

CHAPTER 15 – EXCHANGE RATES AND EXCHANGE RATE SYSTEMS

Key Concepts and Topics

- Introduction: Fixed, Flexible, or In-Between?
- Exchange Rates and Currency Trading
- The Supply and Demand for Foreign Exchange
- The Real Exchange Rate
- Alternatives to Flexible Exchange Rates
- Fixed Exchange Rate Systems
- Choosing the Right Exchange Rate System
- Single Currency Areas
- Appendix: The Interest Rate Parity Condition

Introduction: Fixed, Flexible, or In-Between?

- Every country must choose an exchange rate system to determine how prices in the home country currency are converted into prices in another country's currency
- Countries have numerous choices among exchange rate systems on a continuum from fixed to completely flexible systems
- Each exchange rate system requires that governments and central banks have credible policies to respond differently to the pressures of the world economy

Exchange Rates and Currency Trading

- Exchange rate
 - The price of a currency stated in terms of a second currency
 - Euro per Canadian dollar = 0.6899 Euros
 - Canadian dollar per Euro = 1.4495 dollars
- Appreciation of a currency
 - The currency is becoming more valuable in relation to another currency
 - Euro per Canadian dollar = 0.6942
- Depreciation of a currency
 - The currency is becoming less valuable in relation to another currency

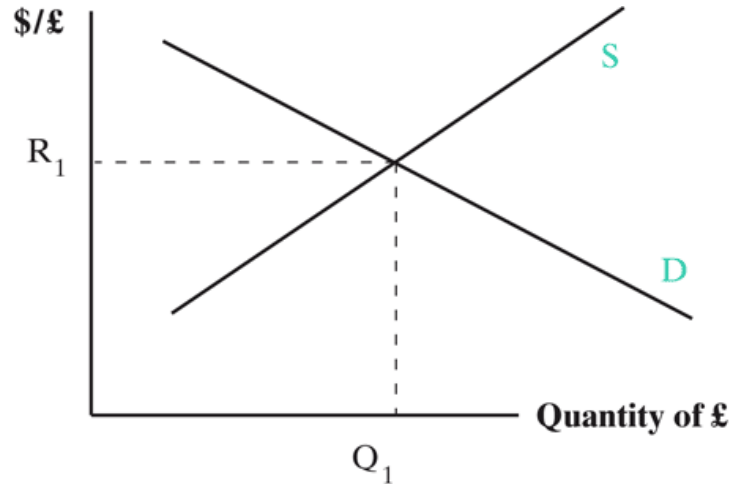
- Canadian dollar per Euro = 1.4405 dollars
- Flexible exchange rate
 - The price of the currency is determined by supply and demand for the country's currency
 - Canadian dollar, U.S. dollar, Euro, Japanese yen, British pound
- Reasons for holding foreign currencies
 1. Trade and investment
 - Traders (importers and exporters) and investors routinely transact in foreign currencies
 2. Interest rate arbitrage
 - Taking advantage of interest rate differentials between countries
 - Arbitrageurs borrow money where interest rates are low and sell it where interest rates are high
 3. Speculation
 - Buying and selling of currency in anticipation of changes in the currency's exchange rate
 - Speculators sell overvalued currencies and buy undervalued currencies
- Institutions
 - Four main participants in foreign currency markets
 - Retail customers: firms and individuals hold foreign currency to engage in purchases, to adjust their portfolios, to profit from expected future currency movements
 - Commercial banks: hold inventories of foreign currencies as part of the services to customers; trade with foreign banks to adjust their holdings
 - Foreign exchange brokers: middlemen between buyers and sellers of foreign currency
 - Central banks: a country's bank of banks
 - Currency trades usually take the form of credits and debits to the bank accounts of seller and buyer
- Exchange rate risk
 - The risk stems from the fact that currencies are constantly changing in value
 - Expected future payments in a foreign currency will likely be a different domestic currency amount from when the contract was signed
 - Firms that do business in more than one country are thus subject to exchange rate risk

- Forward exchange rate
 - The price of currency that will be delivered in the future
 - Allows an exporter or importer to sign a currency contract that guarantees a set price for the foreign currency in either 30, 90, or 180 days into the future
- Forward market
 - A market in which the buying and selling of currencies for future delivery takes place
 - Important mechanism for exporters, importers, financial investors, and speculators to eliminate the exchange rate risk
- Spot market
 - Buying and selling of foreign currencies in the present (the spot prices)
- Hedging
 - Buying a forward contract to sell foreign currency at the same time that the bonds or other interest-earning asset matures
- Covered interest arbitrage
 - The use of forward market by an interest rate arbitrageur against exchange rate risk

