

## Lecture 23: Exchange Rates

### I. OVERVIEW

- Earlier on in this class, we discussed how money serves as a medium of exchange that simplifies transactions between millions of people interacting in a marketplace. However, transactions between people who live in different countries is more complicated because of the existence of different mediums of exchange.
- Transactions that occur across countries typically require a corresponding exchange of one currency for another. An exchange rate describes the price of one currency in terms of another.
- This lecture presents some basic definitions of exchange rates and also describes basic features of the foreign exchange market.

### II. EXCHANGE RATE BASICS

- The exchange rate between two countries is the relative price of the two countries' currency. In this class we will define the exchange rate between 2 countries in terms of domestic currency units per unit of foreign currency.
- So the U.S Dollar/Japanese Yen exchange rate is given as 0.00833 \$ per Yen instead of as 120 Yen per \$, which is what you often see reported in the newspaper.
- Nonetheless, \$/foreign currency is the right way to think about exchange rates since we price goods that way as well, i.e. we think of dollars per cabbage rather than cabbages per dollar.
- We use the symbol “E” to denote the exchange rate. We can multiply the foreign currency price of a good by the exchange rate to convert it to domestic currency terms. Conversely, we can divide the domestic currency price of a good by the exchange rate to convert it to foreign currency terms.
- For example: if a BMW costs 70,000 Deutsche Marks and the exchange rate between Germany and the U.S. was 0.50 \$/DM then the dollar price of the BMW is  $70,000 \text{ DM} * 0.5 \text{ \$/DM} = \$35,000$ . Similarly, if a Dell computer costs \$2500 then its price in Deutsche Marks would be  $\$2500 / (0.5 \text{ \$/DM}) = 5000 \text{ DM}$ .
- An increase in E is called a **depreciation** of the domestic currency, i.e. the \$ has decreased in value (more dollars are needed to buy one unit of foreign currency).
- A decrease in E is an **appreciation** of the domestic currency, i.e. the \$ has increased in value (fewer dollars are needed to buy one unit of foreign currency.)

### III. EXCHANGE RATE DETERMINATION

- In many countries, the value of the currency is determined by the demand and supply of currency in the foreign exchange market. An increase in the demand for currency causes the currency to increase in value, i.e. cause it to appreciate. A decrease in the demand for currency causes the currency to decrease in value, i.e. cause it to depreciate.

- What are some of the main reasons that people buy and sell currency on the foreign exchange market?

1. Trade in Goods and Services:

When someone in the U.S. buys a car from Japan or buys a Turkish carpet that person has to exchange dollars for yen or Turkish lira.

2. Financial Transactions

People buy bonds from foreign governments and companies and they also buy shares in foreign stock markets. So if you want to invest in the Brazilian stock market, or buy Japanese bonds, then you have to exchange your dollars for Brazilian real or Japanese yen.

- One theory of exchange rate determination that has been advanced is the idea of Purchasing Power Parity (PPP), which focuses on the demand for foreign exchange that comes from the trade side.
- The theory of PPP says that the ability to buy goods where they are cheap and sell where they are expensive will equalize the relative price of goods across countries. For example, if the dollar price of foreign goods (is significantly greater than the dollar price of U.S. goods then the exchange rate adjusts to equalize prices.
- This adjustment occurs because people in other countries prefer to buy goods where they are cheap (in the U.S.) and therefore raise the demand for U.S. dollars causing the dollar to appreciate in value. The appreciation of the dollar helps make foreign goods seem cheaper and makes U.S. goods seem more expensive thus reducing the excess demand for U.S. goods.

- PPP may not always hold because of

1. Transportation costs, tariffs and other trade barriers prevent people from buying and selling goods across national borders costlessly.

2. Many goods are not tradable. For example, certain types of services can't be easily exported or imported. E.g. a haircut in Bombay may be considerably cheaper than a haircut in Brookline but there is no easy way to transport that service.

3. It takes time for people to notice differences in goods prices and act to import cheap foreign goods. So trade can affect exchange rate mostly in the long run.

- In the short run, we assume that the exchange rate is determined by the flow of money from one country to another. Since movements in money involve little transportation costs and transactions can be conducted with great speed, it is more natural to assume that the demand for foreign currency that comes from investors seeking the best foreign investment opportunities determines the exchange rate in the short run.
- So an increase in U.S. stock markets, or an increase in U.S. interest rates relative to the foreign interest rate will bring an increase in demand for \$ today as foreigners seek to buy U.S. assets. The increased demand increases the price of the \$, i.e. leads to an appreciation of the dollar.
- Conversely a decrease in the stock market or a domestic interest rate relative to the foreign interest rate will bring a decrease in demand for \$ today as people seek to buy foreign instead of U.S. assets. The decreased demand decreases the price of the \$, i.e. leads to a depreciation of the dollar.

#### IV. THE IMPACT OF EXCHANGE RATE CHANGES ON TRADE

- Basically, changes in the exchange rate change the relative price of goods in two countries.
- Appreciation of the exchange rate causes the relative price of foreign goods to fall. Think intuitively about what would happen to your decision to travel abroad or to buy foreign goods when your own currency becomes stronger. If you are wandering the bazaars of Turkey looking at carpets, or wandering down Red Square checking out mink coats and caviar, foreign goods will seem cheaper to you when the dollar has appreciated. Each dollar buys more units of foreign currency than it used to.
- Conversely, depreciation of the exchange rate can cause the relative price of foreign goods to rise. Think about what would happen to your decision to travel abroad or to buy foreign goods when your own currency becomes weaker. Suddenly the price of the Kenyan safari, the sailboat cruise out of Vancouver island, the week at Club Med in Bali seems very expensive to you because the dollar has depreciated. Each dollar buys fewer units of foreign currency than it used to.

#### **S-I=NX Revisited**

- This helps explain why trade deficits are related to the relationship between savings and investment. When  $I > S$  there is an inflow of investment money from abroad. The inflow of money causes the currency to appreciate and brings about an increase in imports. So NX goes down.
- Conversely, when  $I < S$ , domestic savings is being moved to the rest of the world and as a result the \$ will depreciate. This makes foreign goods more expensive relative to domestic goods and therefore the country will export more: therefore NX rises.