risk

3.3.3 Managed Float System

- Managed float regime is more popularized regime.
- Occasional intervention if rate changes at a very dramatic pace.
- So, what is the difference between soft pegged v.s. managed float?

- Managed Float regime: foreign currency market intervention:
  - Suppose the authority needs to stabilize the exchange rate at $\bar{e}$
  - Scenario 1: D_{FX} shifts to the right. At $\bar{e} \Rightarrow$ Excess demand (more buy than sell) $\Rightarrow$ Central bank must supply USD to clear the excess demand in USD by $Q_{\$0}Q_{\$1}$.
  - Scenario 2: S_{FX} shifts to the right. At $\bar{e} \Rightarrow$ Excess Supply (more buy than sell) $\Rightarrow$ Central bank must buy USD to clear the excess supply in USD by $Q_{\$0}Q_{\$1}$.
- With Forex intervention, domestic financial sector gets impacted. Consider a simplified balance sheet of a central bank

Asset	Liability
Government bond (Govt Bond) Gold	Currency in circulations
Foreign currency reserve (FRA) - Foreign-denominated assets - Foreign currencies - SDRs	Commercial bank reserve Capital + Net Worth

- Foreign exchange Intervention will affect the level of monetary base, and hence money supply.
- When central bank creates "demand" and "supply" for foreign currency, it buys and sells the foreign currency from commercial banks.

- The effect after the intervention on foreign exchange market

Asset	Liability
Government bond (Govt Bond) Gold	Currency in circulations
Foreign currency reserve (FRA) - Foreign-denominated assets - Foreign currencies - SDRs	Commercial bank reserve Capital + Net Worth

  - BOP surplus ⇒ Buying $ (under ES in $) ⇒ Rising in FRA ⇒ MB rises, and hence money supply
  - BOP deficit ⇒ Selling $ (under ED in $) ⇒ Depletion in FRA ⇒ MB falls, and hence money supply

- The unintended consequence after the intervention on the liquidity in the financial system so Central bank might pursue some domestic policy actions to counteract the unintended outcome of the forex intervention, so called "sterilized forex intervention"

- Intervene forex market, with a simultaneous central bank's OMO to keep the monetary base fixed.

Asset	Liability
Government bond (Govt Bond) Gold	Currency in circulations
Foreign currency reserve (FRA) - Foreign-denominated assets - Foreign currencies - SDRs	Commercial bank reserve Capital + Net Worth

  - BOP surplus ⇒ Buying $ (under ES in $) ⇒ Rising in FRA ⇒ MB rises, and hence money supply but OMO sale to offset the rise in money supply
  - BOP deficit ⇒ Selling $ (under ED in $) ⇒ Depletion in FRA ⇒ MB falls, and hence money supply but OMO purchase to offset the fall in money supply