The Supply and Demand for Foreign Exchange

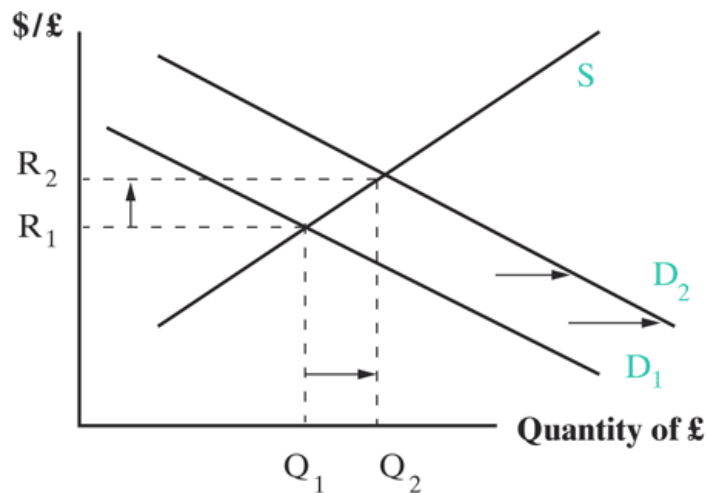
- The value of one nation's money can be analyzed by looking at its supply and demand
- Under a flexible, or floating, exchange rate system
 - An increase in the demand for the dollar will raise its price (cause an appreciation in its value)
 - An increase in its supply will lower its price (cause a depreciation)
- Under a fixed exchange rate system
 - The value of the dollar is held constant through the actions of the central bank that counteract the market forces of supply and demand
- Supply and demand with flexible exchange rates
 - The demand curve slopes downward, indicating that as the pound depreciates relative to dollar, Americans will buy more British goods as the pound becomes cheaper and the quantity of pounds demanded by Americans increases

- The supply curve slopes upward because British firms and consumers are willing to buy a greater quantity of American goods as the dollar becomes cheaper and the quantity of pounds supplied to the U.S. increases



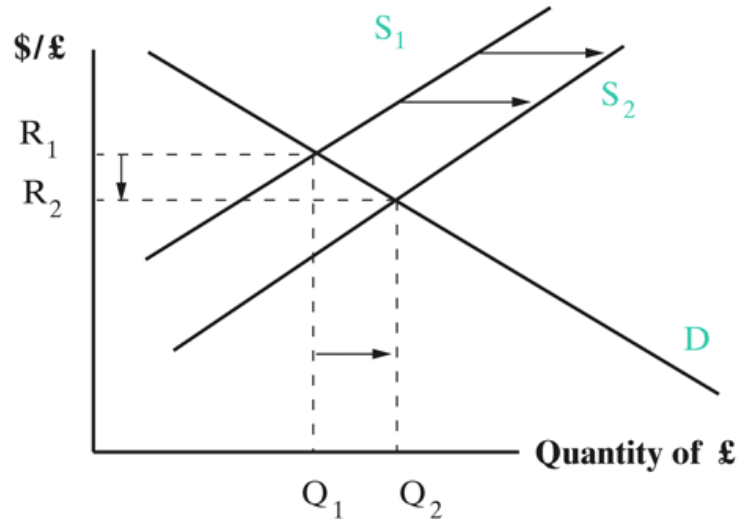
The intersection of the supply of British pounds to the U.S. market and the U.S. demand for British pounds determines the quantity of pounds available in the United States (Q_1) and their dollar price (exchange rate R_1).

- Exchange rates in the long run
 - An increase in the U.S. demand for the pound causes a rise in the exchange rate



An increase in the U.S. demand for British pounds (rightward shift of the curve) causes the dollar to depreciate.

- An increase in the supply of pounds to the U.S. market causes a decrease in the exchange rate



An increase in the supply of British pounds to the U.S. market (rightward shift of the curve) causes the dollar to appreciate.

- Purchasing power parity
 - The equilibrium value of an exchange rate is at the level that allows a given amount of money to buy the same quantity of goods abroad as it will buy at home

Cost of the Same Basket of Goods in Each Country

| | |
|---|--------------------------|
| Price in dollars | \$1,000 |
| Price in pounds | £500 |
| Long-run equilibrium exchange rate | $(\$1,000/£500) = \$2/£$ |

Purchasing power parity states that dollars will tend to exchange for pounds at a rate that maintains a constant purchasing power of a given quantity of currency.

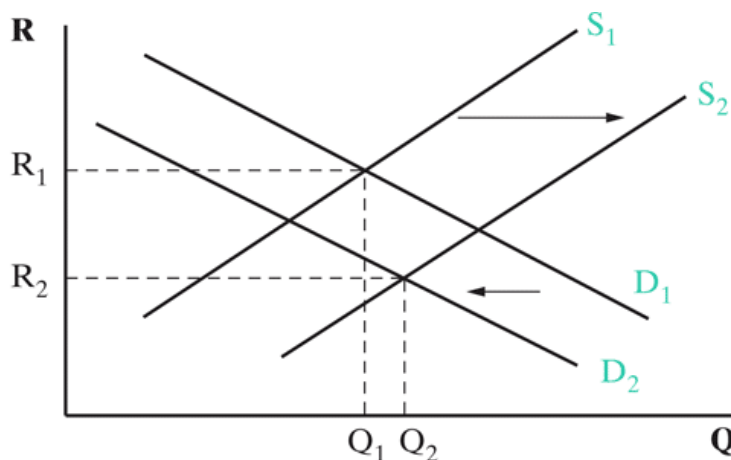
- When a currency is overvalued or undervalued, it creates profit-making opportunities for merchants that can move goods across international borders
- It exerts influence over exchange rates over the long run
- Unrealistic assumptions: no transaction costs, no trade barriers, all goods are tradable

- Exchange rates in the medium run and short run
 - Most important medium-run force is the strength of a country's economic growth
 - Rapid economic growth at home is translated into increased imports and an outward shift in the demand for foreign currency
 - Growth abroad results in an increase of exports from the home country and an increase in the supply of foreign currency
- Two variables in particular are responsible for a large share of short-run capital flows
 1. Interest rates
 2. Expectations of future exchange rates
 - Interest parity: the difference between any two countries' interest rates is approximately equal to the expected change in the exchange rate
 - If $i = i^*$, investors are indifferent
 - If $i > i^*$, investors prefer home to foreign
 - The difference between forward exchange rate and spot rate reflects the expected appreciation or depreciation of the home currency
 - If $F > R$, home currency expected to depreciate, and home interest rates must exceed foreign rates by an equivalent percentage, and vice versa
 - If $i < i^*$ and $F = R$, no changes are expected in the exchange rate, and investors should invest in foreign
 - An example: a US-based investor has a choice between a one-year CD issued by a US bank or a German bank. Assume the CDs are similar with respect to risk, transaction costs, and other characteristics
 - The U.S. investment is denominated in dollars; pays 3% (i)
 - In one year, \$1,000 invested in US will pay $\$1,000 \cdot (1 + 0.03) = \$1,030$
 - The German investment is in euros; pays 2% (i^*)
 - The return on German CD depends on the interest rate and exchange rate a year from now
 - If dollar-euro spot rate is 1.2 today and 1.3 a year from now, then \$1,000 converted to euros today and invested in Germany will pay: $(\$1,000 / 1.2) \cdot (1 + 0.02) \cdot 1.3 = \$1,105$
 - The investor earns $(1.3/R) \cdot (1 + 0.02)$ in one year
 - The German investment is better and will attract capital

- Money flowing into German CDs will push down i^* and increase the spot price of the euro (R)
- Both changes reduce earnings on the German CD until the interest parity condition is reached

$$i - i^* \approx (F - R)/R$$

- Interest rate differences are approximately equal to the expected change in the exchange rate
- The effects of an increase in home's interest rate



An increase in domestic interest rates causes a decrease in demand and an increase in supply of the foreign currency. Both effects cause an appreciation in the exchange rate from R_1 to R_2 .

- Composition of currency trades, April 2010

| Currency | Percent of Total Trades |
|-------------------|-------------------------|
| U.S. dollar | 84.9 |
| EU euro | 39.1 |
| Japanese yen | 19.0 |
| UK pound | 12.9 |
| Australian dollar | 7.6 |
| Swiss franc | 6.4 |
| Canadian dollar | 5.3 |
| Other | 25.0 |

Source: Bank for International Settlements, <http://www.bis.org>.

- Currency Trading Centers

| Location | Percent of World Currency Trading |
|----------------|-----------------------------------|
| United Kingdom | 36.7 |
| United States | 17.9 |
| Japan | 6.2 |
| Singapore | 5.3 |
| Switzerland | 5.2 |
| Hong Kong | 4.7 |
| Australia | 3.8 |
| France | 3.0 |
| Other | 17.2 |

Source: Bank for International Settlements, <http://www.bis.org>.

- Major determinants of an appreciation or depreciation

| | R Falls: An Appreciation in the Domestic Currency | R Rises: A Depreciation in the Domestic Currency |
|---|---|--|
| Long run: Purchasing Power Parity | Home goods are less expensive than foreign goods | Home goods are more expensive than foreign goods |
| Medium run: The Business Cycle | Domestic economy grows more slowly than foreign | Domestic economy grows faster than foreign |
| Short run (1): Interest Parity | Home interest rates rise, or foreign rates fall | Home interest rates fall, or foreign rates rise |
| Short run (2): Speculation | Expectations of a future appreciation | Expectations of a future depreciation |

The Real Exchange Rate

- Foreign prices ultimately determine the purchasing power of the domestic currency in terms of the foreign currency
- Real exchange rate
 - The market exchange rate (nominal exchange rate) adjusted for price differences between countries

- Real exchange rate = [(nominal exchange rate) x (foreign prices)] / (domestic prices)

$$R_r = R_n(P^*/P)$$

- Changes in the value of real exchange rates play an important role in international macroeconomic relations
 - If inflation runs higher at home, then the real value of their currency appreciates
 - Over a period of time, if uncorrected, this can lead to a build-up in the current account deficit as imports increase and exports decrease
 - The end result has been currency crises and the collapse of nominal exchange rates

Alternatives to Flexible Exchange Rates

- Fixed exchange rate system (pegged exchange rate system)
 - The norm for the first 70 years of the 20th century
 - One extreme, a few (mostly very small) countries give up their currency altogether and adopt the currency of another country
 - Second extreme, the value of a nation’s money is set equal to a fixed amount of another country’s currency, or less commonly to a basket of several currencies
 - The value of a nation’s money is defined in terms of a fixed amount of a commodity (e.g., gold) or of another currency (e.g., U.S. dollar)
- Hard peg – the exchange rate is not allowed to vary it
- Soft peg – the exchange rate is allowed to fluctuate within a set band, which can take several forms depending on the amount of variation allowed
- Types of exchange rate systems, 2007

| Currency Regime | Countries |
|------------------------|-----------|
| Hard pegs | 23 |
| Soft pegs | 82 |
| Managed floating | 48 |
| Independently floating | 35 |
| Total | 188 |

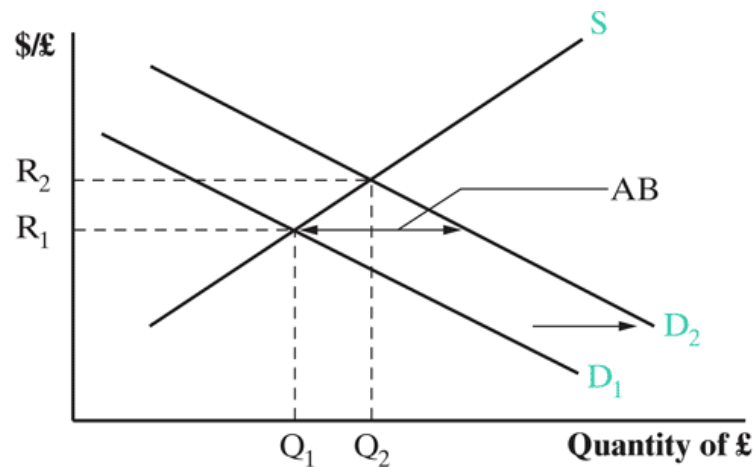
More countries have fixed exchange rates than floating.

Source: IMF, Review of Exchange Arrangements, Restrictions, and Controls, November, 2007.

- Flexible exchange rate system
 - The norm by the end of the 20th century
 - The value of the currency is allowed to float up and down with market forces

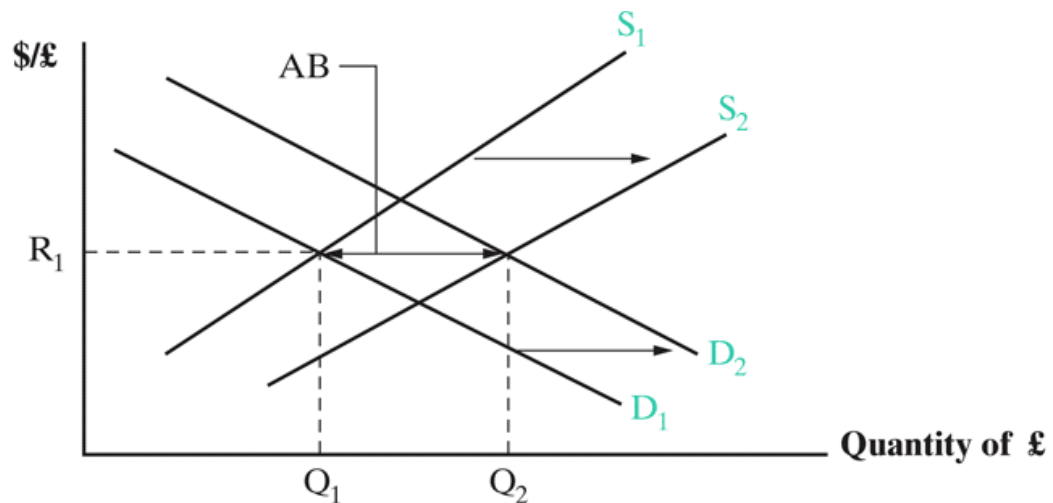
Fixed Exchange Rate Systems

- Gold standards
 - A form of fixed exchange rates (abandoned in the 1930s during the Great Depression)
 - Under a pure gold standard, nations keep gold as their international reserve
- Bretton Woods exchange rate system
 - A type of gold standard in 1947 –1971
 - U.S. dollar and British pound were fixed to each other and to gold
 - A modified Gold standard exchange rate system
 - Fixed exchange rates and changes in demand



An increase in the demand for British pounds puts pressure on the exchange rate and will cause the dollar to depreciate to R_2 unless the increase in demand is countered by an increase in supply equal to line segment AB.

- Selling reserves of pounds to counter a weakening dollar



By selling gold equal in value to AB pounds, the United States prevents a depreciation in the dollar-pound exchange rate.

- Pegged exchange rate system
 - One currency is anchored to another currency instead of gold
- Crawling peg
 - Soft pegs that are fixed but periodically adjusted
 - The idea is to offset any differences in inflation (changes in P) through regular adjustments in R_n
- Monetary unions

| Monetary Union | Members | Exchange Rate System |
|---|--|----------------------|
| European Monetary Union (EMU) | Seventeen of twenty-seven European Union countries | Flexible |
| West African Economic and Monetary Union (WAEMU) | Eight countries in sub-Saharan west Africa | Fixed to euro |
| Central African Economic and Monetary Community (CEMAC) | Six countries in west-central Africa | Fixed to euro |
| Eastern Caribbean Currency Union (ECCU) | Six island countries and two British territories | Fixed to dollar |

- Dollarization
 - The adoption of another country's currency

- The central banks have no control over monetary policy since they cannot expand or contract the money supply
- A country becomes powerless to influence its exchange rate or the quantity of money in circulation

Choosing the Right Exchange Rate System

- If the goal is to find the system that helps minimize negative shocks to an economy, then the source of the shock determines whether a more flexible or more fixed system should be adopted
 - When the shocks originate in the monetary sector, a fixed rate is better since it imposes discipline on the central bank
 - If the shocks to an economy originate in the external environment, then relatively more flexibility in the exchange rate enables the country to adapt to the changes more easily
- The most important criterion for choosing an exchange rate system is that it must have credibility in currency and financial markets

Single Currency Areas

- In 1999, 11 European Union (EU) members adopted a common currency, the euro, which began circulating in 2002
- As of 2011, 17 of 27 EU members use the euro
- Four reasons for countries to adopt common currency
 - Reduces currency conversions and transaction costs
 - Eliminates price fluctuations
 - Help increase political trust between countries
 - Provides exchange rate greater credibility
- Conditions for adopting a single currency
 - Optimal currency area
 - Robert Mundell's criteria to determine whether two or more countries would be better off by sharing a currency
 - For common currency to be viable, countries must share
 1. Synchronized business cycles
 2. A high degree of labour and capital mobility

3. Regional policies to deal with economic imbalances
4. An integration effort that goes beyond mere free trade